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

CHIKKABAGNALU (4D4A1Z1f) MICROWATERSHED

Koppal 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. Thechallenges 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 for Chikkabagnalu microwatershed in Koppal 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:06-11-2019

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

The land resource inventory of Chikkabagnalu 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 these 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 680 ha in Koppal taluk and district, Karnataka. The climate is semiarid and categorized as drought - prone with an average annual rainfall of 662 mm, of which about 424 mm is received during south–west monsoon, 161 mm during north-east and the remaining 77 mm during the rest of the year.

An area of 82 per cent is covered by soils, 6 per cent area is covered by mining/industrial, 1 per cent area is covered by rock lands and 11 per cent is covered by habitation and settlements. The salient findings from the land resource inventory are summarized briefly below.

- *The soils belong to 11 soil series and 29 soil phases (management units) and 5 Land Management Units.*
- *The length of crop growing period is <90 days and starts from 2nd week of August to 2nd week of November.*
- *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 31 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- *An area of about 82 per cent is suitable for agriculture.*
- *An area of about 9 per cent of the soils are shallow to moderately shallow (25-75 cm), 72 per cent of the soils are moderately deep to deep (75-150 cm) and <1 per cent soils are very deep (100->150 cm).*
- *An area of about 73 per cent area in the microwatershed has loamy soils and 9 per cent clayey soils at the surface.*
- *An area of about 33 per cent area has non-gravelly (<15% gravel) soils and 48 per cent has gravelly to very gravelly (15-60% gravel) soils.*

- *An area of about 70 per cent area is very low to low (<50-100 mm/m) and 12 per cent area is medium to high (101-200 mm/m) in available water capacity.*
- *An area of about 12 per cent area of the microwatershed has nearly level (0-1% slope) lands and 70 per cent area of the microwatershed has very gently sloping (1-3% slope) lands.*
- *An area of about 54 per cent area is moderately (e2) eroded and about 28 per cent area is slightly (e1) eroded.*
- *An area of about 1 per cent soils are slightly acid (pH 6.0-6.5), 42 per cent soils are neutral (pH 6.5-7.3) and 38 per cent soil are slightly alkaline to strongly alkaline (pH 7.3-9.0) in soil reaction.*
- *The Electrical Conductivity (EC) of the soils in the entire cultivated area of the microwatershed is <2 dsm^{-1} indicating that the soils are non-saline.*
- *Organic carbon is high (>0.75%) in 76 per cent area and medium (0.5-0.75%) in 6 per cent area of the microwatershed.*
- *Entire cultivated area of the microwatershed is high (>57 kg/ha) in available phosphorus.*
- *Entire cultivated area of the microwatershed is medium (145-337 kg/ha) in available potassium.*
- *Available sulphur is high (>20 ppm) in 1 per cent area, medium (10 -20 ppm) in 31 per cent area and low (<10 ppm) in 50 per cent area of the microwatershed.*
- *An area of about 49 per cent is low (<0.5ppm) and 33 per cent is medium (0.5-1.0 ppm) in available boron content.*
- *An area of about 68 per cent is sufficient (>4.5 ppm) and 13 per cent is deficient (<4.5 ppm) in available iron content.*
- *Entire cultivated area of the microwatershed is sufficient (>1.0 ppm) in available manganese content.*
- *Entire cultivated area of the microwatershed is sufficient (>0.2 ppm) in available copper content.*
- *An area of about 16 per cent is deficient (<0.6 ppm) and 66 per cent is sufficient (>0.6 ppm) in available zinc content.*
- *The land suitability for 31 major 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	*90(13)*	*275(40)*		*Sapota*	*84(12)*	*317(47)*
Maize	*75(11)*	*291(43)*		*Pomegranate*	*84(12)*	*317(47)*
Bajra	*286(42)*	*171(25)*		*Guava*	*1(<1)*	*400(59)*
Groundnut	*131(19)*	*419(62)*		*Jackfruit*	*84(12)*	*317(47)*
Sunflower	*66(10)*	*243(36)*		*Jamun*	*37(5)*	*301(44)*
Cotton	*66(10)*	*275(40)*		*Musambi*	*84(12)*	*293(43)*
Red gram	*66(10)*	*219(32)*		*Lime*	*84(12)*	*293(43)*
Bengalgram	-	*318(47)*		*Cashew*	*40(6)*	*361(53)*
Chilli	*120(18)*	*246(36)*		*Custard apple*	*286(42)*	*264(39)*
Tomato	*120(18)*	*246(36)*		*Amla*	*286(42)*	*264(39)*
Brinjal	*243(36)*	*197(29)*		*Tamarind*	*37(5)*	*82(12)*
Onion	*154(23)*	*287(42)*		*Marigold*	*65(10)*	*301(44))*
Bhendi	*154(23)*	*287(42)*		*Chrysanthemum*	*65(10)*	*301(44))*
Drumstick	*84(12)*	*318(47)*		*Jasmine*	*65(10)*	*301(44))*
Mulberry	*84(12)*	*410(60)*		*Crossandra*	*65(10)*	*277(41)*
Mango	*37(5)*	*47(7)*				

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the 5 identified 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 treatment plan has 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. That would help in supplementing the farm income, provide fodder and fuel, and generate lot of biomass which in turn would help in maintaining the ecological balance and contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

Soil is a finite natural resource that is central to sustainable agriculture and food security. Over the years, this precious resource is faced with the problems of erosion, salinity, alkalinity, degradation, depletion of nutrients and even decline in availability of land for agriculture. It is a known fact, that it takes thousands of years to form a few centimetres of soil, thus, soil is a precious gift of nature. 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. However, the capacity of a soil to produce is limited and the limits to the production are set by its intrinsic characteristics, agro-climatic setting, and use and management. There is, therefore, tremendous pressure on land and water resources, which is causing decline in soil-health and stagnation in productivity. As much as 121 m ha of land is reportedly degraded which leads to impaired soil quality. It is imperative that steps are urgently taken to check and reverse land degradation without any further loss of time. The improvements in productivity will have to come from sustainable intensification measures that make the most effective use of land and water resources. 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.

Added to this, every year there is a significant diversion of farm lands and water resources for non-agricultural purposes. Thus, developing strategies to slow down the degradation process or reclaim the soils to normal condition and ensure sustainability of production system are the major issues today. This demands a systematic appraisal of our soil and land resources with respect to their extent, geographic distribution, characteristics, behaviour and uses potential, which is very important for developing an effective land use and cropping systems for augmenting agricultural production on a sustainable basis. The soil and land resource inventories made so far in Karnataka had limited utility because the surveys were of different types, scales and intensities carried out at different times with specific objectives. Hence, there is an urgent need to generate

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 all the parameters which are critical for productivity *viz.,* soils, site characteristics like slope, erosion, gravelliness and stoniness, climate, water, 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 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 was 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 Chikkabagnalu microwatershed in Koppal Taluk and 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 scales under 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 Chikkabagnalu Microwatershed is located in the central part of northern Karnataka in Koppal Taluk, Koppal District, Karnataka State (Fig.2.1). It comprises parts of Chikkabaganala, Hirebaganala, Karkihalli, Kunakeri & Lachanakeri villages. It lies between $15^0$14' – $15^0$17' North latitudes and $76^0$14'– $76^0$15' East longitudes and covers an area of 680 ha. It is about 15 km from Koppal town and is surrounded by Hirebaganala village on the north, Karkihalli village on the south, Lachanakeri village on the west, Chikkabaganala village on the north, northeast and east and Kunakeri village on the northwestern side of the microwatershed.

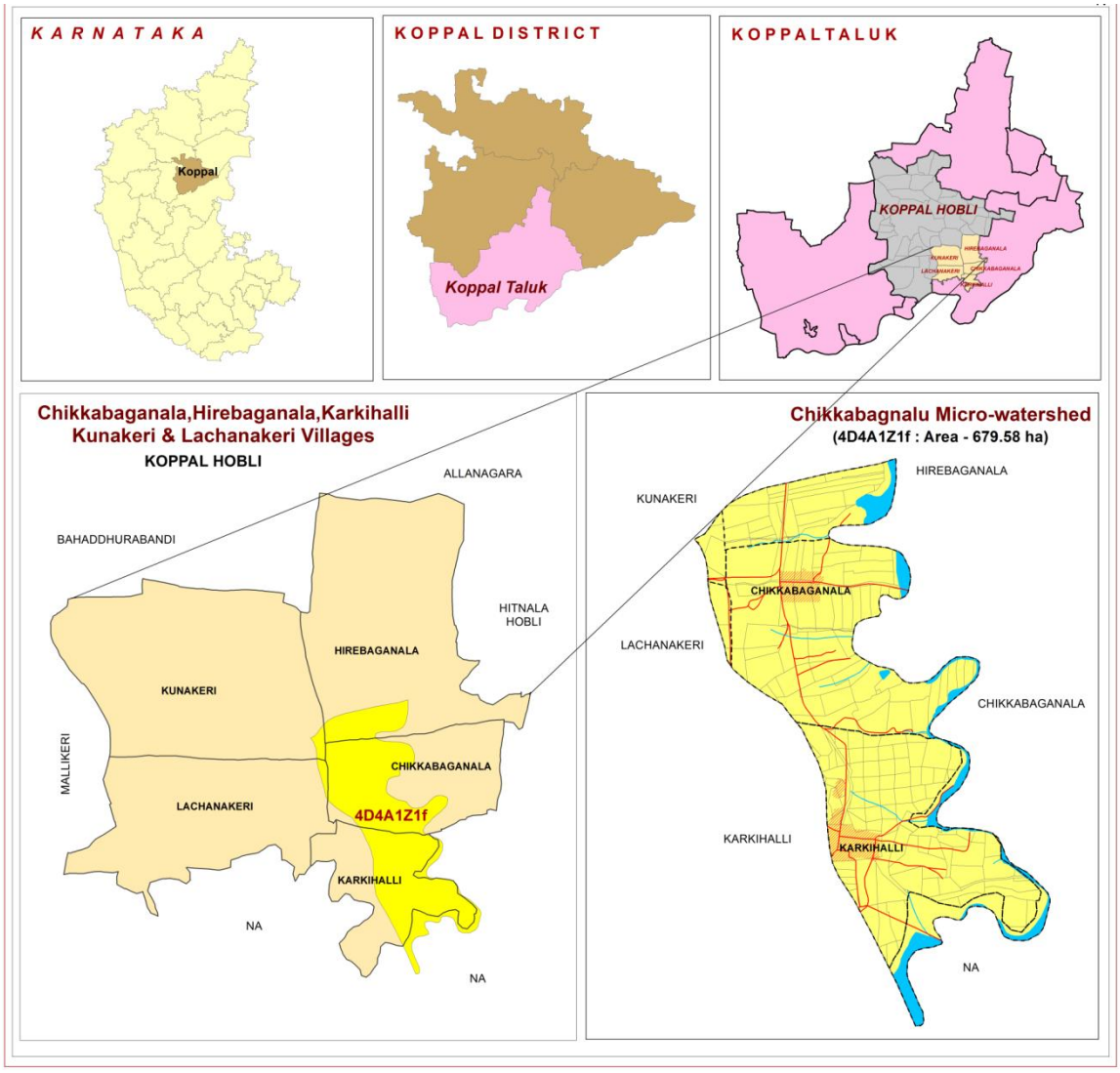


Fig.2.1 Location map of Chikkabagnalu Microwatershed

2.2 Geology

Major rock formation observed in the microwatershed is granite gneiss (Figs.2.2). 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 Bettageri village.

Fig.2.2 Granite and granite gneiss rocks

2.3 Physiography

Physiographically, the area has been identified as Granite gneiss landscape based on geology. The microwatershed area has been further divided into mounds/ridges, summits, side slopes and very gently sloping uplands and nearly level plains based on slope and its relief features. The elevation ranges from 504-519 m in the gently sloping uplands. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

The area is drained by several small seasonal streams that join Hire *halla* and Chenna *halla* along its course. Though, the streams are not perennial, during rainy season they carry large quantities of rain water. The microwatershed has only few small tanks which are not able to store the water flowing during the rainy season. Due to this, the ground water recharge is very much affected in the villages. This is reflected in the failure of many bore wells in the villages. If the available rain water is properly harnessed by constructing 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 dendritic to sub parallel.

2.5 Climate

The district falls under semiarid tract of the state and is categorized as drought - prone with total annual rainfall of 662 mm (Table 2.1) Of this, a maximum of 424 mm

precipitation takes place during south–west monsoon period from June to September, north-east monsoon contributes about 161 mm and prevails from October to early December and the remaining 77 mm received during the rest of the year. The winter season is from December to February. During April and May, the temperatures reach up to 45°C and in December and January, the temperatures will go down to 16°C. Rainfall distribution is shown in Figure 2.3. The average Potential Evapo Transpiration (PET) is 145 mm and varies from a low of 101 mm in December and 193 mm in the months of May. The PET is always higher than precipitation in all the months except in the month of September. Generally, the Length of crop Growing Period (LGP) is <90 days and starts from 2nd week of August to 2nd week of November.

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

Sl. No.	Months	Rainfall	PET	1/2 PET
1	January	1.60	116.70	58.35
2	February	1.50	129.20	64.60
3	March	14.10	169.80	84.90
4	April	18.10	180.60	90.30
5	May	41.60	193.50	96.75
6	June	85.80	167.90	83.95
7	July	72.10	156.20	78.10
8	August	110.50	152.50	76.25
9	September	155.60	138.50	69.25
10	October	116.30	122.30	61.15
11	November	36.00	106.40	53.20
12	December	9.10	101.00	50.50
TOTAL		**662.30**	**144.55**	

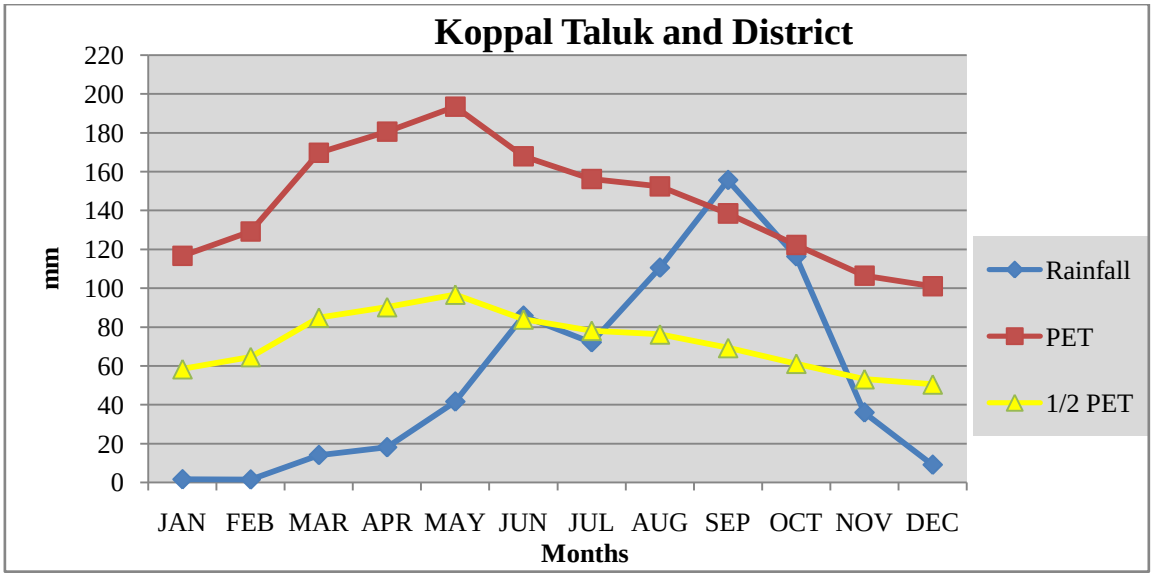


Fig. 2.3 Rainfall distribution in Koppal Taluk and District

2.6 Natural Vegetation

The natural vegetation is sparse comprising few tree species, shrubs and herbs. The mounds, ridges and boulders occupy sizeable areas which are 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 (Fig 2.4).

Apart from the continuing deforestation, the presence of large population of goats, sheep and other cattle in the microwatershed is 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 and eventually resulting in the heavy siltation of few tanks and reservoirs in the microwatershed.

Fig 2.4 Natural vegetation of Chikkabagnalu microwatershed

2.7 Land Utilization

About 91 per cent area (Table 2.2) in Koppal district is cultivated at present and about 17 per cent of the area is sown more than once. An area of about 3 per cent is currently barren. Forests occupy a small area of about 5 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, bajra, cotton, safflower, sunflower, red gram, horse gram, onion, mulberry, pomegranate, sugarcane, Bengalgram, marigold and groundnut (Fig 2.5 a & b). 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 Chikkabagnalu Microwatershed is presented in Fig.2.6. Simultaneously, enumeration of existing wells (bore wells and open wells) and other soil and water conservation structures in the microwatershed is made and their

location in different survey numbers is marked on the cadastral map. Map showing the location of wells in Chikkabagnalu Microwatershed is given Fig.2.7.

Table 2.2 Land Utilization in Koppal District

Sl. No.	Agricultural land use	Area (ha)	Per cent
1	Total geographical area	552495	
2	Total cultivated area	500542	90.6
3	Area sown more than once	92696	16.8
4	Trees and groves	210	0.04
5	Cropping intensity	-	118
6	Forest	29451	5.33
7	Cultivable wasteland	2568	0.46
8	Permanent Pasture land	14675	2.66
9	Barren land	16627	3.01
10	Non agricultural land	40591	7.35
11	Current fallow	19660	3.56

Fig.2.5 a Different crops and cropping systems in Chikkabagnalu Microwatershed

Fig.2.5 b Different crops and cropping systems in Chikkabagnalu Microwatershed

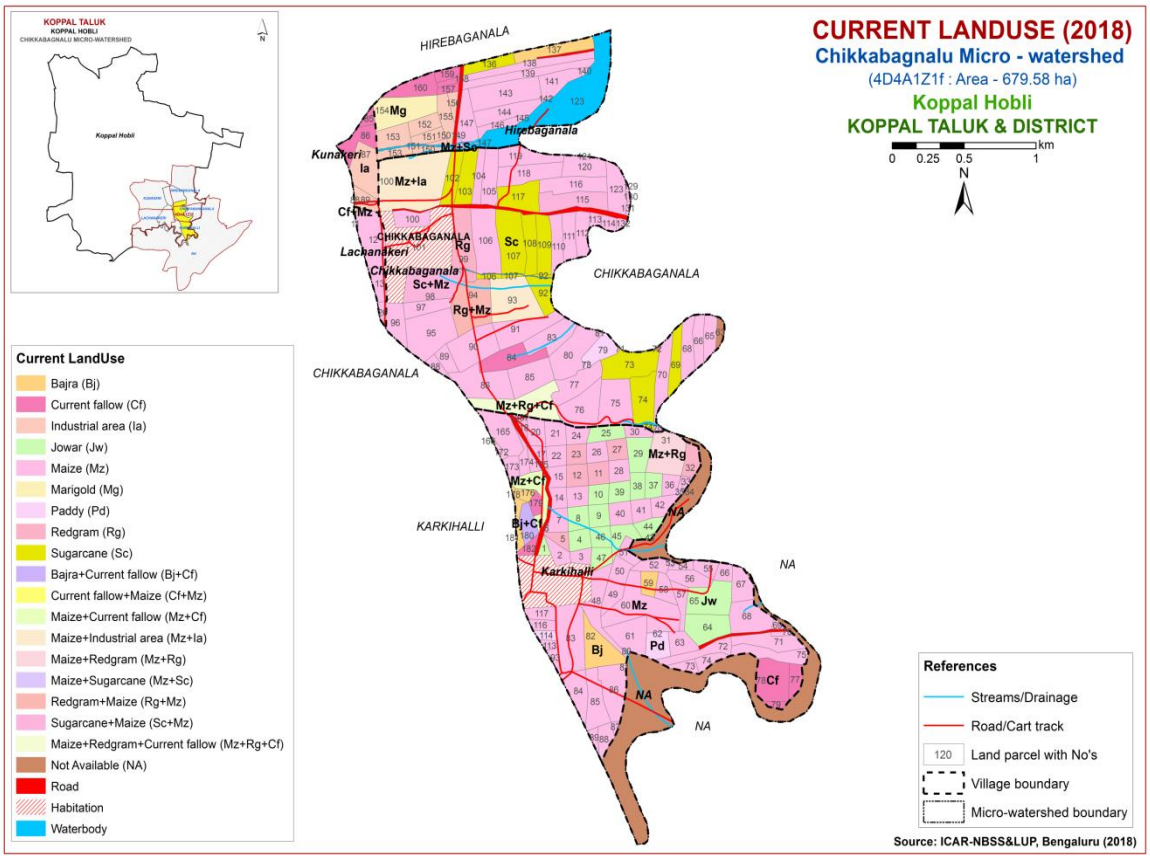


Fig.2.6 Current Land Use – Chikkabagnalu Microwatershed

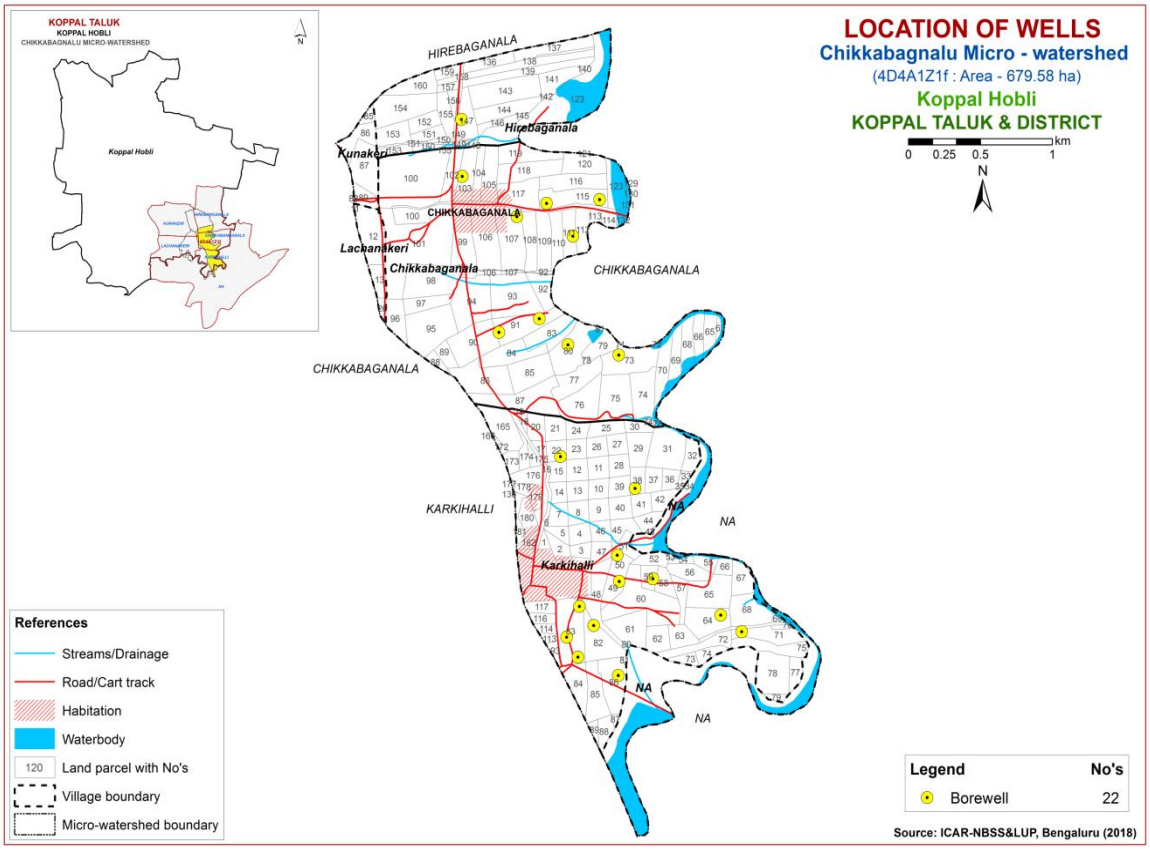


Fig.2.7 Location of wells - Chikkabagnalu Microwatershed

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 Chikkabagnalu 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, 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 their extent and geographic distribution on the microwatershed cadastral map. The detailed soil survey at 1:7920 scale was carried out in 680 ha area. 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 the 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 geology, 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 used for initial traversing, identification of geology, landscapes 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 (FCC) of Cartosat-I and LISS-IV merged satellite data covering the 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 landscape and is divided into landforms such as uplands, summits and very gently sloping based on slope. 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)

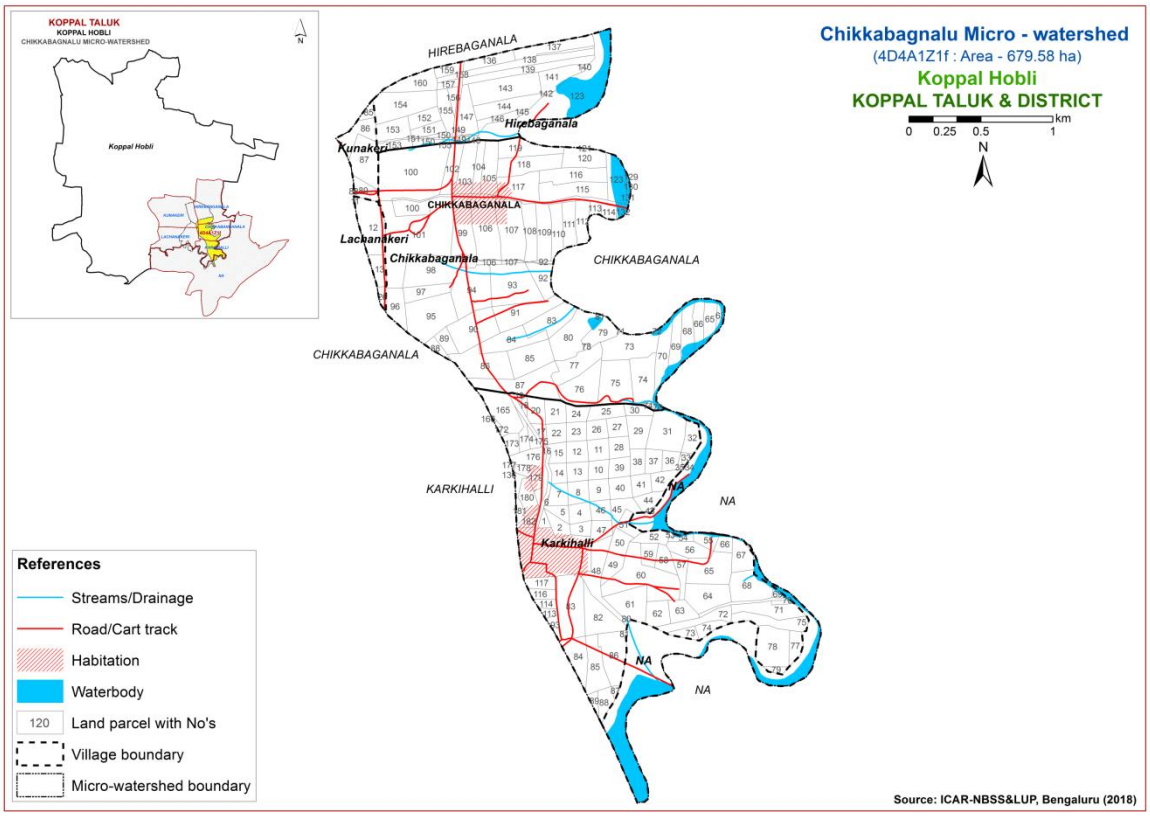


Fig 3.1 Scanned and Digitized Cadastral map of Chikkabagnalu Microwatershed

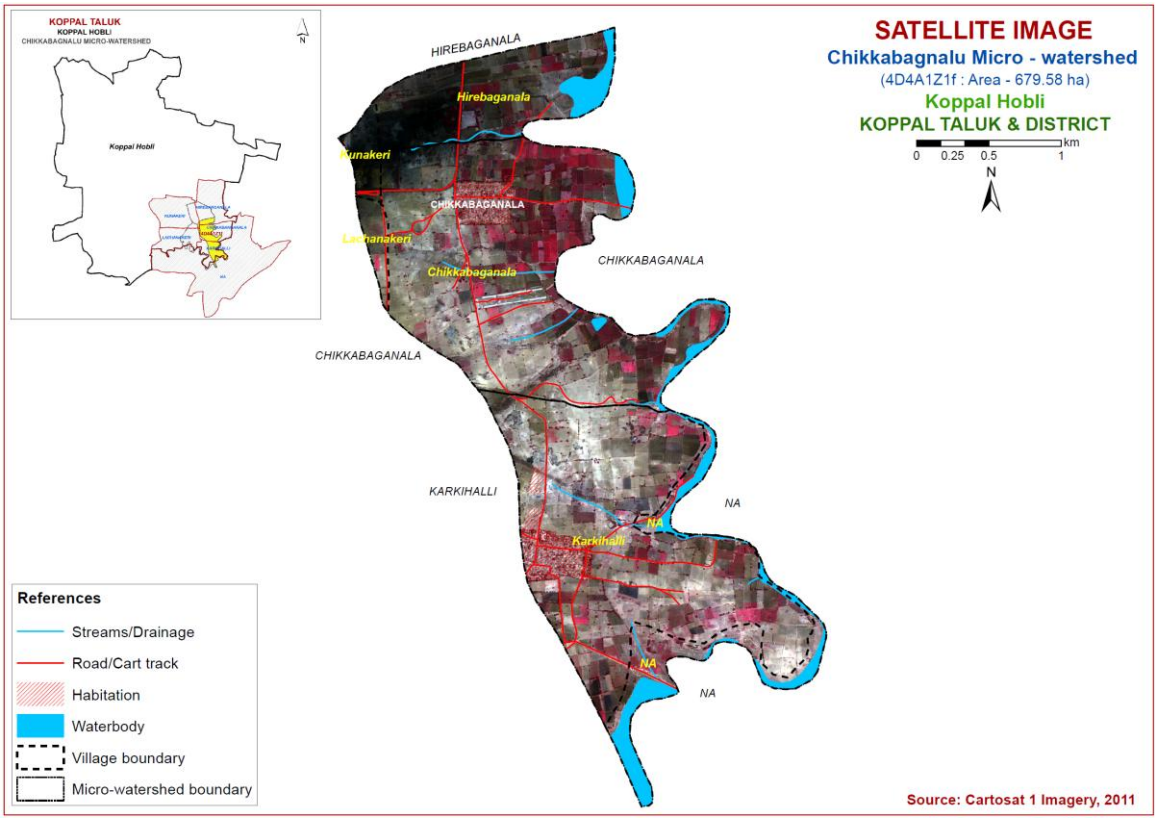


Fig.3.2 Satellite Image of Chikkabagnalu Microwatershed

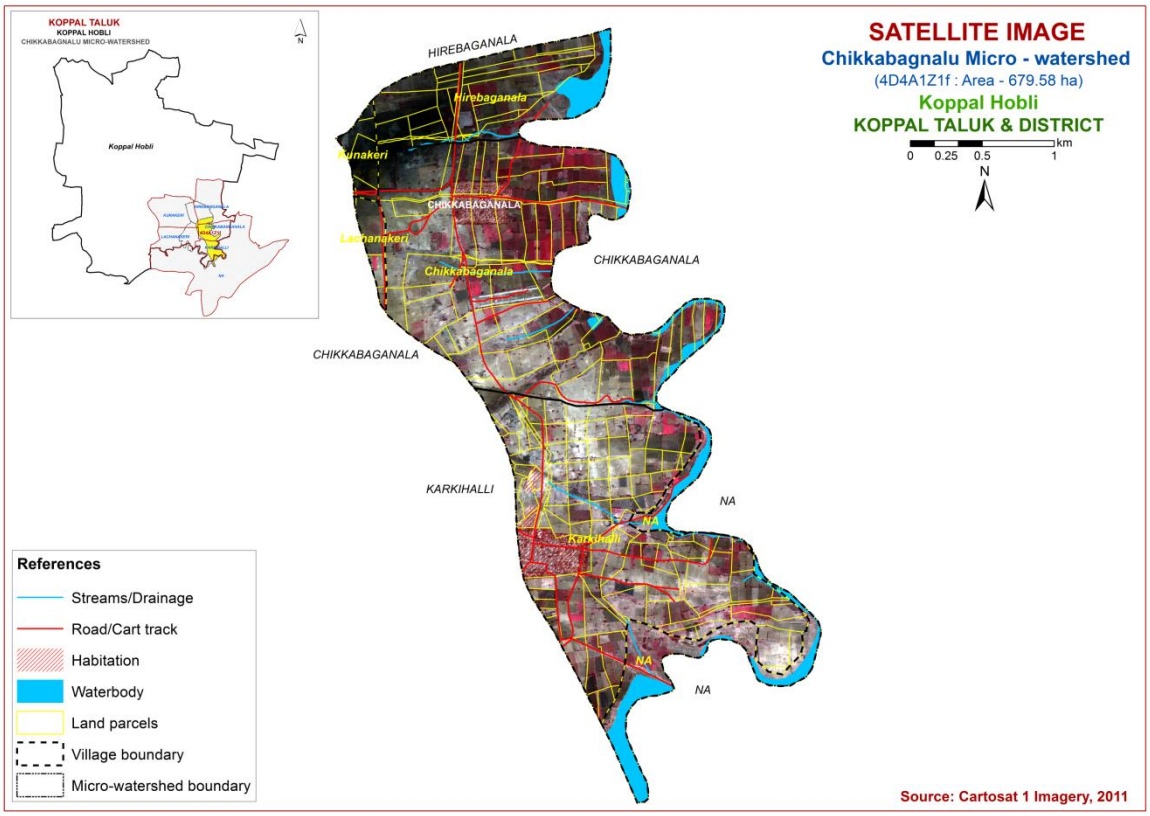


Fig.3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Chikkabagnalu Microwatershed

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 uplands and plains 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).

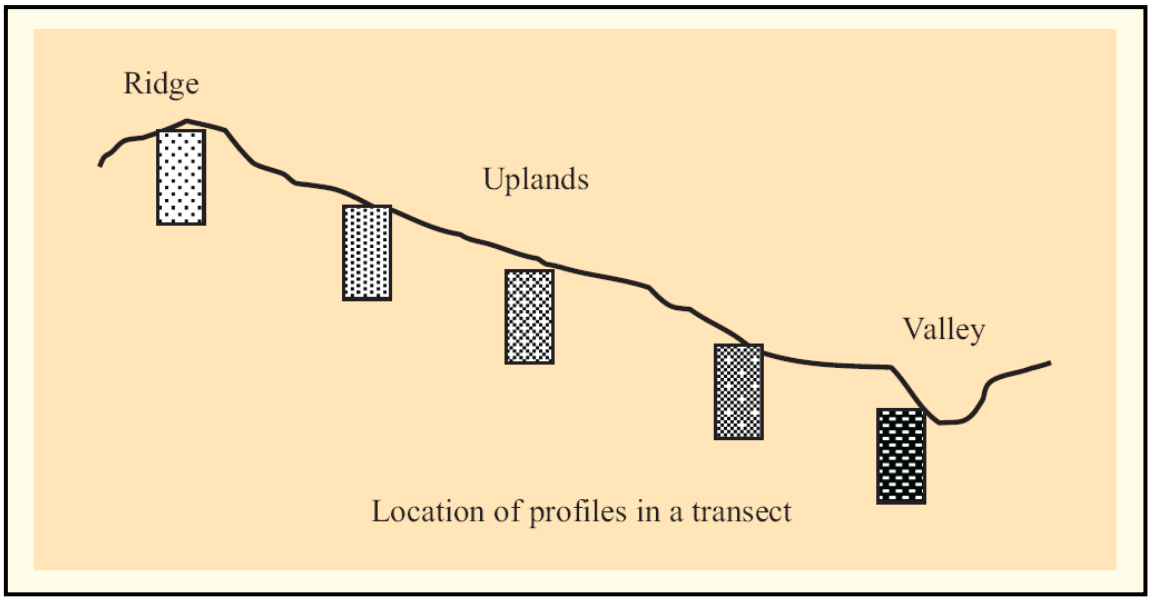


Fig: 3.4. Location of profiles in a transect

In the selected transect, soil profiles (Fig.3.4) were located 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 up to 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 to validate the soil map unit boundaries.

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, amount and nature of gravel present, calcareousness, nature of substratum etc, were used as the major differentiating characteristics for

identifying 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, 11 soil series were identified in Chikkabagnalu Microwatershed.

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	Calcareou-sness
SOILS OF GRANITE GNEISS LANDSCAPE							
1	Kanchanahalli (KNH)	25-50	2.5YR3/4,3/6	sc	<15	Ap-Bt-Cr	-
2	Mukhadahalli (MKH)	50-75	5YR3/3,3/4,4/3,5/4,6/6 2.5YR3/4	gsc	>35	Ap-Bt-Cr	-
3	Hatti (HTI)	50-75	5 YR 3/3, 3/4,	gsc	15-35	Ap-Bt-Cr	-
4	Hooradhahalli (HDH)	75-100	2.5YR2.5/4,3/4, 3/6	gsc-gc	>35	Ap-Bt-Cr	-
5	Gollarahatti (GHT)	75-100	2.5YR3/4,3/6, 4/4,4/6	gscl	15-35	Ap-Bt-Cr	-
6	Bisarahalli (BSR)	75-100	5 YR 3/3, 3/4	gsc	15-35	Ap-Bt-Cr	-
7	Chikkamegheri (CKM)	75-100	2.5YR2.5/3,3/4, 3/6	sc	<15	Ap-Bt-Cr	-
8	Jedigere (JDG)	100-150	5YR4/6,3/4, 7.5YR 3/4, 4/6	sc-c	<15	Ap-Bt-BC-Cr	-
9	Balapur (BPR)	100-150	2.5YR2.5/4,3/4	gsc-gc	>35	Ap-Bt-Cr	-
10	Giddadapalya (GDP)	100-150	2.5YR3/4, 3/6	gsc-gc	35-60	Ap-Bt-Cr	-
11	Ranatur (RTR)	>150	2.5YR2.5/3,2.5/4,3/3, 4/6	c	<15	Ap-Bt	-

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 soil 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 boundaries on the soil map. The soil map shows the geographic distribution and area extent of 29 mapping units representing 11 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 29 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 phase will have similar management needs and have to be treated accordingly.

3.5 Laboratory Characterization

Soil samples for each 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 in the year 2018 from Chikkabagnalu farmer's fields (66 samples) for fertility status (major and micronutrients) at 320 m grid interval 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 Kriging method for the microwatershed.

3.6 Land Management Units (LMUs)

The 29 soil phases identified and mapped in the microwatershed were regrouped into 5 Land 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 Chikkabagnalu 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.

Table 3.2 Soil map unit description of Chikkabagnalu Microwatershed

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
SOILS OF GRANITE GNEISS LANDSCAPE				
	KNH	Kanchanahalli soils are shallow (25-50 cm), well drained, have dark reddish brown to dark red, sandy clay soils occurring on very gently sloping uplands under cultivation		**7 (1.01)**
467		KNHiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	7 (1.01)
	MKH	Mukhadahalli soils are moderately shallow (50-75 cm), well drained, have dark brown to reddish brown, red gravelly sandy clay soils occurring on gently very gently to gently sloping uplands under cultivation		**23 (3.43)**
76		MKHcB2	Sandy loam surface, slope 1-3%, moderate erosion	2 (0.36)
77		MKHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	21 (3.07)
	HTI	Hatti soils are moderately shallow (50-75 cm), well drained, have dark reddish brown, red gravelly sandy clay soils		**33 (4.78)**

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
		occurring on nearly level to very gently sloping uplands under cultivation		
92		HTIcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	9 (1.29)
94		HTIhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	24 (3.49)
	HDH	Hooradhahalli soils are moderately deep (75-100 cm), well drained, have dark red to dark reddish brown, red gravelly sandy clay to clay soils occurring on nearly level to moderately sloping uplands under cultivation		**91.04 (13.4)**
106		HDHcA1g1	Sandy loam surface, slope 0-1%, slight erosion, gravelly (15-35%)	14 (2.06)
111		HDHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	17 (2.46)
118		HDHhA2	Sandy clay loam surface, slope 0-1%, moderate erosion	39 (5.78)
120		HDHhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	0.04 (0.01)
122		HDHhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	6 (0.91)
123		HDHhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	15 (2.18)
	GHT	Gollarahatti soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay loam soils occurring on nearly level very gently sloping uplands under cultivation		**154 (22.67)**
137		GHTcB2	Sandy loam surface, slope 1-3%, moderate erosion	5 (0.7)
138		GHTcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	63 (9.26)
139		GHThA1g2	Sandy clay loam surface, slope 0-1%, slight erosion, very gravelly (35-60%)	24 (3.56)
140		GHThB1	Sandy clay loam surface, slope 1-3%, slight erosion	46 (6.77)
142		GHThB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	16 (2.38)
	BSR	Bisarahalli soils are moderately deep (75-100 cm), well drained, have dark reddish brown, red gravelly sandy clay soils occurring on very gently sloping uplands under cultivation		**39 (5.71)**
159		BSRcB1	Sandy loam surface, slope 1-3%, slight erosion	10 (1.53)
161		BSRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	11 (1.55)
164		BSRiB1	Sandy clay surface, slope 1-3%, slight erosion	18 (2.63)

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
	CKM	Chikkamegheri soils are moderately deep (75-100 cm), well drained, have dark brown to dark reddish brown, red sandy clay soils occurring on nearly level to very gently sloping uplands under cultivation		**34 (4.88)**
172		CKMcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	19 (2.72)
175		CKMhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	15 (2.16)
	JDG	Jedigere soils are deep (100-150 cm), well drained, have dark brown to dark reddish brown, red sandy clay to clay soils occurring on nearly level to very gently sloping uplands under cultivation		**46 (6.89)**
211		JDGhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	17 (2.57)
458		JDGiB1	Sandy clay surface, slope 1-3%, slight erosion	29 (4.32)
	BPR	Balapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay to clay soils occurring on nearly level to gently sloping uplands under cultivation		**93 (13.61)**
225		BPRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	49 (7.16)
231		BPRhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	35 (5.12)
239		BPRiB2	Sandy clay surface, slope 1-3%, moderate erosion	9 (1.33)
	GDP	Giddadapalya soils are deep (100-150 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay to clay soils occurring on very gently sloping uplands under cultivation		**36.15 (5.3)**
267		GDPcB2	Sandy loam surface, slope 1-3%, moderate erosion	36 (5.28)
269		GDPiB2	Sandy clay surface, slope 1-3%, moderate erosion	0.15 (0.02)
	RTR	Ranatur soils are very deep (>150 cm), well drained, have dark reddish brown to dark red, clay soils occurring on nearly level to very gently sloping uplands under cultivation		**1 (0.15)**
286		RTRhA1	Sandy clay loam surface, slope 0-1%, slight erosion	1 (0.15)
994		Mining/ Industrial	Mining/Industrial area	**42 (6.2)**
999		Rock-outcrops	Rock lands, both massive and bouldery with little or no soil	**10 (1.4)**
1000		Others	Habitation and water body	**72 (10.58)**

*Soil map unit numbers are continuous for the taluk, not for the microwatershed

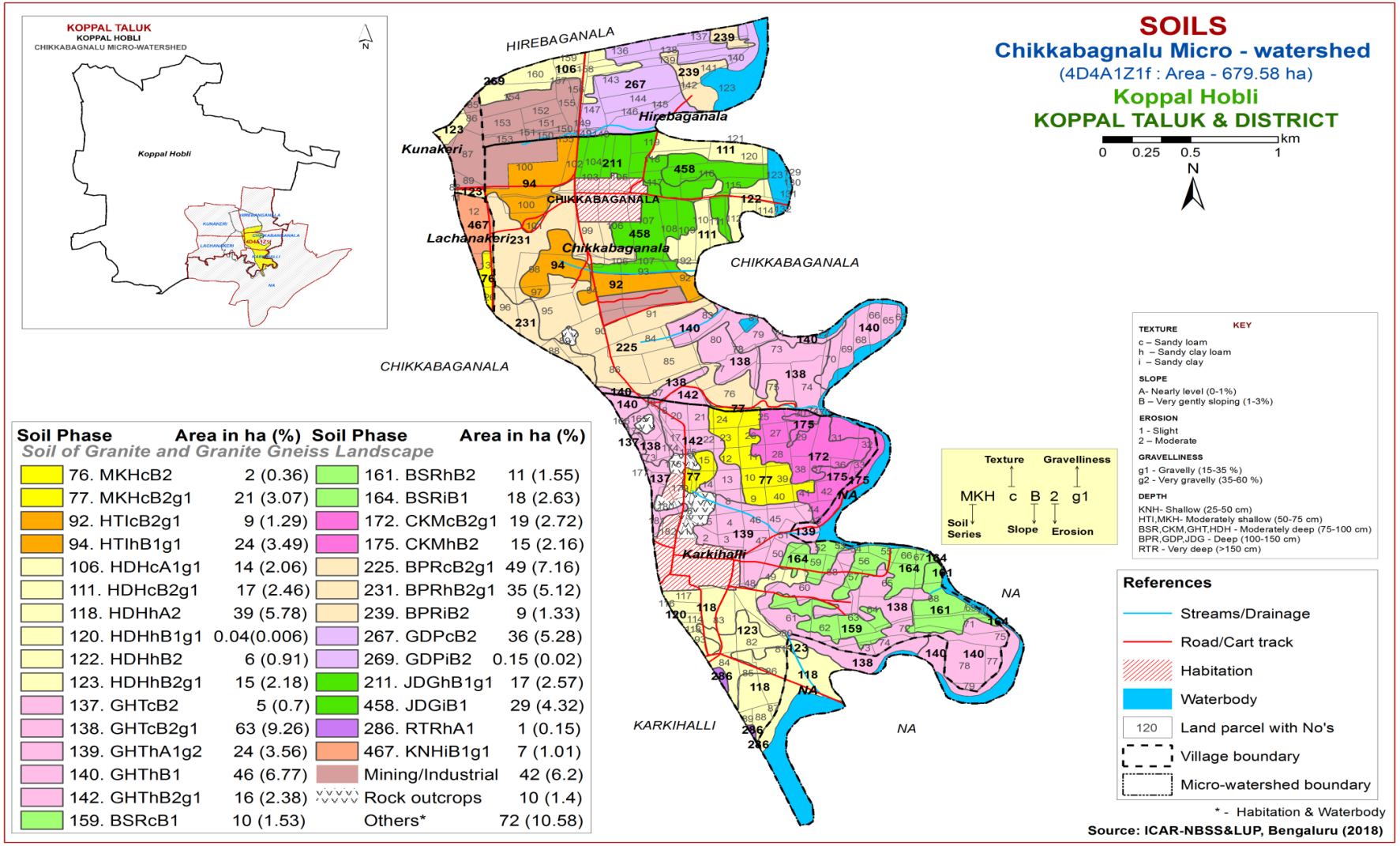


Fig 3.5 Soil Phase or Management Units- Chikkabagnalu Microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Chikkabagnalu Microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss landscape based on geology. In all, 11 soil series are identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. The soil formation is dominantly influenced by the parent material, climate, time and relief.

A brief description of each of the 11 soil series identified followed by 29 soil phases (management units) mapped (Fig. 3.5) are furnished below. The physical and chemical characteristics of soil series identified in Chikkabagnalu 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, 11 soil series are identified and mapped. Of these, Gollarahatti (GHT) series occupies major area 154 ha (23%) followed by Balapur (BPR) 93 ha (14%), Hooradhahalli (HDH) 91 ha (13%), Jedigere (JDG) 46 ha (7%), Bisarahalli (BSR) 39 ha (6%), Giddadapalya (GDP) 36 ha (5%), Chikkamegheri (CKM) 34 ha (5%), Hatti (HTI) 33 ha (5%), Mukhadahalli (MKH) 23 ha (3%), Kanchanahalli (KNH) 7 ha (%) and Ranatur (RTR) 1 ha (<1%). The brief description of each soil series along with the soil phases identified and mapped is given below.

4.1.1 Kanchanahalli (KNH) Series: Kanchanahalli soils are shallow (25 -50 cm), well drained, have dark reddish brown, sandy clay soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands. The Kanchanahalli series has been classified as a member of the clayey, mixed, isohyperthermic family of (Paralithic) Rhodustalfs.

The thickness of the solum ranges from 28 to 50 cm. The thickness of A-horizon ranges from 12 to 18 cm. Its colour is in 5YR and 2.5 YR hue with value 3 and chroma 4 to 6. The texture varies from sandy clay loam to sandy clay with 10 to 15 per cent gravel. The thickness of B horizon ranges from 16 to 38 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Its texture is sandy clay with gravel content of < 15 per cent. The available water capacity is low (50-100 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Kanchanahalli (KNH) Series

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

The thickness of the solum ranges from 51 to 72 cm. The thickness of A-horizon ranges from 12 to 17 cm. Its colour is in 5 YR and 7.5 YR hue with value 3 to 4 and chroma 2 to 4. The texture varies from loamy sand to sandy loam with 20 to 45 per cent gravel. The thickness of B horizon ranges from 40 to 68 cm. Its colour is in 2.5 YR and 5 YR hue with value and chroma 3 to 6. Texture is sandy clay loam to sandy clay with 35 to 50 per cent gravel. The available water capacity is low (<50 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Mukhadahalli (MKH) Series

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

The thickness of the solum ranges from 57 to 74 cm. The thickness of A-horizon ranges from 16 to 20 cm. Its colour is in 5 YR hue with value and chroma 3 to 4. The texture varies from sandy loam to sandy clay loam and sandy clay with 15 to 60 per cent gravel. The thickness of B horizon ranges from 45 to 56 cm. Its colour is in 5 YR hue with value 3 and chroma 3 to 4. Texture is sandy clay with 15 to 35 per cent gravel. The available water capacity is low (50-100 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Hatti (HTI) Series

4.1.4 Hooradhahalli (HDH) Series: Hooradhahalli soils are moderately deep (75-100 cm), well drained, have red to dark red and reddish brown, gravelly sandy clay to clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Hooradhahalli series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 76 to 100 cm. The thickness of A-horizon ranges from 11 to 19 cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 4 and chroma 3 to 6. The texture varies from loamy sand to sandy clay with 15 to 50 per cent gravel. The thickness of B horizon varies from 65 to 83 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 4 to 6. Texture is sandy clay to clay with 35 to 50 per cent gravel. The available water capacity is low (50-100mm/m). Six soil phases were identified and mapped.

Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

4.1.5 Gollarahatti (GHT) Series: Gollarahatti soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay loam soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Gollarahatti series has been classified as a member of the fine-loamy, mixed, isohyperthermic family of Typic Rhodustalfs.

The thickness of the solum ranges from 78 to 98 cm. The thickness of A-horizon ranges from 12 to 18cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture varies from loamy sand to sandy clay with 15 to 35 per cent gravel. The thickness of B horizon ranges from 66 to 81cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay loam with 15 to 35 per cent gravel. The available water capacity is medium (51-100 mm/m). Five soil phases were identified and mapped.

Landscape and soil profile characteristics of Gollarahatti (GHT) Series

4.1.6 Bisarahalli (BSR) Series: Bisarahalli soils are moderately deep (75-100 cm), well drained, have dark reddish brown, red gravelly sandy clay soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Bisarahalli series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Paleustalfs.

The thickness of the solum ranges from 75 to 98 cm. The thickness of A-horizon ranges from 17 to 25 cm. Its colour is in 5 YR hue with value 3 to 4 and chroma 3 to 6. The texture ranges from sandy clay loam to sandy clay with 15 to 35 per cent gravel. The thickness of B horizon ranges from 61 to 79 cm. Its colour is in 5 YR hue with value 3 and chroma 3 to 4. Its texture is gravelly sandy clay with gravel content of 15-35 per cent. The available water capacity is low (50-100 mm/m). Three soil phases were identified and mapped.

Landscape and soil profile characteristics of Bisarahalli (BSR) Series

4.1.7 Chikkamegheri (CKM) Series: Chikkamegheri soils are moderately deep (75-100 cm), well drained, have dark brown to dark reddish brown and red, sandy clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently sloping uplands. The Chikkamegheri series has been classified as a member of the fine, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 76 to 100 cm. The thickness of A-horizon ranges from 11 to 24 cm. Its colour is in 7.5 YR, 5YR and 2.5 YR hue with value 2 to 4 and chroma 3 to 6. The texture varies from sandy clay loam to sandy clay with 10 to 15 per cent gravel. The thickness of B horizon ranges from 65 to 86 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 3 to 6. Its texture is dominantly sandy clay to clay. The available water capacity is medium (100-150 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Chikkamegheri (CKM) Series

4.1.8 Jedigere (JDG) Series: Jedigere soils are deep (100-150 cm) well drained, have yellowish red to strong brown, sandy clay to clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently sloping uplands under cultivation. The Jedigere series has been classified as a member of the fine, mixed, isohyperthermic Typic Haplustalfs.

The thickness of the solum ranges from 117 to 145 cm. The thickness of A-horizon ranges from 13 to 21 cm. Its colour is in hue 5 YR and 7.5 YR with value 2 to 4 and chroma 2 to 6. Its texture is dominantly sandy clay and sand clay loam. The thickness of B horizon ranges from 104 to 124 cm. Its colour is in hue 5 YR and 7.5 YR with value 2 to 4 and chroma 3 to 6. Its texture is dominantly clay. The available water capacity is very high (>200mm/m). Two soil phases were identified and mapped.

Landscape and Soil Profile Characteristics of Jedigere (JDG) Series

4.1.9 Balapur (BPR) Series: Balapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay to clay soils. These soils are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Balapur series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Typic Rhodustalfs.

The thickness of the solum ranges from 102 to 147 cm. The thickness of A-horizon ranges from 12 to 17cm. Its colour is in 5 YR and 2.5 YR hue with value and chroma 3 to 4. The texture ranges from loamy sand to sandy clay with 15 to 50 per cent gravel. The thickness of B horizon ranges from 90 to 132 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 4 to 6. Texture is sandy clay to clay with 35 to 50 per cent gravel. The available water capacity is medium (100-150 mm/m). Three soil phases were identified and mapped.

Landscape and soil profile characteristics of Balapur (BPR) Series

4.1.10 Giddadapalya (GDP) Series: Giddadapalya soils are deep (100-150 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay to clay soils. They are developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Giddadapalya soil series has been classified as a member of the fine, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 106 to 145 cm. The thickness of A-horizon ranges from 12 to 13 cm. Its colour is in 5 YR hue with value and chroma 3 to 4. The texture ranges from sandy loam with 10 to 15 per cent gravel. The thickness of B-horizon ranges from 106 to 123 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 3 to 6. Texture is sandy clay to clay with 35 to 75 per cent gravel after 60 cm depth. The available water capacity is low (51-100 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Giddadapalya (GDP) Series

4.1.11 Ranatur (RTR) Series: Ranatur soils are very deep (> 150 cm), well drained, have dark reddish brown to dark red, clayey soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands. The Ranatur series has been classified as a member of the fine, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum is more than 150 cm. The thickness of A-horizon ranges from 8 to 14 cm. Its colour is in 5 YR and 2.5 YR hue with value 2.5 to 4 and chroma 3 to 6. The texture varies from sandy loam to sand clay. The thickness of B horizon is more than 150 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 3 to 6. Its texture is clay. The available water capacity is high (150-200 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Ranatur (RTR) Series

Table: 4.1 Physical and Chemical Characteristics of Soil Series identified in Chikkabagnalu Microwatershed

Series Name: Mukahadahalli (MKH), **Pedon:** R-11
Location: $15^0$22'05.4"N, $76^0$04'10.3"E, Halageri village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey-skeletal, 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
0-19	Ap	65.71	8.83	25.46	9.27	9.06	14.42	21.52	11.43	70	scl	16.54	8.60
19-32	Bt	55.89	11.13	32.98	6.47	9.18	11.89	19.19	9.18	50	scl	19.24	12.78
32-58	Bt	47.95	10.41	41.63	17.52	3.78	9.13	9.55	7.97	50	sc	24.03	16.02

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}							%	%
0-19	7.38	-	-	0.09	0.2	0.00	8.97	4.32	0.26	0.22	13.77	14.84	0.58	93	1.49
19-32	7.5	-	-	0.106	0.41	0.00	15.98	3.27	0.16	0.50	19.91	20.88	0.63	95	2.38
32-58	7.46	-	-	0.173	0.49	0.00	19.71	4.53	0.23	1.32	25.79	25.76	0.62	100	5.11

Contd....

Series Name: Hatti (HTI), **Pedon:** R-20
Location: $15^0$21'45"N, $76^0$03'06" E Lakshmapura village Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Typic Paleustalfs

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
0-16	Ap	65.33	12.19	22.48	13.79	11.32	13.37	18.31	8.54	15-20	scl	16.83	5.49
16-41	Bt1	41.54	14.04	44.42	6.47	6.26	9.50	13.36	5.95	15-20	c	27.26	16.64
41-64	Bt2	48.71	8.48	42.81	26.06	7.55	5.38	6.31	3.41	55-60	sc	27.22	12.63

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}							%	%
0-16	7.11			0.109	0.92		21.06	8.23	0.39	0.06	29.74	20.19	1.65	147	0.30
16-41	7.54			0.220	0.92		21.93	8.47	0.23	0.27	30.90	31.31	2.23	99	0.85
41-64	7.82			0.168	0.55		19.43	7.09	0.31	0.47	27.30	26.57	3.13	103	1.77

Contd....

Soil Series: Hooradhahalli (HDH), **Pedon:** RM-69
Location: $13^0$24'31"N, $76^0$33'41"E, (4D3D8G2d), Hesarahalli village, Chikkanayakanahalli taluk, Tumukura district
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Rhodic Paleustalfs

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
0-18	Ap	72.56	15.17	12.27	4.57	8.33	17.38	23.88	18.39	35	sl	-	-
18-33	Bt1	56.29	10.75	32.96	7.88	10.24	13.41	14.43	10.34	55	scl	-	-
33-58	Bt2	46.66	10.79	42.55	10.79	9.87	8.43	9.04	8.53	55	sc	-	-
58-90	Bt3	43.09	13.63	43.27	9.90	8.25	7.32	8.76	8.87	45	c	-	-

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}							%	%
0-18	6.54	-	-	0.07	0.60	0.00	2.68	1.38	0.44	0.42	4.91	5.84	0.48	84.07	7.11
18-33	5.90	-	-	0.07	0.52	0.00	3.99	1.27	0.09	0.37	5.71	8.61	0.26	66.32	4.29
33-58	6.16	-	-	0.07	0.44	0.00	4.92	1.67	0.08	0.55	7.22	10.00	0.24	72.23	5.50
58-90	6.39	-	-	0.06	0.40	0.00	4.30	2.02	0.08	0.46	6.87	9.21	0.21	74.61	5.05

Contd....

Soil Series: Gollarahatti (GHT), **Pedon:** RM-2

Location: $50^0$04'88.8"N, $75^0$37'65.2"E, (4D4A3I1f), Belhatti village, Shirahatti taluk, Gadag district.

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

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
0-26	Ap	83.22	5.74	11.05	9.71	11.73	16.68	27.10	16.58	30	ls	-	-
26-63	Bt1	55.91	13.36	30.73	13.05	9.66	11.10	14.29	7.81	20	scl	-	-
63-84	Bt2	57.17	11.38	31.45	10.53	10.11	12.28	13.83	10.42	20	scl	-	-

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}							%	%
0-26	5.70	-	-	0.06	0.20	0.00	1.50	0.60	0.09	0.13	2.32	3.17	0.29	73.00	4.10
26-63	6.26	-	-	0.04	0.24	0.00	7.35	1.55	0.09	0.17	9.15	9.89	0.32	93.00	1.72
63-84	6.50	-	-	0.05	0.20	0.47	-	-	0.09	0.21	0.30	10.18	0.32	100.00	2.06

Contd....

Series Name: Bisarahalli (BSR) **Pedon:** R-9
Location: $15^0$25'21.0"N, $76^0$11'42.0"E Hatti village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Typic Paleustalfs

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
0-14	Ap	70.11	9.29	20.60	22.31	15.97	11.98	9.83	10.03	20	scl	13.22	7.81
14-57	Bt1	47.27	7.52	45.20	27.04	8.28	4.61	2.10	5.24	25	sc	16.39	13.31
57-80	Bt2	41.93	8.67	49.40	21.95	6.83	4.76	4.66	3.73	30	c	21.41	15.41
80-99	Bt3	49.02	9.87	41.11	19.90	10.78	6.84	6.42	5.08	40	sc	21.82	14.24

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}							%	%
0-14	6.59	-	-	0.12	0.73	-	4.47	1.77	0.06	0.53	6.82	8.80	0.43	77.55	6.00
14-57	7.02	-	-	0.04	0.48	-	5.85	2.31	0.06	0.20	8.43	14.70	0.33	57.32	1.36
57-80	7.00	-	-	0.05	0.28	-	11.74	2.26	0.08	0.22	14.31	15.60	0.32	91.73	1.44
80-99	6.90	-	-	0.06	0.18	-	13.70	2.16	0.08	0.14	16.08	16.50	0.40	97.44	0.83

Contd....

Series Name: Chikkamegheri (CKM), **Pedon:** RM-2
Location: $15^0$21'40"N, $76^0$16'43"E, Gudanahalli village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Rhodic Paleustalfs

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
0-10	Ap	66.80	5.51	27.69	10.14	10.04	20.29	14.75	11.58	-	scl	20.59	7.15
10-25	Bt1	39.52	7.17	53.32	8.75	9.59	7.27	8.43	5.48	-	c	26.96	13.99
25-38	Bt2	42.00	7.16	50.84	13.16	8.74	6.42	8.53	5.16	-	c	26.51	13.42
38-55	Bt3	41.77	10.31	47.92	15.19	8.54	6.33	7.38	4.32	10	c	25.28	14.10
55-70	Bt4	44.03	8.96	47.01	15.72	9.22	6.92	6.81	5.35	20	c	24.30	14.35
70-90	Bt5	56.02	8.46	35.52	11.41	17.07	12.36	10.26	4.92	25	sc	20.59	13.06

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}							%	%
0-10	7.99	-	-	0.326	0.83	4.44	9.35	4.76	0.28	0.54	14.93	12.50	0.45	119	1.73
10-25	7.36	-	-	0.345	0.99	2.40	10.37	4.84	0.10	1.18	16.48	17.60	0.33	94	2.67
25-38	6.69	-	-	0.477	0.79	0.00	10.25	4.20	0.09	1.61	16.15	16.10	0.32	100	4.00
38-55	6.45	-	-	0.548	0.63	0.00	9.43	2.86	0.10	1.52	13.91	14.80	0.31	94	4.11
55-70	6.35	-	-	0.532	0.71	0.00	9.59	2.79	0.11	1.66	14.16	14.60	0.31	97	4.56
70-90	6.44	-	-	0.613	0.27	0.00	9.58	3.10	0.19	1.87	14.74	14.70	0.41	100	5.08

Contd....

Series Name: Jedigere (JDG), **Pedon:** R5
Location: $15^0$29'06"N, $76^0$10'38" E Chennahalu village, Yelburga Taluk and Koppal District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **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
0-14	Ap	70.63	8.33	21.04	16.26	23.58	13.41	11.59	5.79	-	scl	13.46	6.17
14-39	Bt1	49.95	11.56	38.49	10.61	17.40	10.30	7.42	4.22	-	sc	23.07	13.70
39-62	Bt2	45.88	11.44	42.68	10.72	16.70	9.28	6.80	2.37	-	sc	25.24	15.20
62-94	Bt3	42.89	8.51	48.61	9.48	14.54	8.35	6.80	3.71	-	c	25.30	14.07
94-118	Bt4	45.24	11.90	42.86	10.66	15.53	8.59	6.63	3.83	-	sc	23.52	13.58

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}							%	%
0-14	6.11			0.078	0.83		5.58	2.49	0.18	0.19	8.45	9.41	1.12	90	2.06
14-39	6.87			0.123	0.67		12.01	5.62	0.32	0.29	18.24	18.22	1.57	100	1.59
39-62	7.65			0.121	0.50				0.42	0.43		21.68	1.89	-	1.99
62-94	8.21			0.188	0.28				0.34	0.41		21.09	2.47	-	1.93
94-118	8.23			0.189	0.24				0.33	0.36		17.62	1.48	-	2.02

Contd....

Soil Series: Balapur (BPR), **Pedon**: RM-78
Location: $13^0$26'39"N, $76^0$35'03"E, (4D3D8G2c), Kasaba, Chikkanayakanahalli taluk, Tumakuru district
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Typic Rhodustalfs

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
0-12	Ap	65.66	18.66	15.68	4.14	6.16	13.33	21.82	20.20	-	sl	-	-
12-34	Bt1	61.91	11.52	26.57	2.36	6.78	12.53	21.36	18.89	-	scl	-	-
34-60	Bt2	51.81	11.24	36.94	4.66	5.70	12.23	15.96	13.26	30	sc	-	-
60-84	Bt3	46.61	9.02	44.37	14.70	6.88	7.51	8.97	8.55	55	sc	-	-
84-112	Bt4	48.75	12.92	38.33	15.73	8.13	6.87	8.23	9.79	60	sc	-	-
112-127	Bc	50.98	24.74	24.28	5.25	4.63	5.15	10.92	25.03	50	scl	-	-

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}							%	%
0-12	6.64	-	-	0.03	0.56	0.00	1.90	1.32	0.21	0.03	3.46	5.45	0.35	63.48	0.51
12-34	6.99	-	-	0.02	0.48	0.00	3.66	1.90	0.07	0.08	5.70	7.82	0.29	72.93	0.96
34-60	7.29	-	-	0.02	0.40	0.00	5.13	2.08	0.11	0.20	7.52	11.19	0.30	67.18	1.75
60-84	7.50	-	-	0.02	0.32	0.00	5.83	6.36	0.13	0.23	12.55	12.38	0.28	101.43	1.83
84-112	7.54	-	-	0.02	0.24	0.00	6.02	6.59	0.11	0.25	12.96	12.77	0.33	101.49	1.97
112-127	7.90	-	-	0.02	0.20	0.00	8.04	3.62	0.07	0.32	12.04	12.47	0.51	96.56	2.55

Contd....

Series Name: Giddadapalya (GDP), **Pedon:** R-8
Location: $15^0$25'26"N, $76^0$10'59"E, Kalakeri village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Rhodic Paleustalfs

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
0-16	Ap	74.95	9.24	15.81	18.43	18.94	13.85	14.97	8.76	-	sl	11.88	5.09
16-43	Bt1	41.69	13.89	44.42	9.84	10.90	7.41	7.62	5.93	-	c	23.13	14.53
43-61	Bt2	47.67	6.13	46.19	21.14	10.15	5.29	6.45	4.65	-	sc	21.60	11.87
61-83	Bt3	52.52	7.10	40.38	24.42	10.59	5.66	7.55	4.30	40	sc	19.51	11.35
83-119	Bt4	43.76	11.59	44.65	20.15	7.56	5.77	5.46	4.83	60	c	20.80	12.06
119-139	Bt5	54.93	9.84	35.23	29.70	10.49	5.50	5.92	3.32	50	sc	15.24	11.97

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}							%	%
0-16	7.88	-	-	0.103	0.79	-	5.98	1.35	0.05	0.22	7.60	7.8	0.49	97	2.87
16-43	7.81	-	-	0.117	0.66	-	13.99	1.97	0.08	0.46	16.50	16.9	0.38	98	2.74
43-61	7.74	-	-	0.132	0.51	-	12.70	2.18	0.08	0.69	15.64	15.9	0.34	98	4.36
61-83	7.72	-	-	0.142	0.39	-	11.46	2.22	0.08	0.66	14.41	14.6	0.36	99	4.53
83-119	7.58	-	-	0.115	0.22	-	11.30	2.70	0.09	0.73	14.82	15.3	0.34	97	4.79
119-139	7.50	-	-	0.113	0.22	-	10.03	2.19	0.07	0.65	12.95	13.2	0.37	98	4.89

Contd....

Soil Series: Ranatur (RTR), **Pedon:** TR7-3
Location: $15^0$07'58.3"N, $75^0$38'30.6"E, (4D4A3G2d), Devihal-4 microwatershed, Shirahatti taluk, Gadag district
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed, isohyperthermic Rhodic Paleustalfs

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
0-10	Ap	80.08	8.23	11.69	7.22	16.46	17.68	21.95	16.77	<5	sl	-	-
10-34	Bt1	44.96	12.64	42.39	3.84	11.42	10.07	11.32	8.31	<5	c	-	-
34-71	Bt2	43.35	13.02	43.63	5.20	10.40	9.77	9.77	8.21	<5	c	-	-
71-100	Bt3	47.00	10.23	42.77	10.43	12.71	9.09	7.54	7.23	<5	sc	-	-
100-138	Bt4	45.04	12.78	42.17	8.37	10.33	9.30	9.19	7.85	<5	sc	-	-
138-170	Bt5	44.63	13.79	41.58	9.19	8.99	8.26	9.40	8.78	<5	c	-	-

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}							%	%
0-10	6.47	-	-	0.03	0.49	0.00	5.61	1.33	0.13	0.01	7.07	7.07	0.60	100.00	0.41
10-34	6.46	-	-	0.03	0.57	0.00	11.69	3.19	0.14	0.01	15.03	16.87	0.40	89.00	0.06
34-71	7.23	-	-	0.03	0.53	1.20	-	-	0.16	0.01	-	17.33	0.40	100.00	0.06
71-100	7.60	-	-	0.03	0.3	0.30	-	-	0.17	0.04	-	17.21	0.40	100.00	0.23
100-138	7.88	-	-	0.03	0.6	0.42	-	-	0.17	0.15	-	16.30	0.39	100.00	0.92
138-170	8.12	-	-	0.08	0.64	0.60	-	-	0.14	0.06	-	16.87	0.41	100.00	0.36

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 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: Soil depth, soil texture, coarse fragments, soil reaction, available water capacity, calcareousness, salinity/alkali *etc*.

Land characteristics: Slope, erosion, drainage and 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 severe 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 identified 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 29 soil map units identified in the Chikkabagnalu microwatershed are grouped under 2 Land capability classes and 4 land capability subclasses (Fig. 5.1). Entire cultivated area of about 557 ha (82%) is suitable for agriculture. An area of about 42 ha (6%) is under mining/Industrial, 10 ha (1%) is under rock lands and 72 ha (11%) is under habitation and settlements.

Maximum area of about 398 ha (58%) is good lands (Class II) and distributed in the major part of the microwatershed with minor problems of soil and erosion. An area about 159 ha (23%) is moderately good lands (Class III) and distributed in the central, northern and southern part of the microwatershed with moderate limitations of soil and erosion.

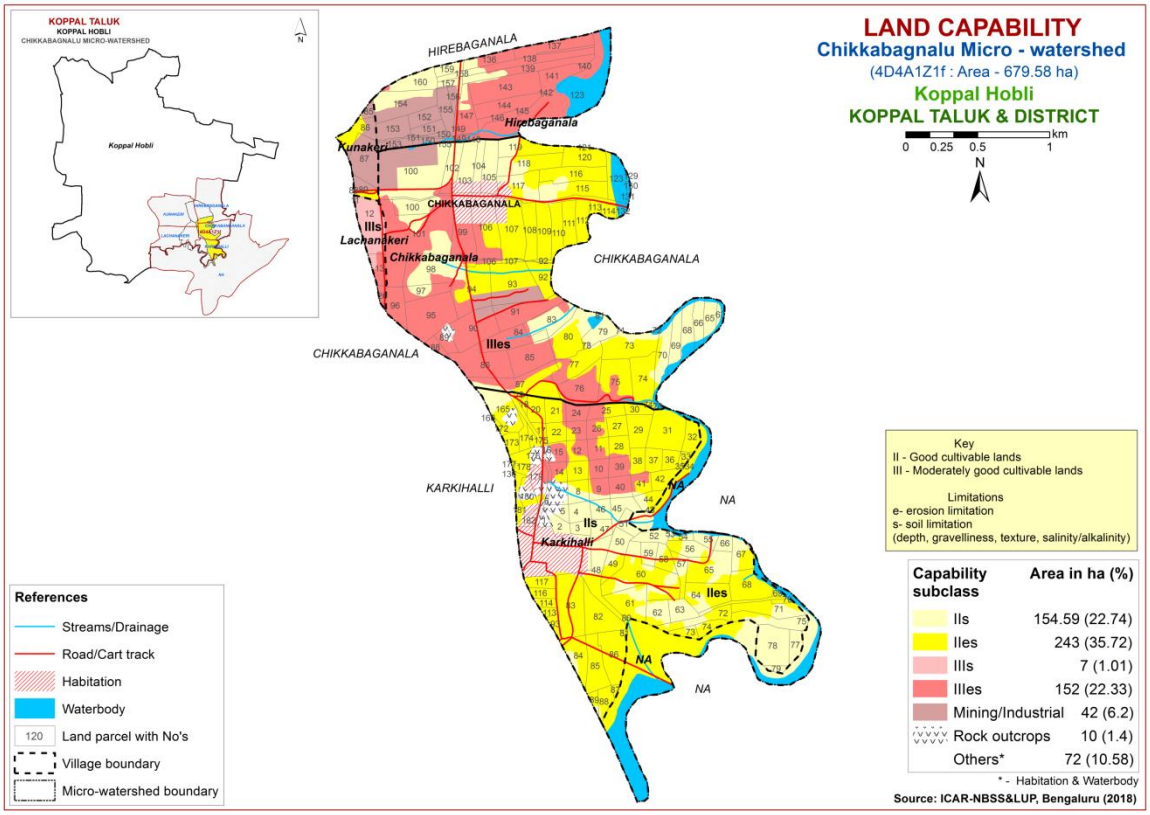


Fig. 5.1 Land Capability map of Chikkabagnalu Microwatershed

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 (Fig. 5.2).

An area of about 7 ha (1%) is under shallow (25-50 cm) soils and distributed in the northern part of the microwatershed. Moderately shallow (50-75 cm) soils cover an area of about 56 ha (8%) and occur in the central and northern part of the microwatershed. Moderately deep (75-100 cm) soils cover a major area of about 317 ha (47%) and distributed in the central, northern and southern part of the microwatershed. Maximum area of about 175 ha (26%) is under deep (100-150 cm) soils and occur in the central and northern part of the microwatershed. Very deep (>150 cm) soils occupy an area of 1 ha (<1%) and occur in the southern part of the microwatershed.

The most productive lands cover about 176 ha (26%) where all climatically adapted long duration crops can be grown. The problem soils cover about 7 ha (1%) area where only short duration crops can be grown and the probability of crop failure is high.

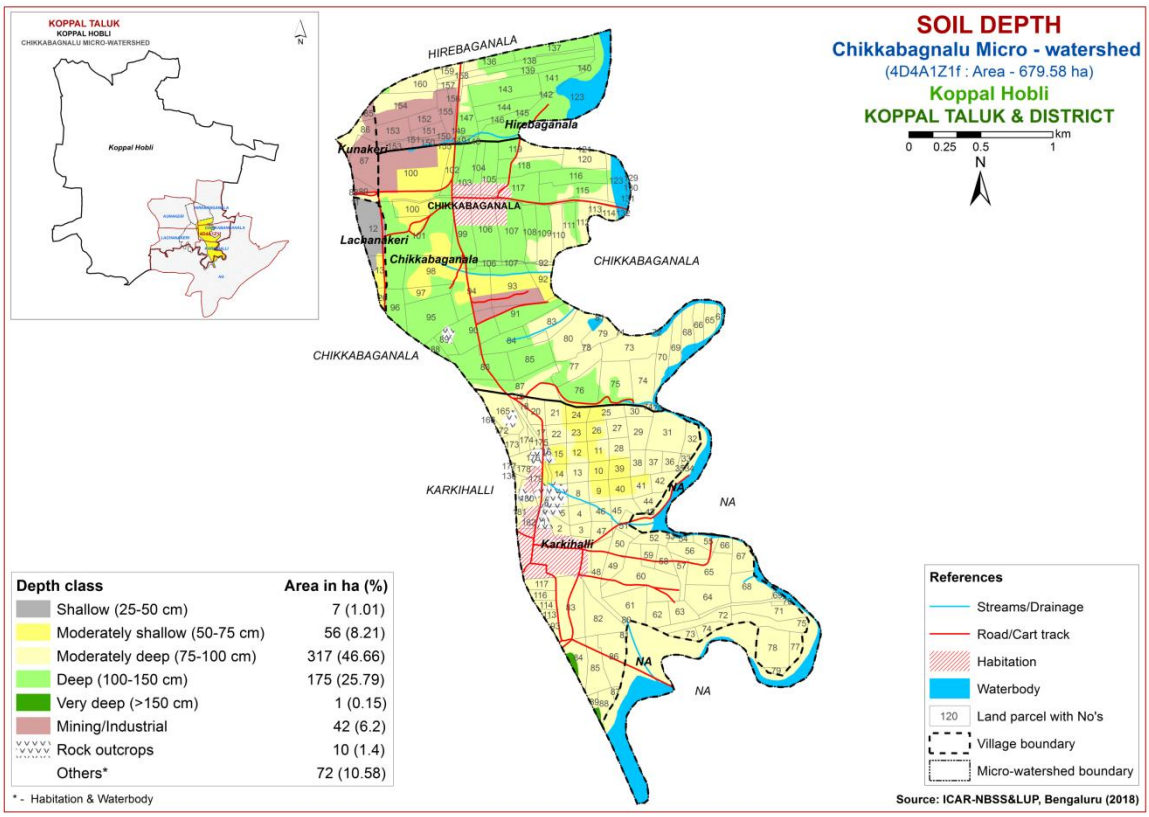


Fig. 5.2 Soil Depth map of Chikkabagnalu Microwatershed

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 showing sandy, loamy and clayey at the surface was generated. The area extent and their geographical distribution in the microwatershed is shown in Fig.5.3.

Maximum area of about 493 ha (73%) is loamy and distributed in the major part of the microwatershed. An area of 63 ha (9%) has soils that are sandy clay at the surface and occur in the northern and southern part of the microwatershed.

Entire area has most productive lands with respect to surface soil texture 9 per cent area where they are sandy clay soils. These soils have high potential for soil-water retention and availability, and nutrient retention and availability, but have more problems of drainage, infiltration, workability and other physical problems. The other productive lands are loamy soils (73%) which also have high potential for soil-water retention and nutrient availability but have no drainage or other physical problems.

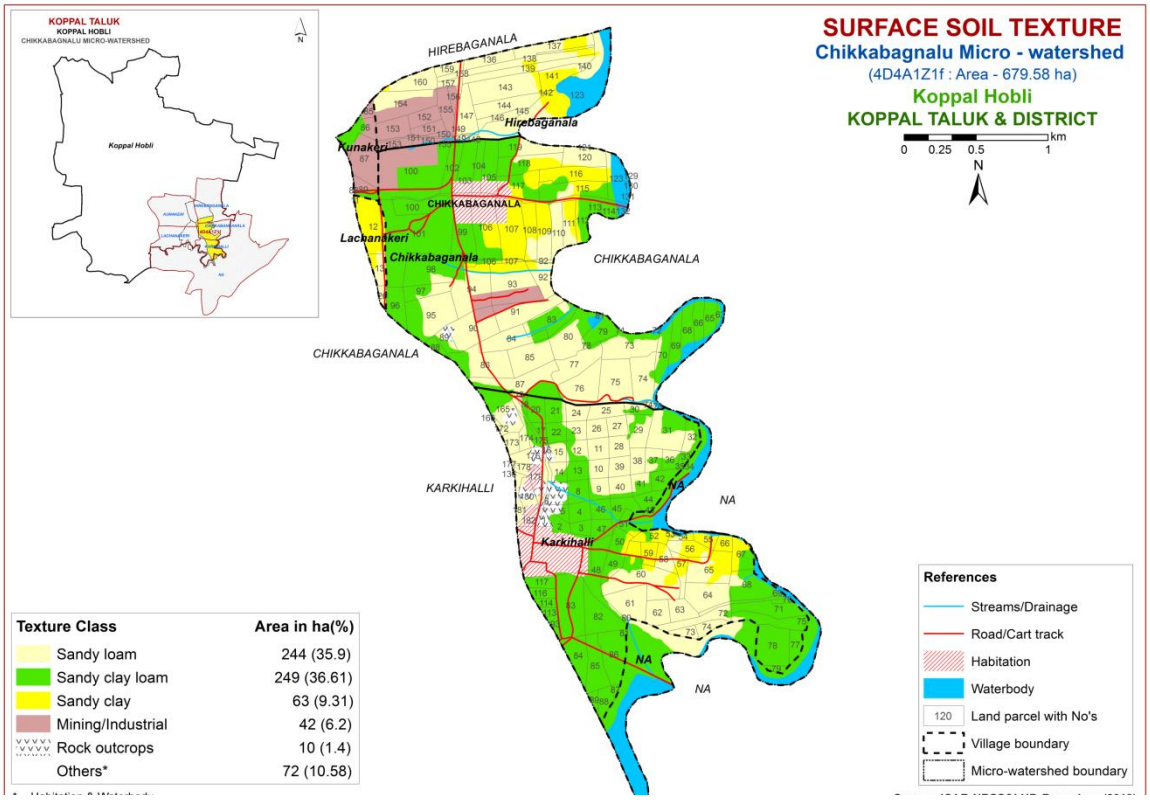


Fig. 5.3 Surface Soil Texture map of Chikkabagnalu Microwatershed

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 spatial distribution in the microwatershed is shown in Fig.5.4.

An area of about 227 ha (33%) has non gravelly (<15%) soils and occur in the central, northern and southern part of the microwatershed. Maximum area of about 304 ha (45%) has gravelly (15-35%) soils and distributed in the central, northern and southern part of the microwatershed. An area of about 24 ha (4%) has very gravelly (35-60%) soils and occur in the southern part of the microwatershed.

An area of about 227 ha (33%) are most productive lands with respect to gravelliness. They are non-gravelly with less than 15 per cent gravel and have potential for growing both annual and perennial crops. The problem lands cover about 328 ha (48%) that are gravelly to very gravelly where only medium or short duration crops can be grown.

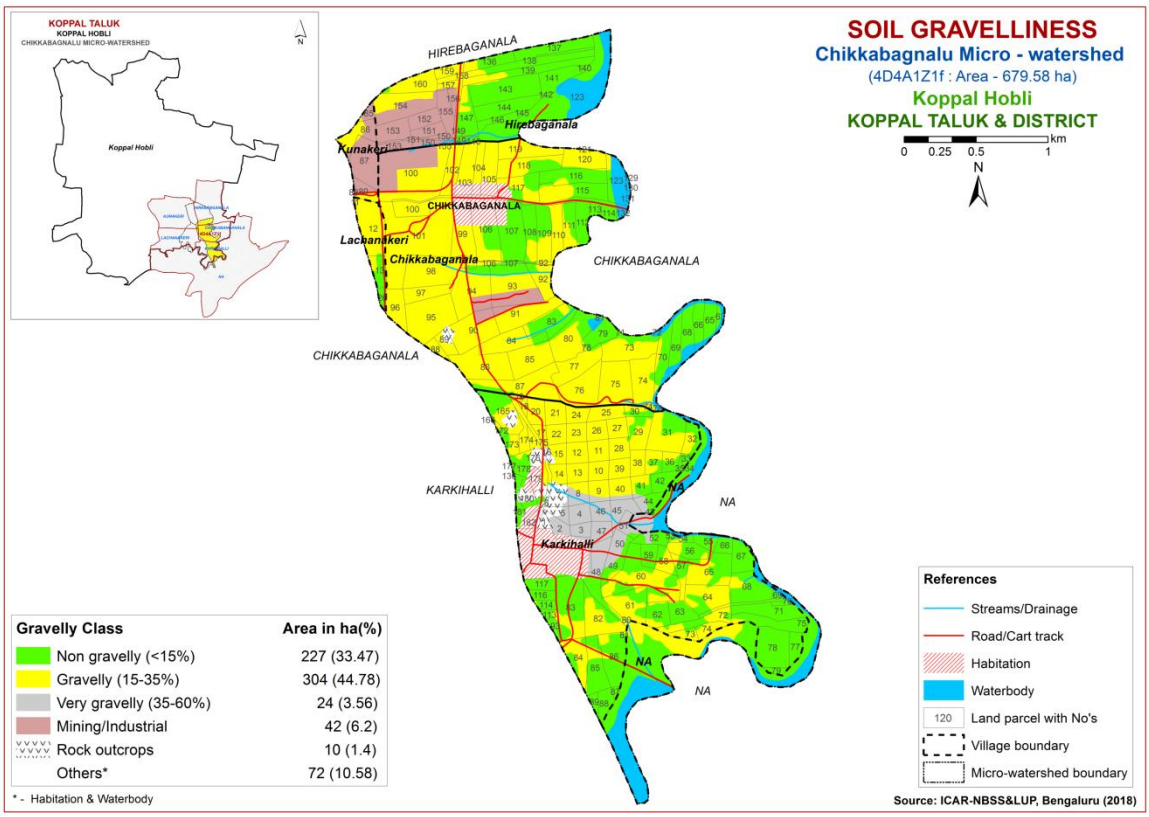


Fig. 5.4 Soil Gravelliness map of Chikkabagnalu Microwatershed

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 (Fig. 5.5).

An area of about 121 ha (18%) has soils that are very low (<50 mm/m) in available water capacity and distributed in the central, northern and southern part of the microwatershed. Low (51-100 mm/m) in available water capacity cover a major area of about 354 ha (52%) and occur in the major part of the microwatershed. An area of about 80 ha (12%) is medium (101-150 mm/m) in available water capacity and occur in the central, northern and southern part of the microwatershed. High (151-200 mm/m) in available water capacity cover an area of about 1 ha (<%) and distributed in the southern part of the microwatershed.

Maximum area of about 475 ha (70%) in the microwatershed has soils that are problematic with regard to available water capacity. Here, only short duration crops can be grown and the probability of crop failure is very high. These areas are best put to other alternative uses. An area of about 1 ha (<1%) has soils that have very high potential (151-

200 mm/m) with regard to available water capacity where all climatically adapted long duration crops can be grown successfully.

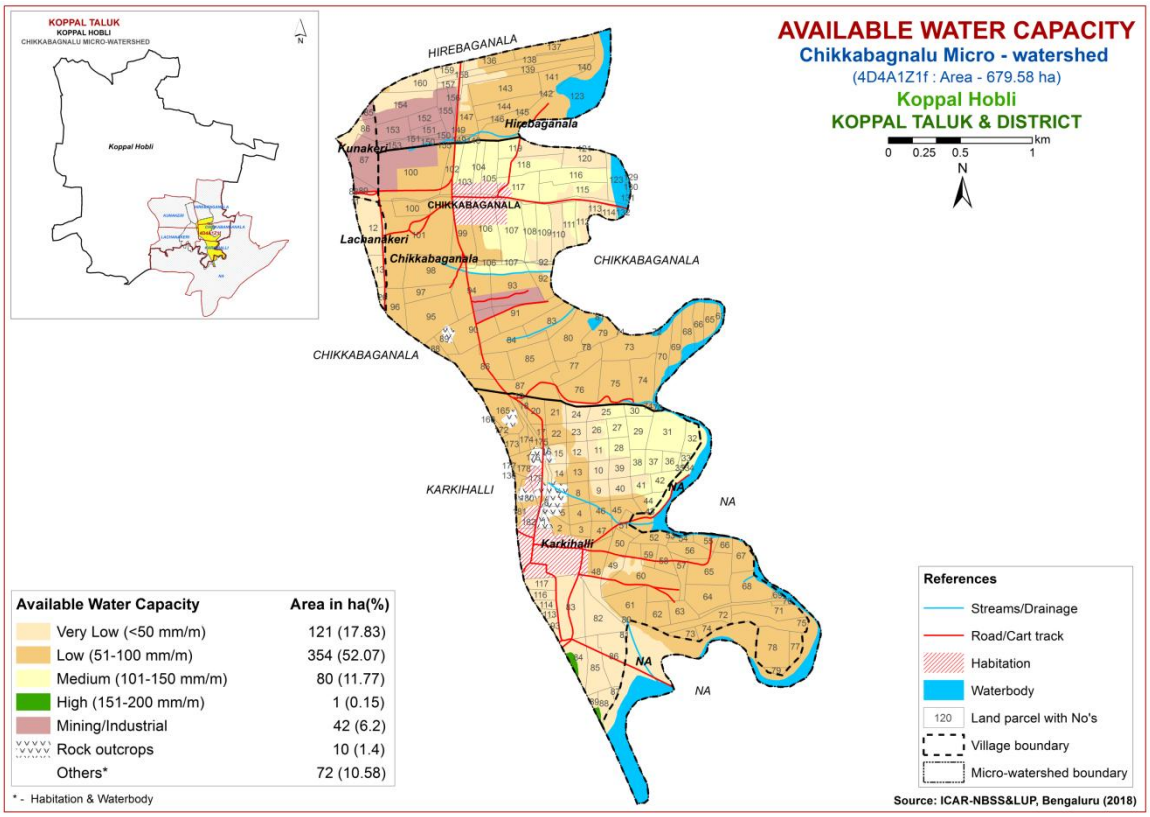


Fig. 5.5 Soil Available Water Capacity map of Chikkabagnalu Microwatershed

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 different slope classes and a slope map was generated showing the area extent and their geographic distribution of different slope classes in the microwatershed (Fig. 5.6).

An area of about 78 ha (12%) falls under nearly level (0-1% slope) lands and distributed in the southern and northern part of the microwatershed. Maximum area of about 478 ha (71%) falls under very gently sloping (1-3% slope) lands and distributed in the major part of the microwatershed.

Entire cultivated area of the microwatershed has soils that have high potential in respect of soil slopes. In these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

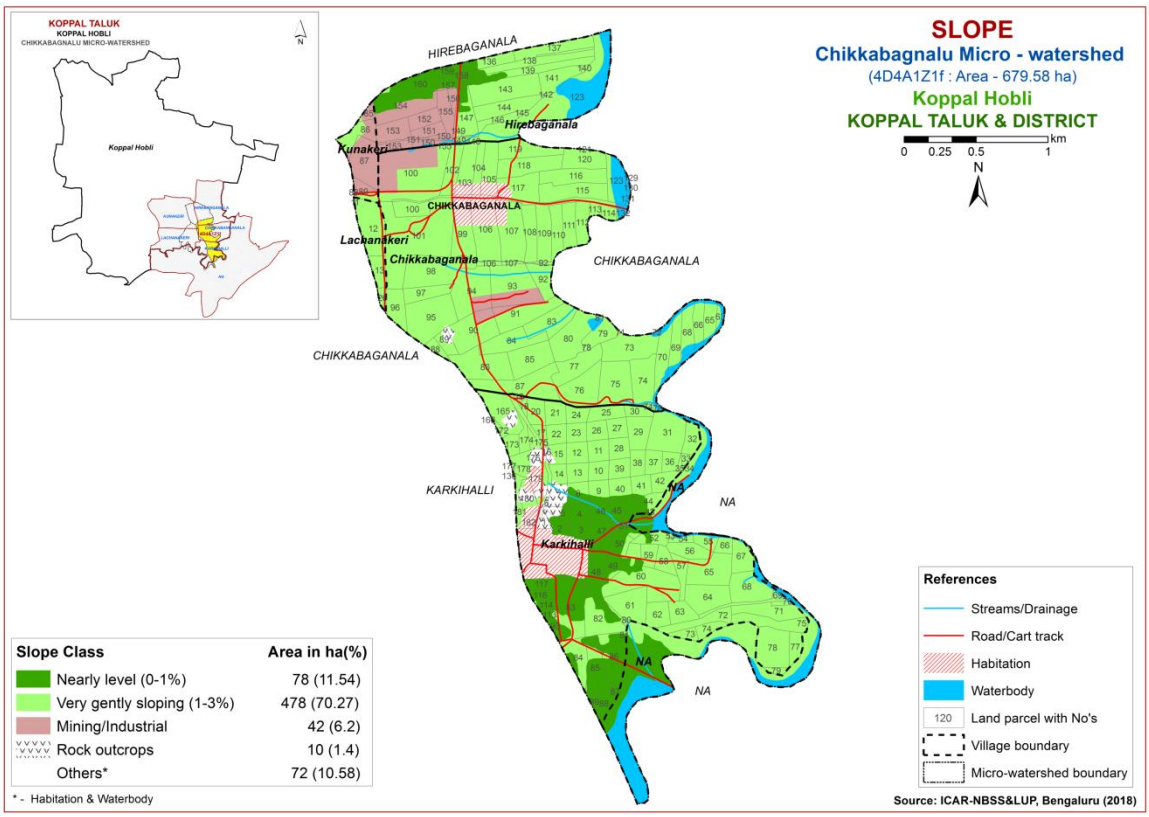


Fig. 5.6 Soil Slope map of Chikkabagnalu Microwatershed

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.

Soils that are slightly eroded (e1 class) cover an area of 191 ha (28%) and distributed in the central, northern and southern part of the microwatershed. Soils that are moderately eroded (e2 class) cover a major area of 365 ha (54%) and distributed in the major part of the microwatershed.

Maximum area of about 365 ha (54%) in the microwatershed is problematic because of moderate erosion. For these areas, taking up soil and water conservation and other land development measures are needed.

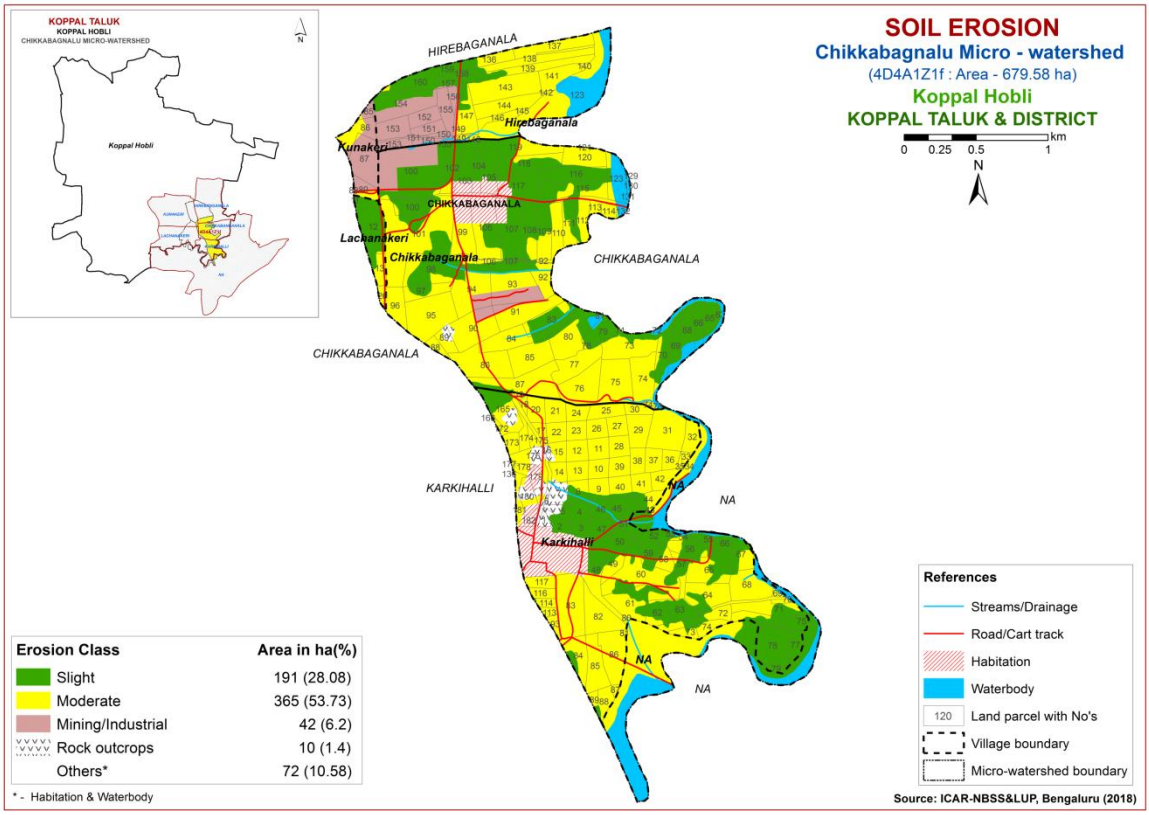


Fig. 5.7 Soil Erosion map of Chikkabagnalu Microwatershed

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 grid interval) all over the microwatershed through land resource inventory in the year 2018 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 the 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 Chikkabagnalu microwatershed for soil reaction (pH) showed that an area of about 7 ha (1%) is under slightly acid (pH 6.0-6.5) in soil reaction and distributed in the southern part of the microwatershed. Maximum area of about 288 ha (42%) is under neutral (pH 6.5-7.3) in soil reaction and distributed in the central, northern and southern part of the microwatershed. An area of about 261 ha (38%) is under slightly alkaline to strongly alkaline (pH 7.3-9.0) in soil reaction and occur in the central, northern and southern part of the microwatershed (Fig.6.1). Thus, major soils covering 288 ha (42%) area under neutral, 261 ha (38%) is under alkaline and 7 ha (1%) is under acidic condition.

6.2 Electrical Conductivity (EC)

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

6.3 Organic Carbon (OC)

The soil organic carbon content (an index of available Nitrogen) of the microwatershed is medium (0.5-0.75%) in an area of about 41 ha (6%) and occur in the southern part of the microwatershed. Maximum area of about 515 ha (76%) is high (>0.75%) in organic carbon and distributed in the major part of the microwatershed (Fig.6.3).

6.4 Available Phosphorus

Available phosphorus content is high (>57 kg/ha) in the entire cultivated area of the microwatershed (Fig 6.4).

6.5 Available Potassium

Available potassium content is medium (145-337 kg/ha) in the entire cultivated area of the microwatershed (Fig.6.5).

6.6 Available Sulphur

Maximum area of about 341 ha (50%) is low (<10 ppm) in available sulpur and distributed in the major part of the microwatershed. An area of about 211 ha (31%) is medium (10-20 ppm) and occur in the northern and southern part of the microwatershed. An area of about 5 ha (1%) is high (>20 ppm) and distributed in the southern part of the microwatershed (Fig.6.6).

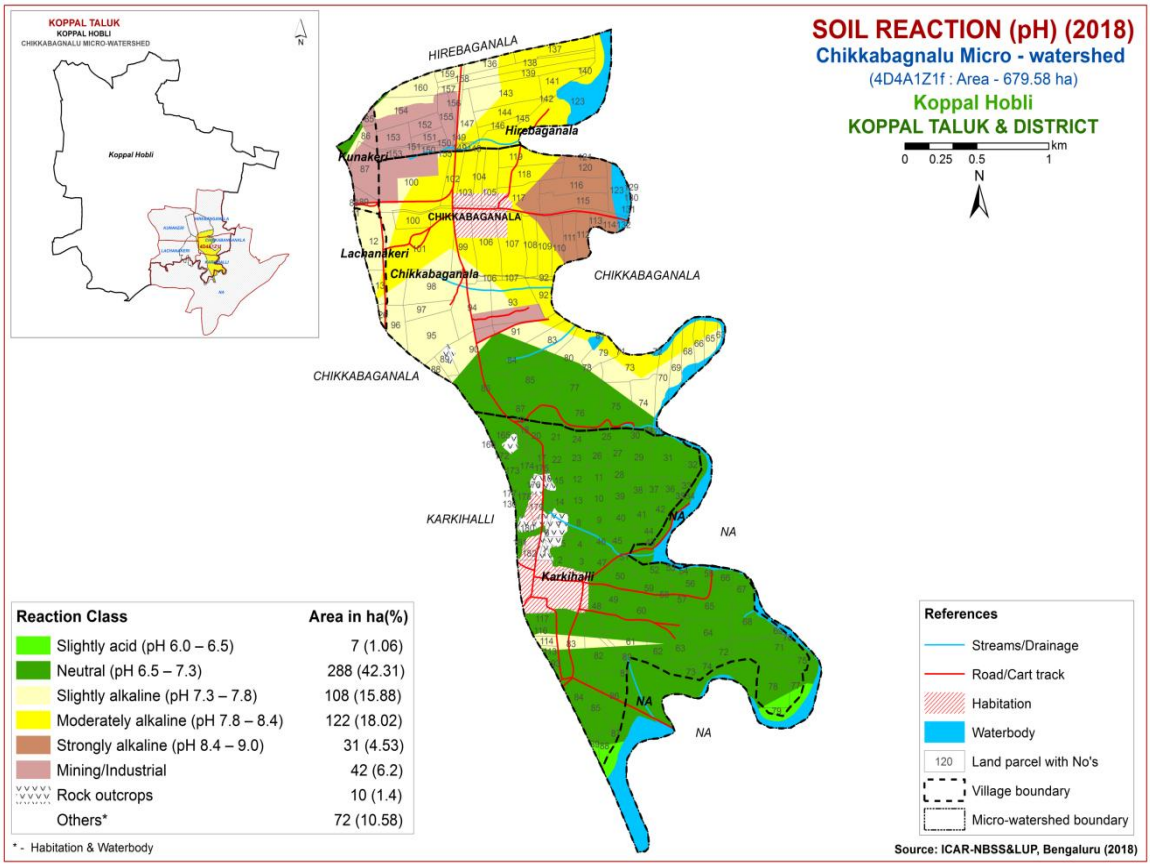


Fig.6.1 Soil Reaction (pH) map of Chikkabagnalu Microwatershed

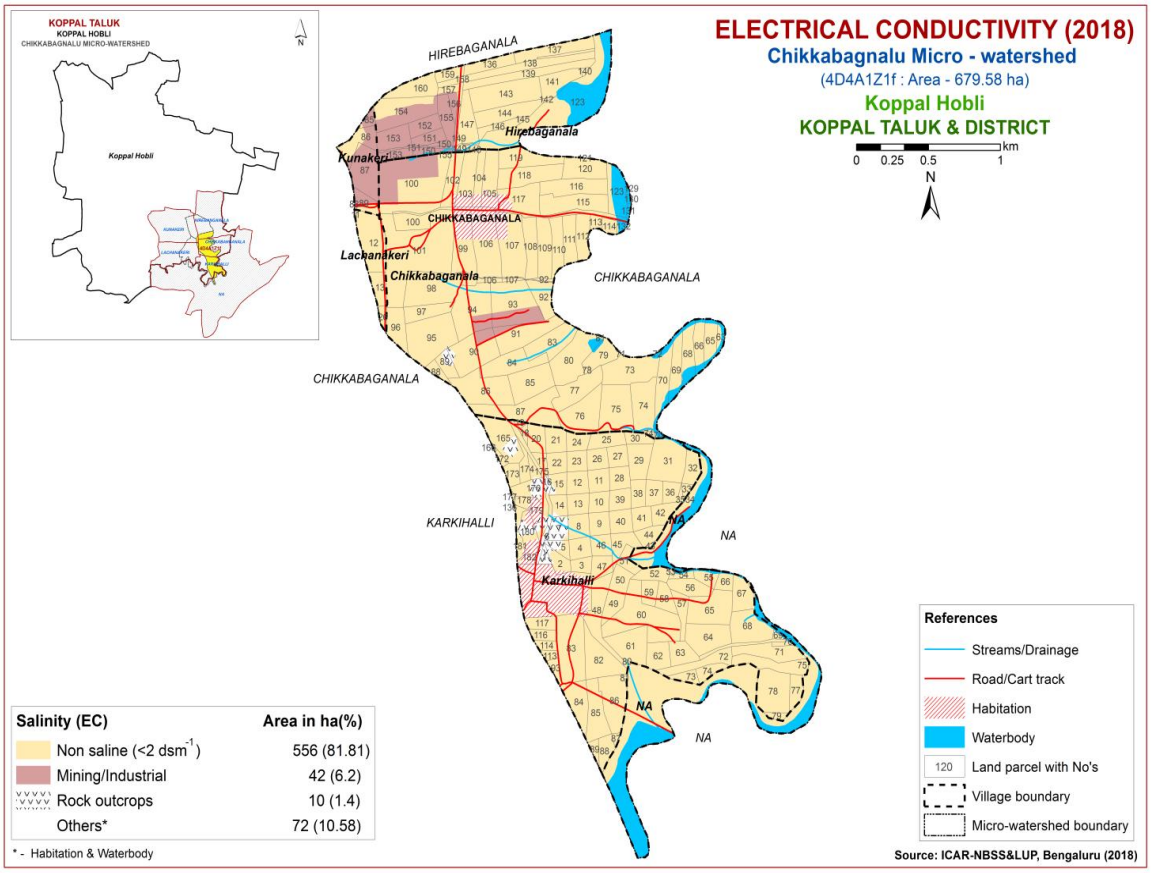


Fig.6.2 Electrical Conductivity (EC) map of Chikkabagnalu Microwatershed

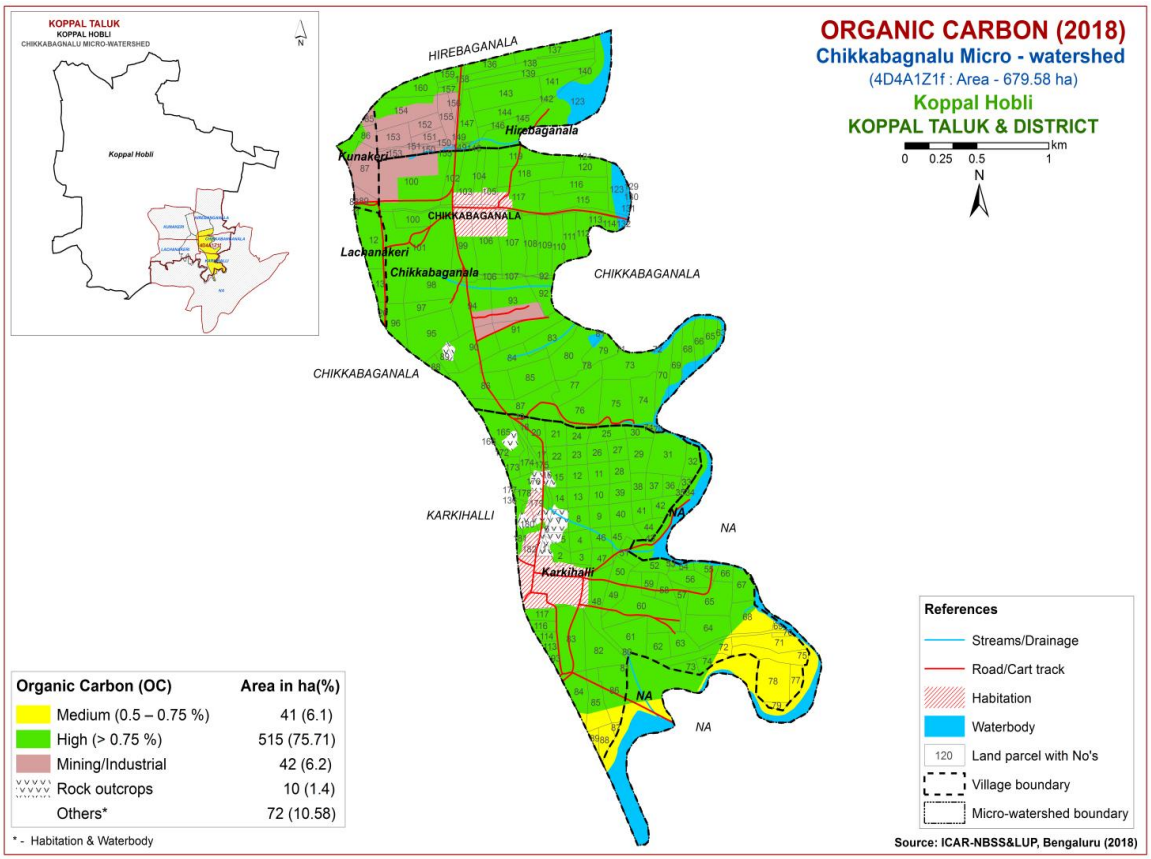


Fig.6.3 Soil Organic Carbon (OC) map of Chikkabagnalu Microwatershed

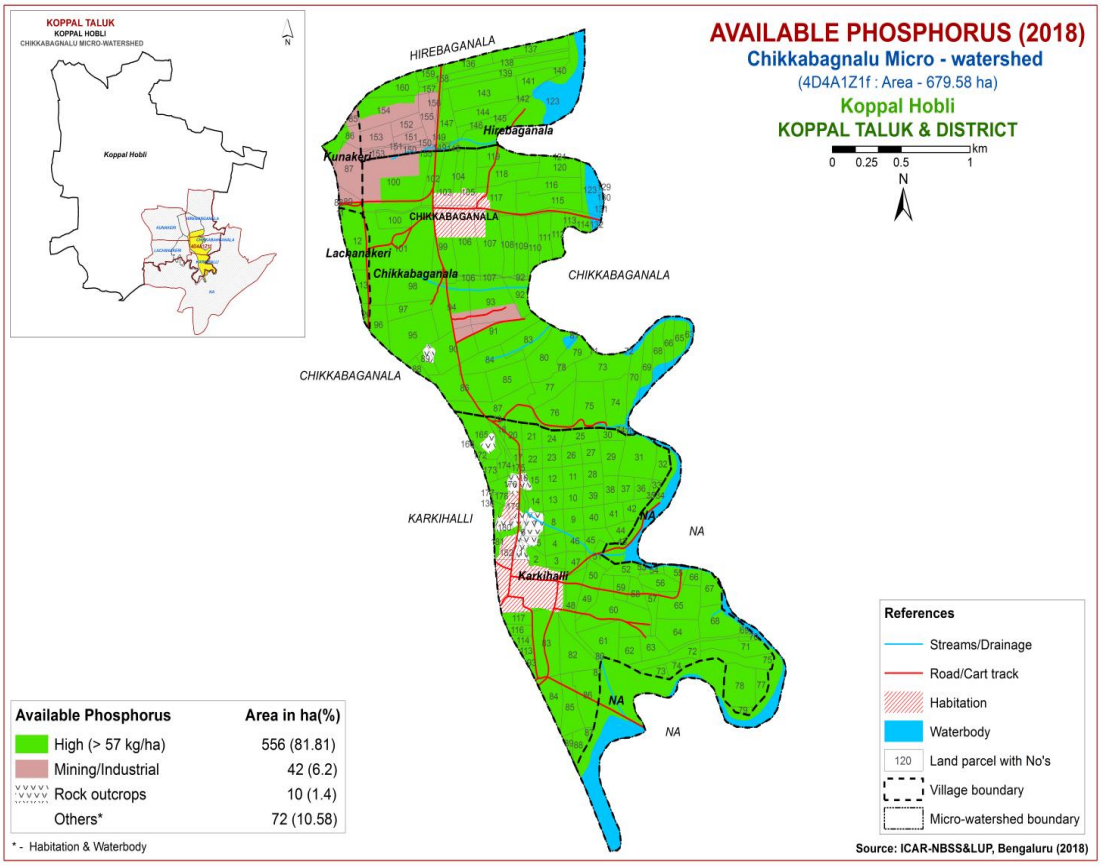


Fig.6.4 Soil Available Phosphorus map of Chikkabagnalu Microwatershed

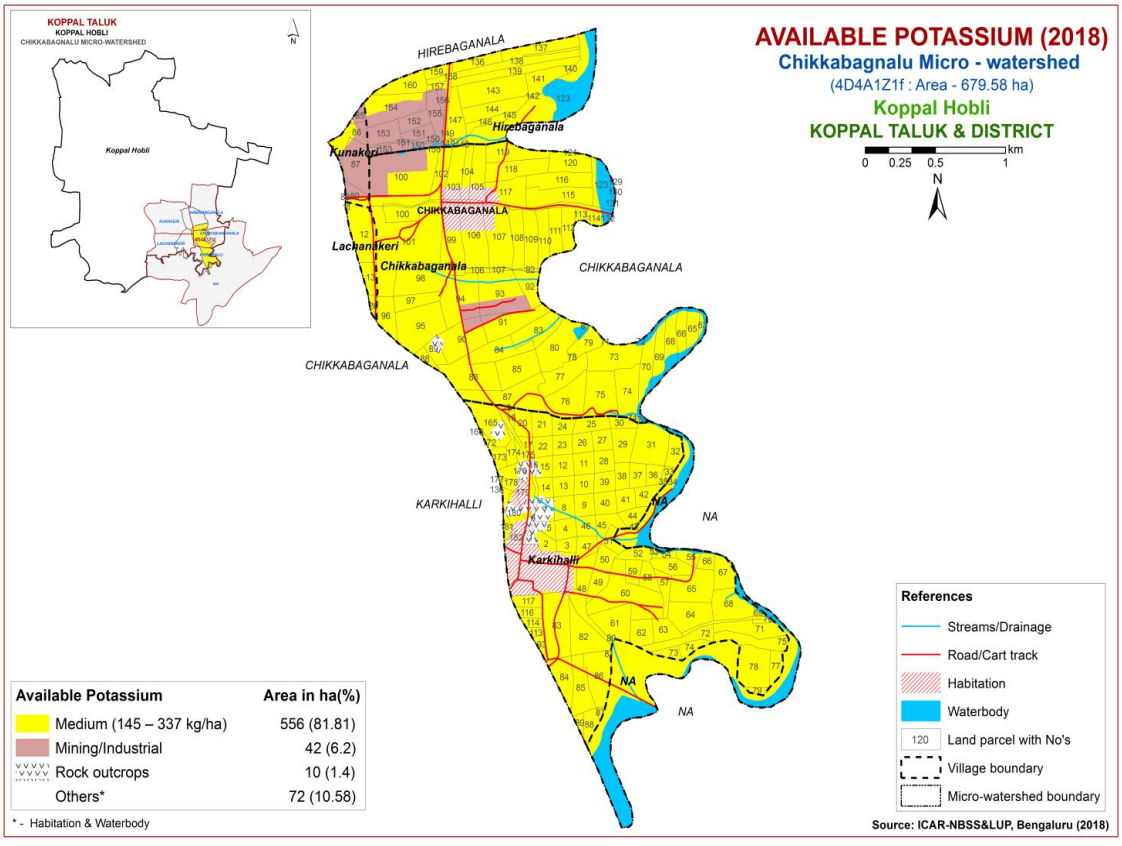


Fig.6.5 Soil Available Potassium map of Chikkabagnalu Microwatershed

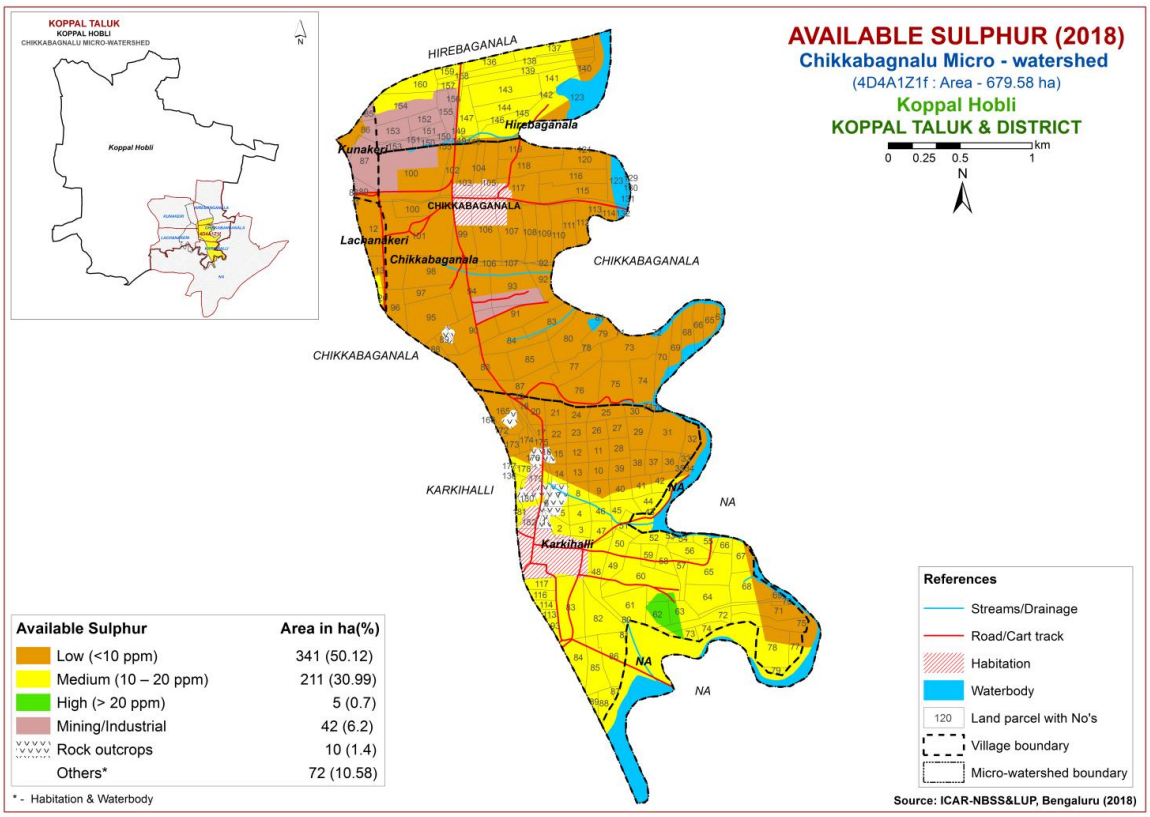


Fig.6.6 Soil Available Sulphur map of Chikkabagnalu Microwatershed

6.7 Available Boron

Available boron is low (<0.5 ppm) in a major area of about 332 ha (49%) and distributed in the central, northern and southern part of the microwatershed. An area of about 224 ha (33%) is medium (0.5-1.0 ppm) and occur in the central, northern and southern part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content is sufficient (>4.5 ppm) in major area of about 464 ha (68%) and distributed in the major part of the microwatershed. An area of about 92 ha (13%) is deficient (<4.5 ppm) and distributed in the central, northern and southern part of the microwatershed (Fig 6.8).

6.9 Available Manganese

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

6.10 Available Copper

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

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in an area of about 108 ha (16%) and distributed in the southern part of the microwatershed. Maximum area of about 448

ha (66%) is sufficient (>0.6 ppm) and distributed in the major part of the microwatershed (Fig 6.11).

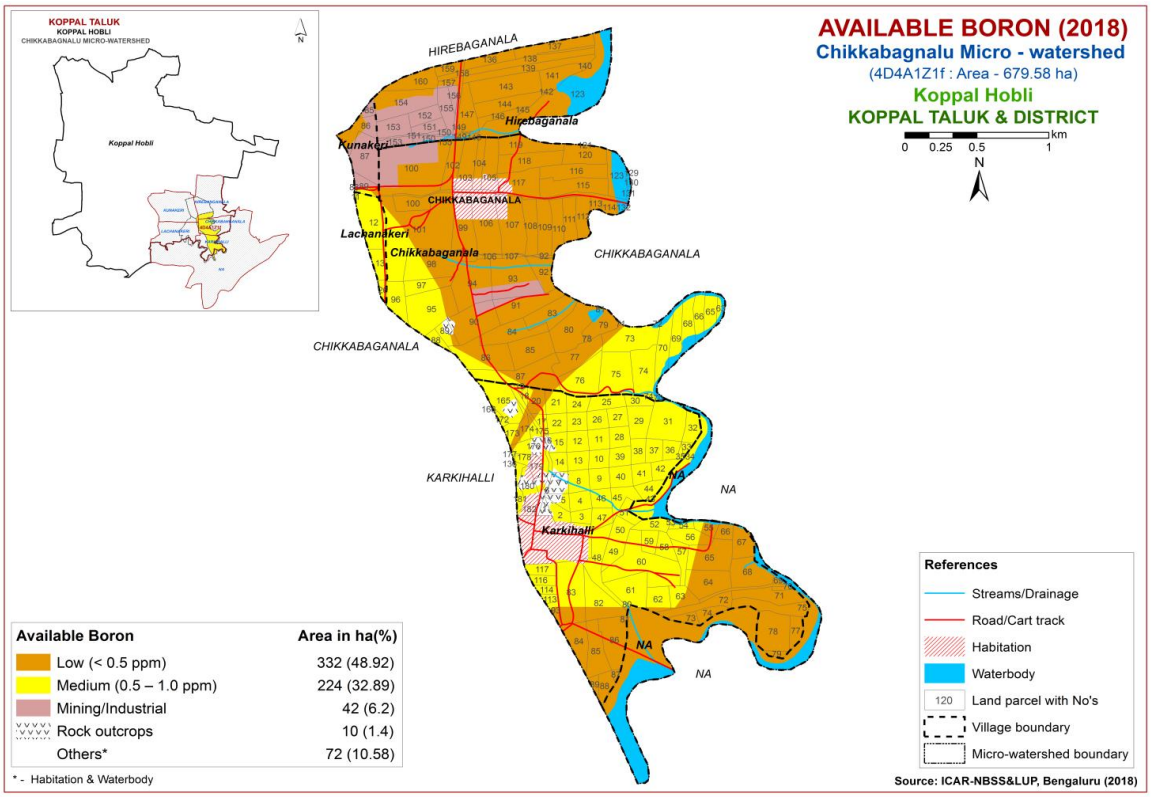


Fig.6.7 Soil Available Boron map of Chikkabagnalu Microwatershed

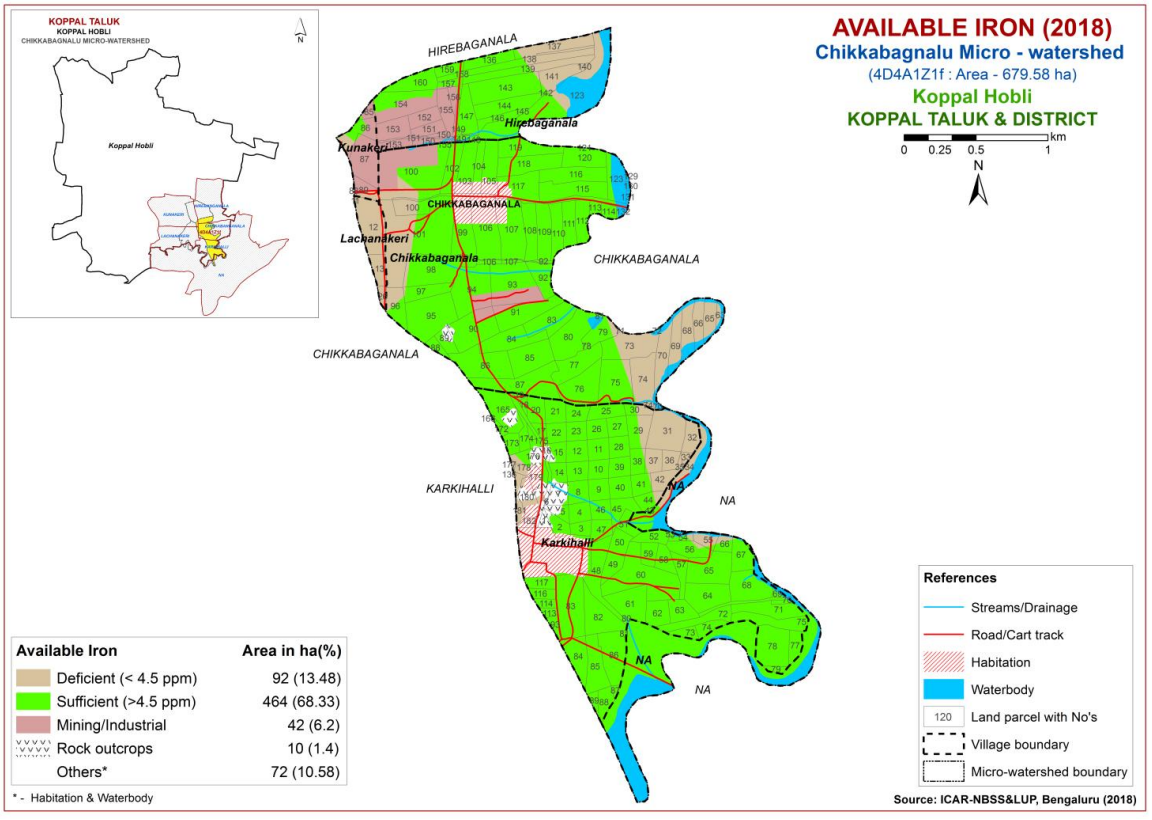


Fig.6.8 Soil Available Iron map of Chikkabagnalu Microwatershed

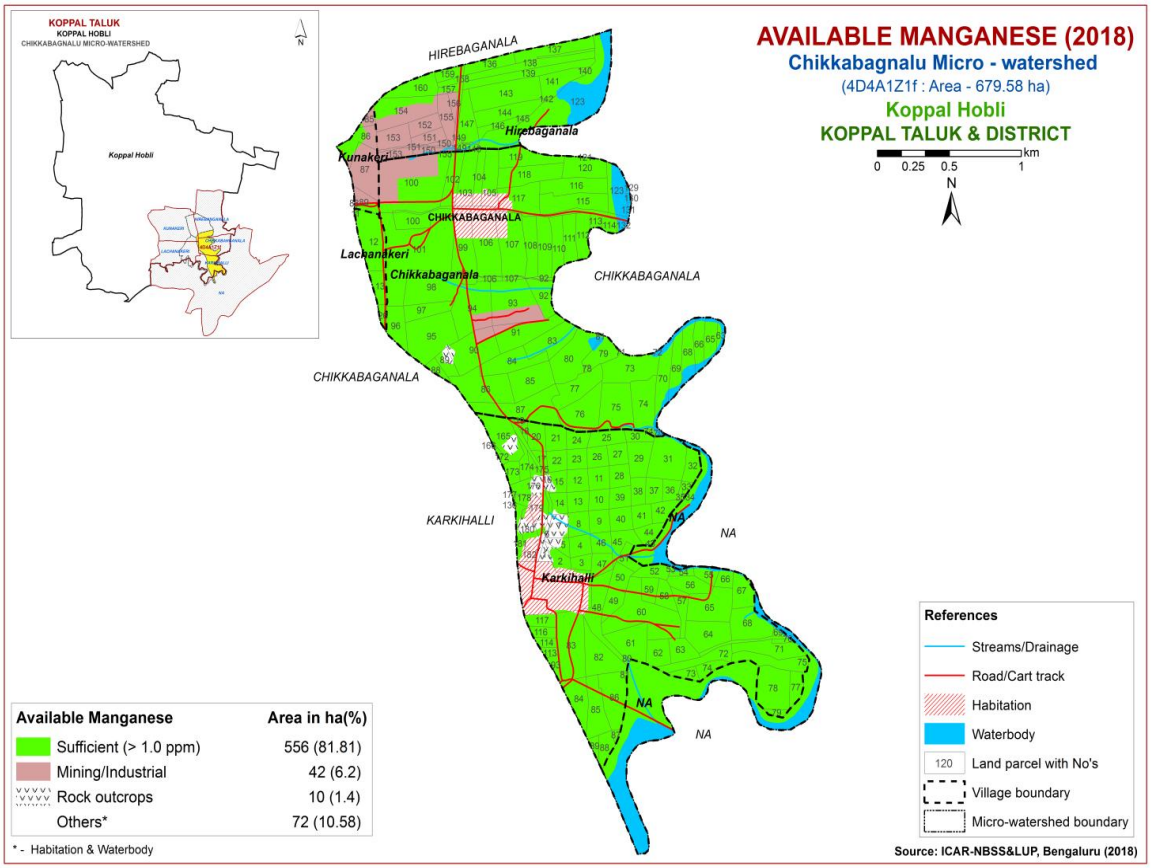


Fig.6.9 Soil Available Manganese map of Chikkabagnalu Microwatershed

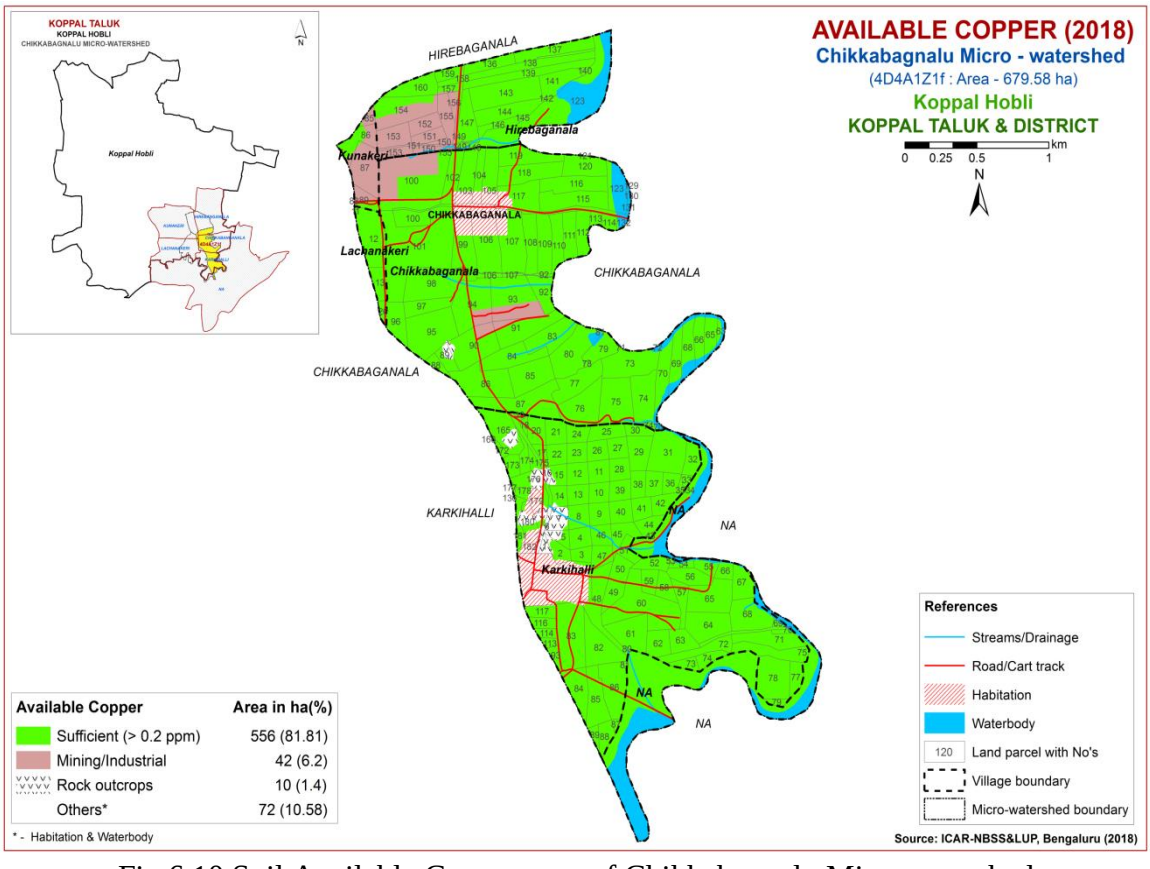


Fig.6.10 Soil Available Copper map of Chikkabagnalu Microwatershed

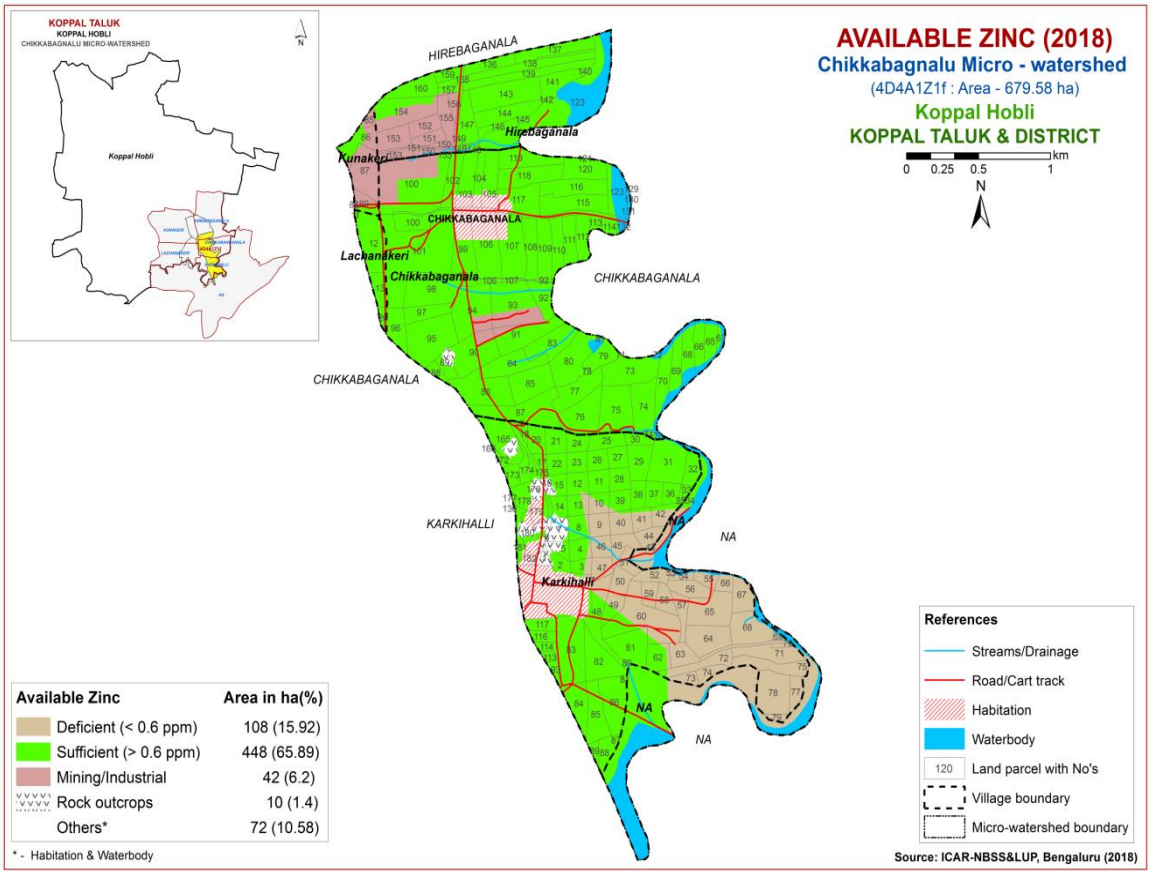


Fig.6.11 Soil Available Zinc map of Chikkabagnalu Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Chikkabagnalu Microwatershed 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 soil and land characteristics (Table 7.1) were matched with the crop requirements (Tables 7.2 to 7.32) to arrive at the crop suitability. The soil and land characteristics table and crop requirements tables are given at the end of the chapter. 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, N1 and N2 are 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, 'z' for calcareousness and 'w' for drainage. 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 for 31 major 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 food crop grown in Karnataka in an area of 10.47 lakh ha in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad, Bellary, Chitradurga, Mysore and Chamarajnagar 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 land a 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.

An area of about 90 ha (13%) is highly suitable (Class S1) for growing sorghum and occur in the northern and southern part of the microwatershed. Maximum area of about 275 ha (40%) is moderately suitable (Class S2) for growing sorghum and

distributed in the central, northern and southern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing sorghum and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

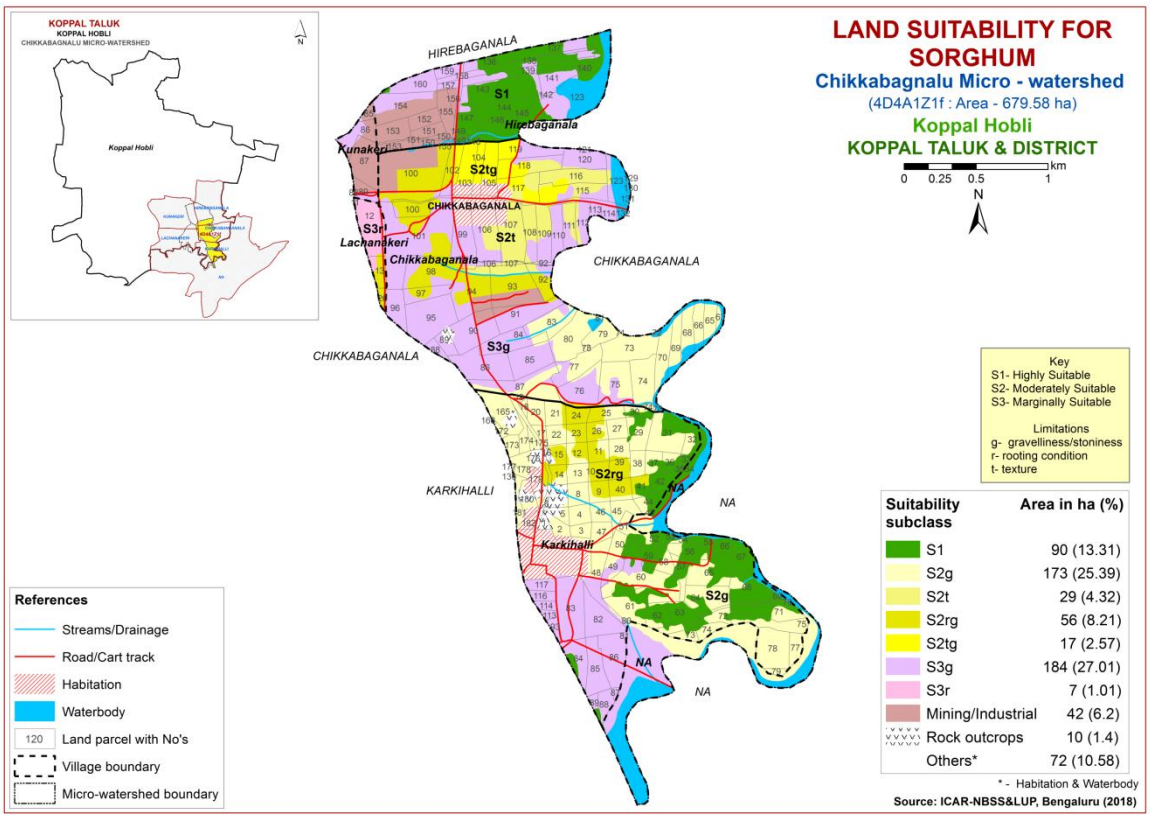


Fig. 7.1 Land Suitability map of Sorghum

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.

An area of about 75 ha (11%) is highly suitable (Class S1) for growing maize and occur in the northern and southern part of the microwatershed. Maximum area of about 291 ha (43%) is moderately suitable (Class S2) for growing maize and distributed in the central, northern and southern part of the microwatershed with minor limitations of texture, rooting depth and gravelliness. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing maize and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

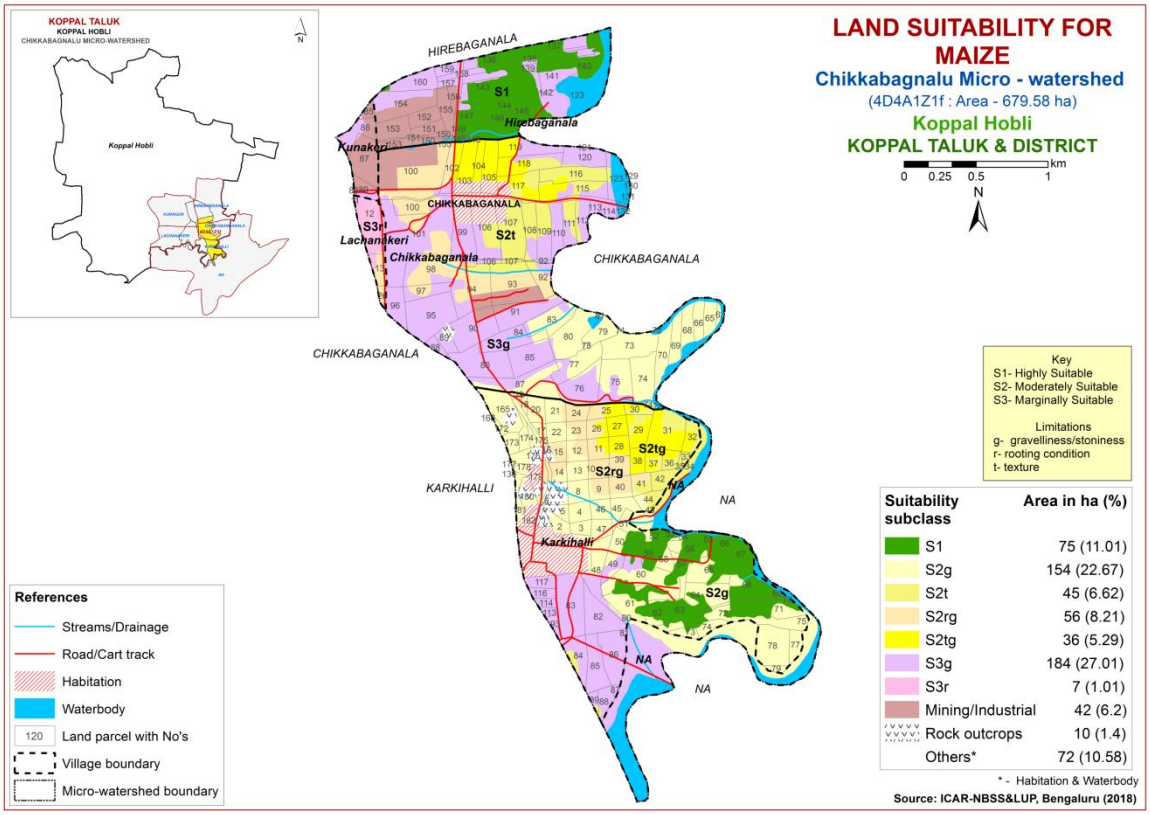


Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

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

Maximum area of about 286 ha (42%) is highly suitable (Class S1) for growing bajra and distributed in the central, northern and southern part of the microwatershed. An area of about 171 ha (25%) is moderately suitable (Class S2) for growing bajra and distributed in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. An area of about 99 ha (15%) is marginally suitable (Class S3) for growing bajra and distributed in the central and northern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

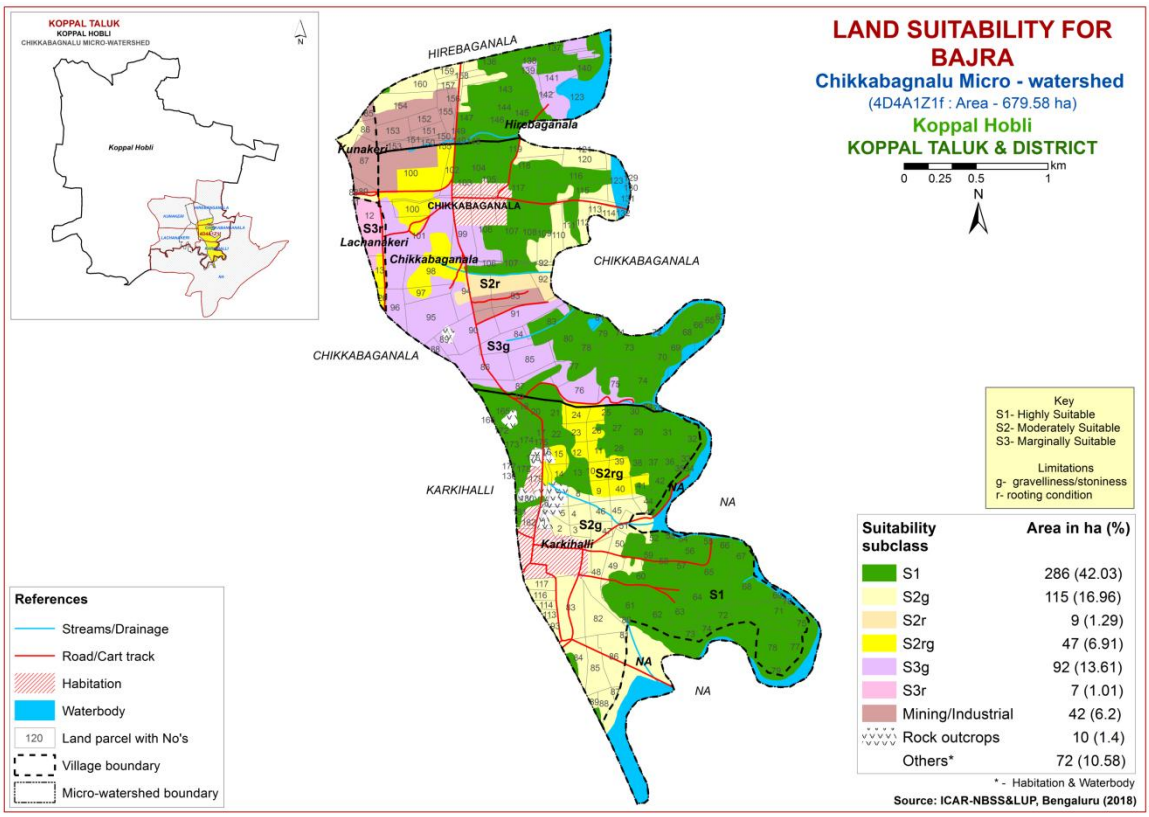


Fig. 7.3 Land Suitability map of Bajra

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.

An area of about 131 ha (19%) is highly suitable (Class S1) for growing groundnut and distributed in the central and southern part of the microwatershed. Maximum area of about 419 ha (62%) is moderately suitable (Class S2) for growing groundnut and distributed in the major part of the microwatershed. They have minor limitations of texture, rooting depth and gravelliness. An area of about 7 ha (1%) is marginally suitable (Class S3) for growing groundnut and distributed in the northern part of the microwatershed with moderate limitation of rooting depth.

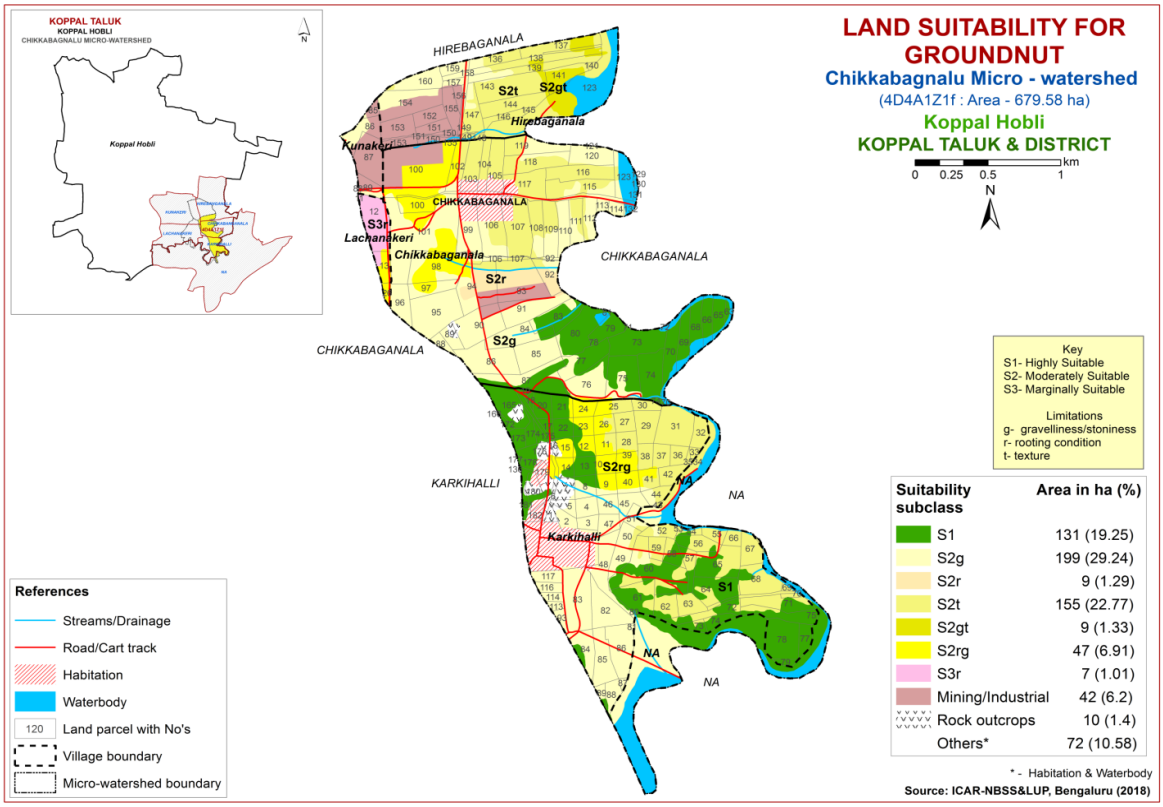


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annus*)

Sunflower is one of the most important oilseed crop grown in an area of 3.56 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.

An area of about 66 ha (10%) is highly suitable (Class S1) for growing sunflower and distributed in the northern and southern part of the microwatershed. Maximum area of about 243 ha (36%) is moderately suitable (Class S2) for growing sunflower and distributed in the central, northern and southern part of the microwatershed with minor limitations of gravelliness and rooting depth. An area of about 239 ha (35%) is marginally suitable (Class S3) for growing sunflower and occur in the central, northern and southern part of the microwatershed with moderate limitations of gravelliness and rooting depth. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing sunflower with severe limitation of rooting depth and occur in the northern part of the microwatershed.

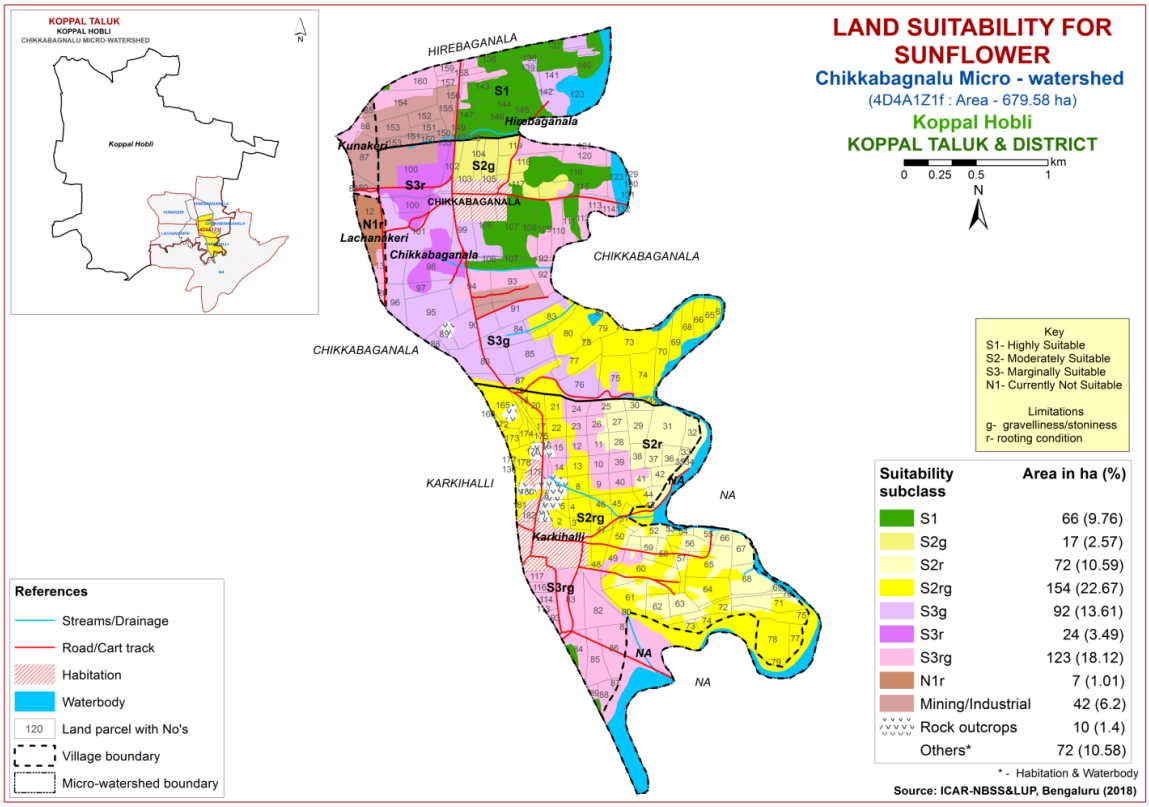


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land Suitability for Cotton (*Gossypium hirsutum*)

Cotton is one of the most important fibre crop grown in the state in about 8.75 lakh ha area in Raichur, Dharwad, Belgaum, Kalaburagi, Bijapur, Bidar, Bellary, Chitradurga and Chamarajnagar districts. The crop requirements for growing cotton (Table 7.7) 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 7.6.

An area of about 66 ha (10%) is highly suitable (Class S1) for growing cotton and occur in the northern and southern part of the microwatershed. Maximum area of about 275 ha (40%) is moderately suitable (Class S2) for growing cotton and distributed in the central, northern and southern part of the microwatershed with minor limitations of gravelliness, texture and rooting depth. An area of about 215 ha (32%) is marginally suitable (Class S3) for growing cotton and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

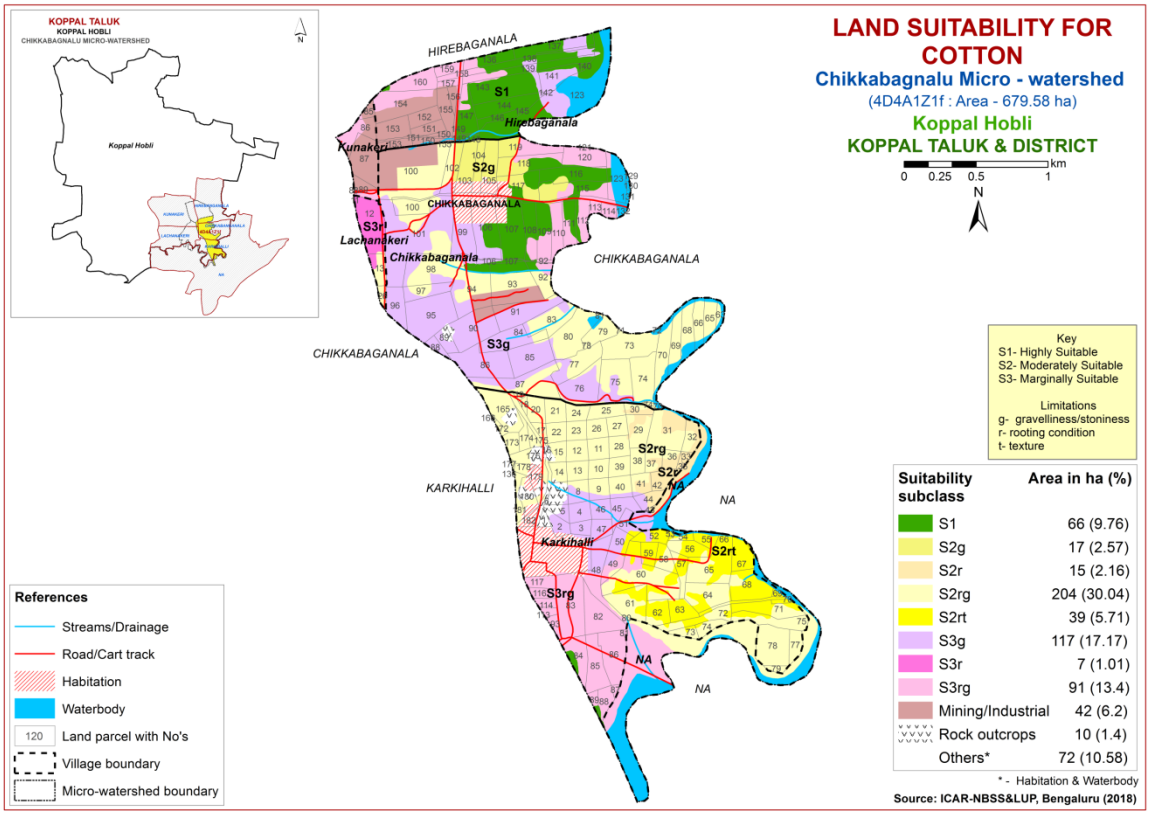


Fig. 7.6 Land Suitability map of Cotton

7.7 Land Suitability for Red gram (*Cajanus cajana*)

Red gram is one of the major pulse crop grown in an area of 7.28 lakh ha mainly in northern Karnataka in Bijapur, Kalaburagi, Raichur, Bidar, Belgaum, Dharwad and Bellary districts. The crop requirements for growing red gram (Table 7.8) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing red gram was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed is given in Figure 7.7.

An area of about 66 ha (10%) is highly suitable (Class S1) for growing red gram and occur in the northern and southern part of the microwatershed. An area of about 219 ha (32%) is moderately suitable (Class S2) for growing red gram and occur in the central, northern and southern part of the microwatershed. They have minor limitations of texture, rooting depth and gravelliness. Major area of about 264 ha (39%) is marginally suitable (Class S3) for growing red gram and distributed in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing red gram and occur in the northern part of the microwatershed with severe limitation of rooting depth.

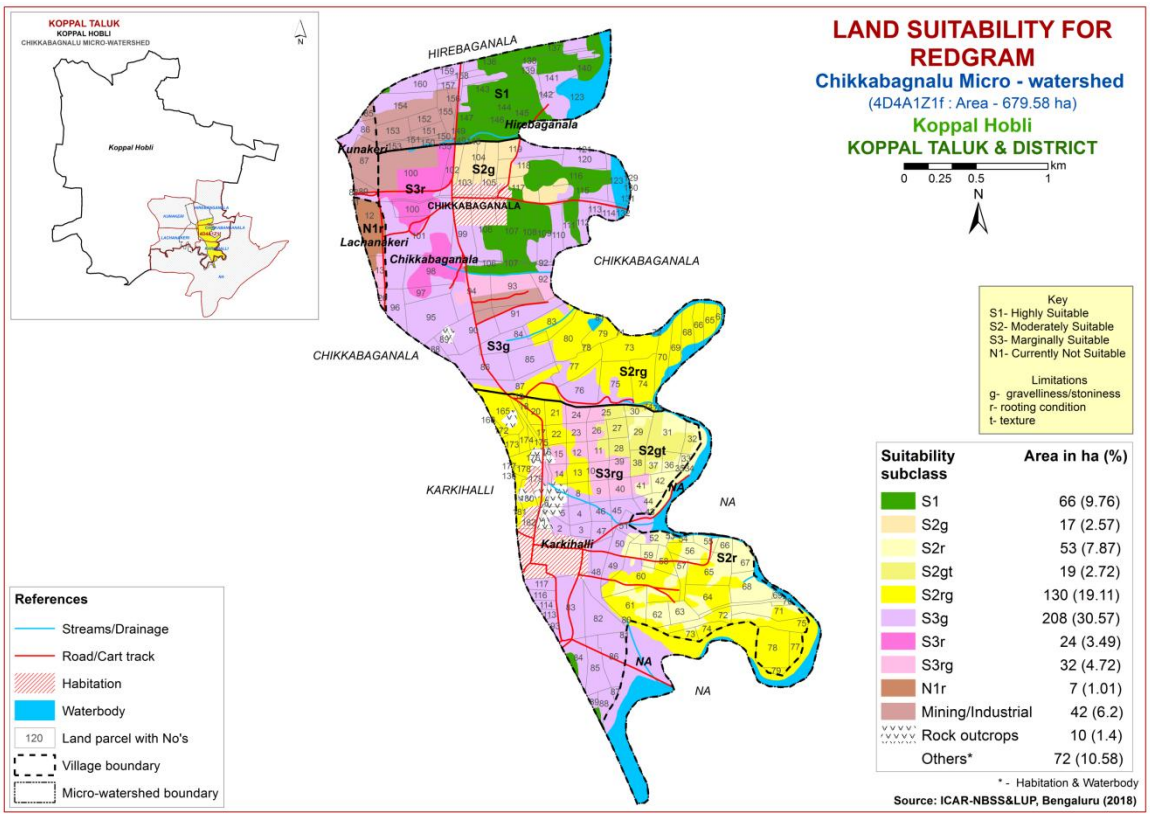


Fig. 7.7 Land Suitability map of Red gram

7.8 Land Suitability for Bengal gram (*Cicer aerativum*)

Bengal gram is one of the most important pulse crop grown in about 9.39 lakh ha area in Bijapur, Raichur, Kalaburagi, Dharwad, Belgaum and Bellary districts. The crop requirements for growing Bengal gram (Table 7.9) 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 is given in Figure 7.8.

Maximum area of about 318 ha (47%) is moderately suitable (Class S2) for growing bengal gram and distributed in the central, northern and southern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. An area of about 239 ha (35%) is marginally suitable (Class S3) for growing bengal gram and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth, texture and gravelliness.

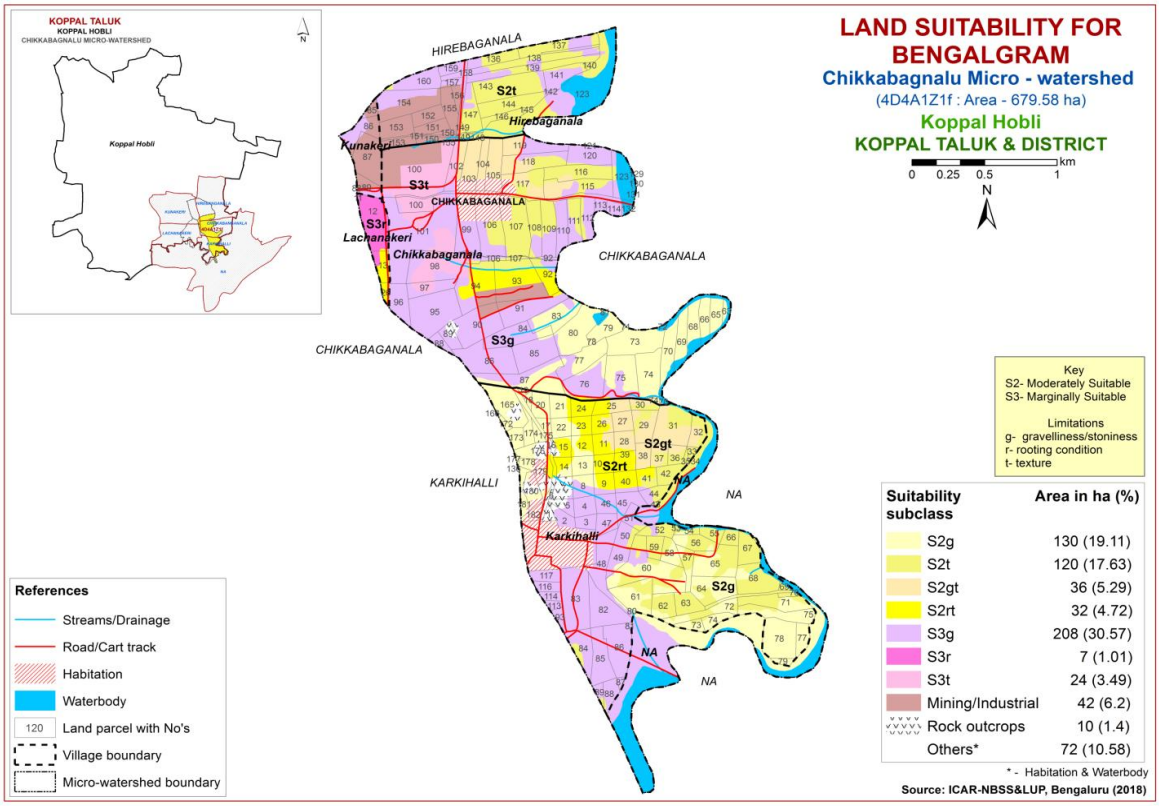


Fig. 7.8 Land Suitability map of Bengal gram

7.9 Land Suitability for Chilli (*Capsicum annuum L*)

Chilli is one of the major spice crop grown in an area of 0.42 lakh ha in Karnataka State. The crop requirements for growing chilli (Table 7.10) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing chilli was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.9.

An area of about 120 ha (18%) is highly suitable (Class S1) for growing chilli and distributed in the central, northern and southern part of the microwatershed. Maximum area of about 246 ha (36%) is moderately suitable (Class S2) for growing chilli and distributed in the central, northern and southern part of the microwatershed with minor limitations of gravelliness and rooting depth. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing chilli and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

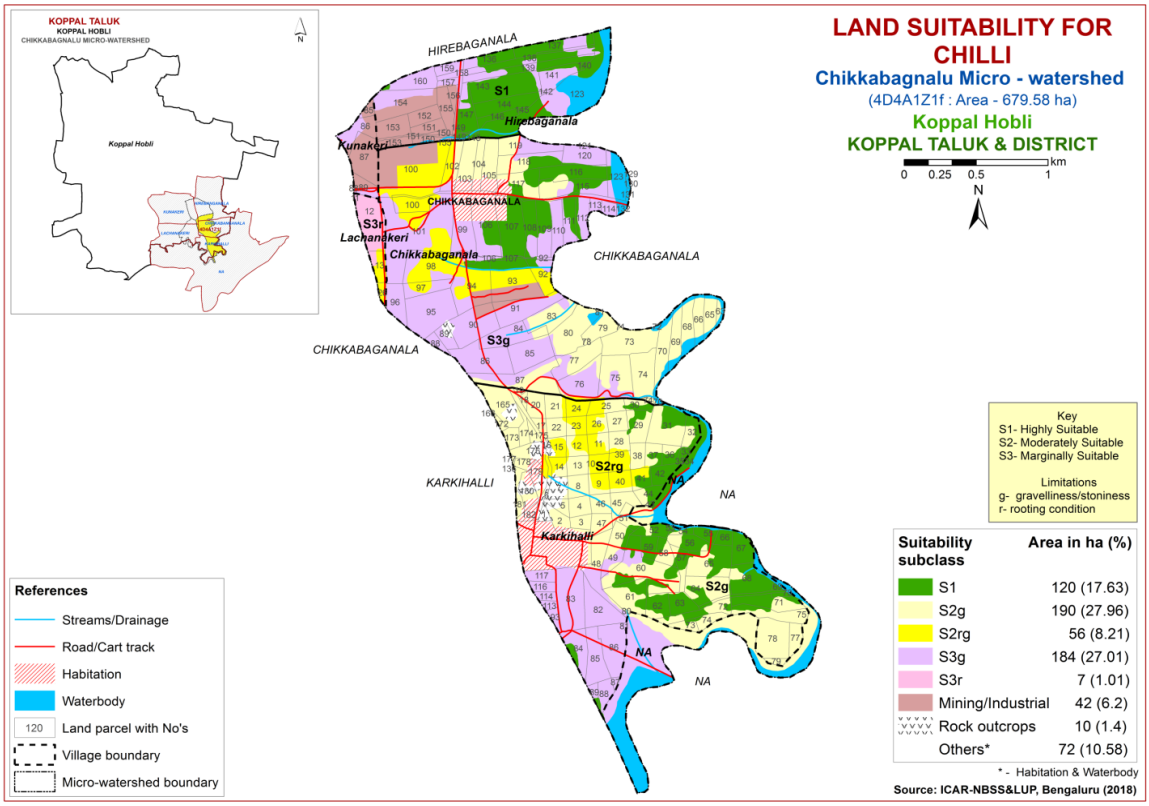


Fig. 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Solanum lycopersicum*)

Tomato is one of the most important vegetable crop grown in an area of 0.65 lakh ha in almost all the districts of the State. The crop requirements (Table 7.11) for growing tomato 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.10.

An area of about 120 ha (18%) is highly suitable (Class S1) for growing tomato and distributed in the central, northern and southern part of the microwatershed. Maximum area of about 246 ha (36%) is moderately suitable (Class S2) for growing tomato and distributed in the central, northern and southern part of the microwatershed with minor limitations of gravelliness and rooting depth. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing tomato and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

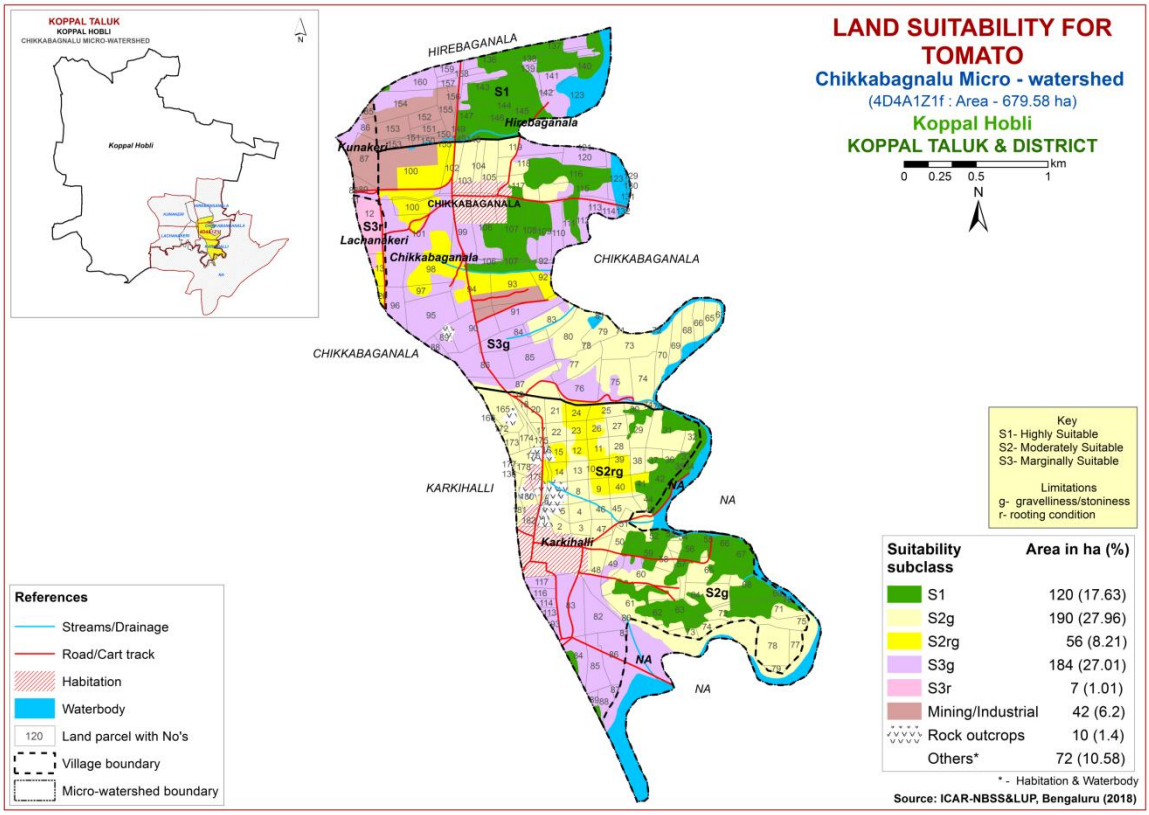


Fig. 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Brinjal (*Solanum melongena*)

Brinjal is one of the most important vegetable crop grown in the state. The crop requirements for growing brinjal (Table 7.12) 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 is given in Figure 7.11.

Highly suitable (Class S1) lands for growing brinjal occur in a major area of 243 ha (36%) and distributed in the central, northern and southern part of the microwatershed. An area of about 197 ha (29%) is moderately suitable (Class S2) for brinjal and distributed in the central, northern and southern part of the microwatershed. They have minor limitations of gravelliness, rooting depth, drainage and texture. An area about of 114 ha (17%) is marginally suitable (Class S3) and distributed in the central, northern and southern part of the microwatershed with moderate limitation of gravelliness.

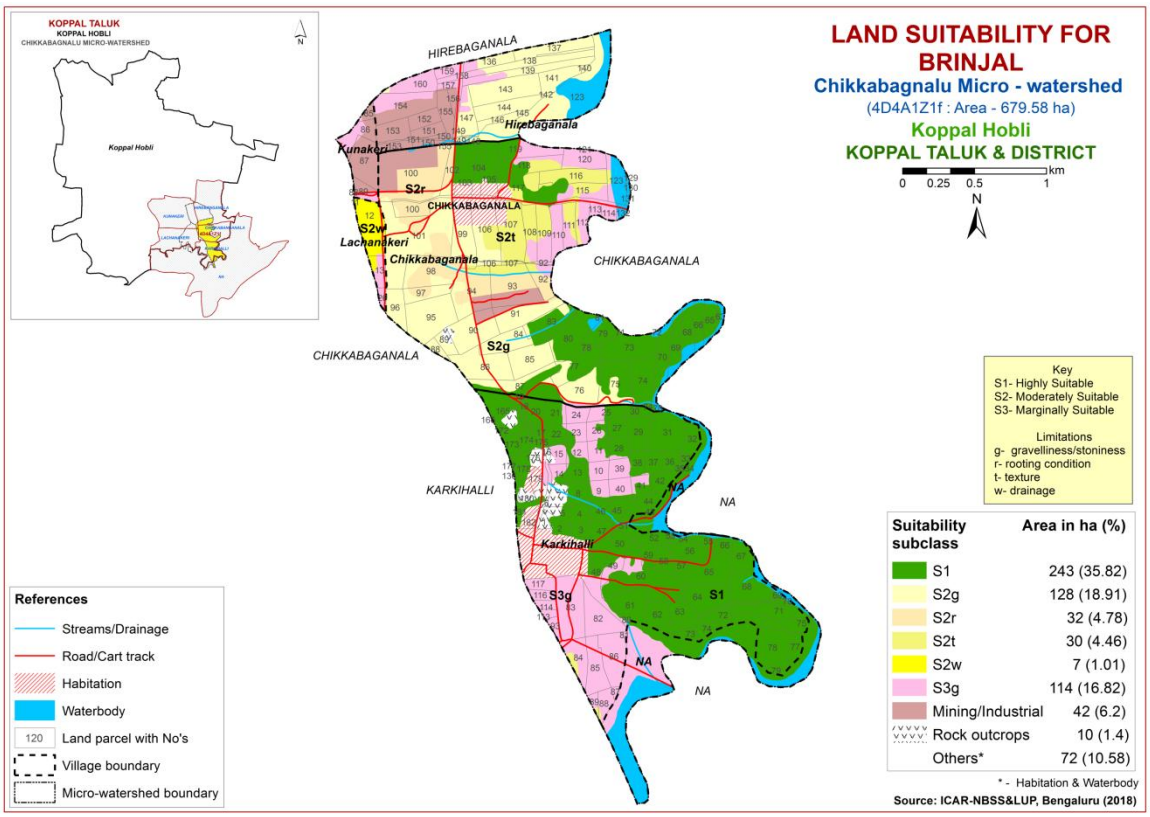


Fig 7.11 Land Suitability map of Brinjal

7.12 Land Suitability for Onion (*Allium cepa L.*,)

Onion is one of the most important vegetable crop grown in the state. The crop requirements for growing onion (Table 7.13) 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 is given in Figure 7.12.

Highly suitable (Class S1) lands for growing onion occur in an area of 154 ha (23%) and distributed in the central and southern part of the microwatershed. Maximum area of about 287 ha (42%) is moderately suitable (Class S2) for onion and distributed in the central, northern and southern part of the microwatershed. They have minor limitations of rooting depth, texture, drainage and gravelliness. An area of about 114 ha (17%) is marginally suitable (Class S3) and distributed in the central, northern and southern part of the microwatershed with moderate limitation of gravelliness.

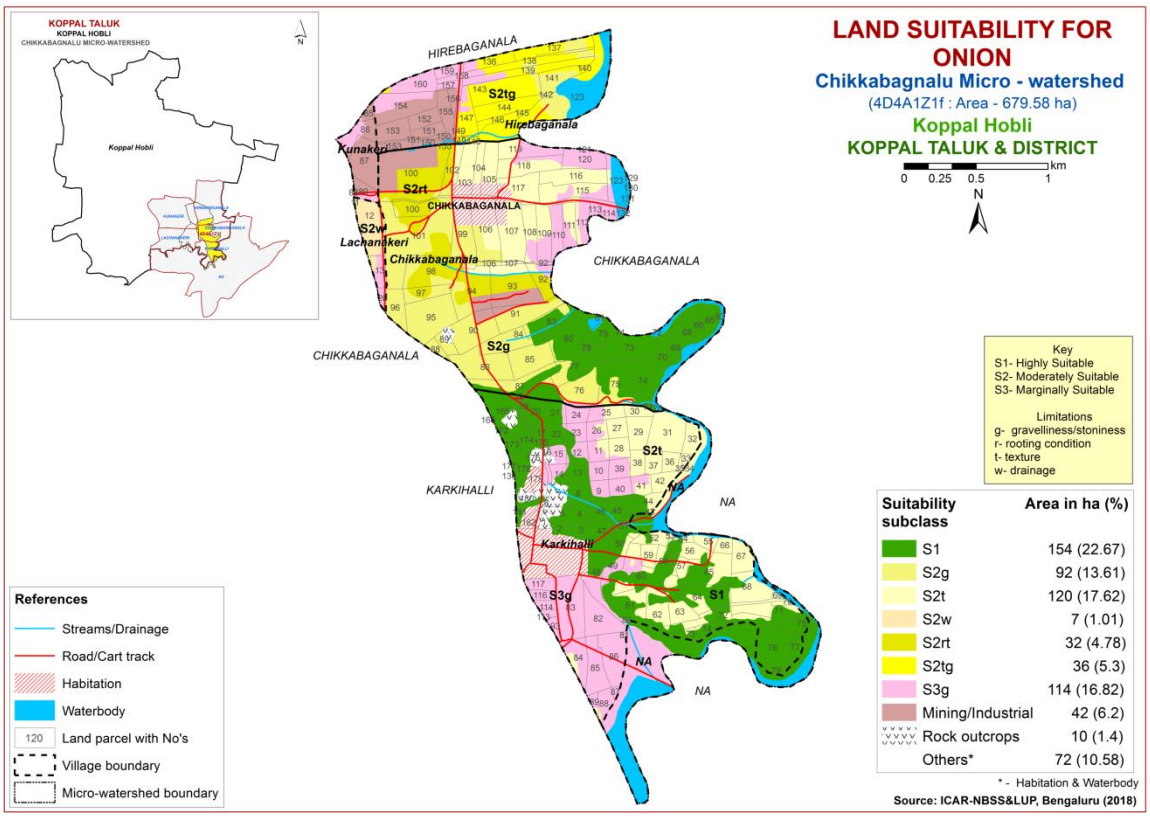


Fig 7.12 Land Suitability map of Onion

7.13 Land Suitability for Bhendi (*Abelmoschus esculentus*)

Bhendi is one of the most important vegetable crop grown in the state. 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 is given in Figure 7.13.

Highly suitable (Class S1) lands for growing bhendi occur in an area of 154 ha (23%) and distributed in the central and southern part of the microwatershed. Maximum area of about 287 ha (42%) is moderately suitable (Class S2) for bhendi and distributed in the central, northern and southern part of the microwatershed. They have minor limitations of gravelliness, rooting depth, drainage and texture. An area about of 114 ha (17%) is marginally suitable (Class S3) and distributed in the central, northern and southern part of the microwatershed with moderate limitation of gravelliness.

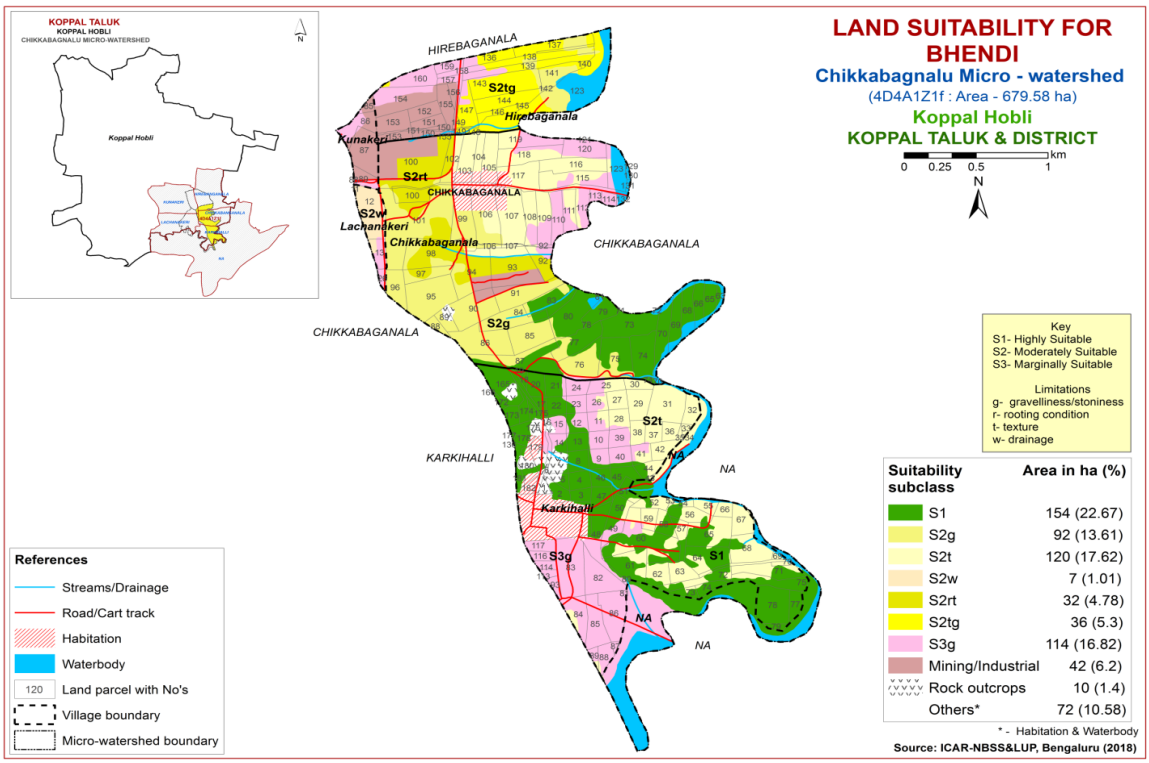


Fig 7.13 Land Suitability map of Bhendi

7.14 Land Suitability for Drumstick (*Moringa oleifera)*

Drumstick is one of the most important vegetable crop grown in 2403 ha area in the state. The crop requirements for growing drumstick (Table 7.15) 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 7.14.

An area of about 84 ha (12%) is highly suitable (Class S1) for growing drumstick and distributed in the northern and southern part of the microwatershed. Maximum area of 318 ha (47%) is moderately suitable (Class S2) for growing drumstick and distributed in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. An area of about 146 ha (22%) is marginally suitable (Class S3) for growing drumstick and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing drumstick and occur in the northern part of the microwatershed with severe limitation of rooting depth.

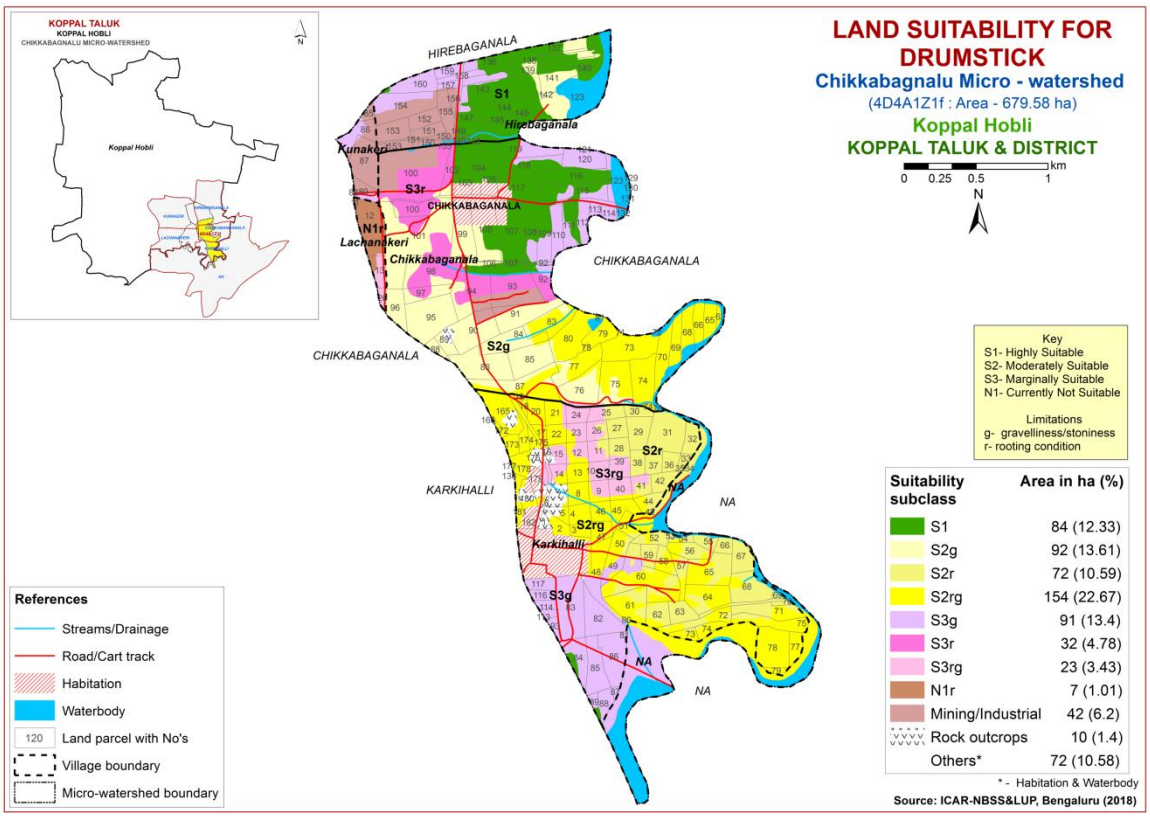


Fig. 7.14 Land Suitability map of Drumstick

7.15 Land Suitability for Mulberry (*Morus nigra*)

Mulberry is the most important leaf crop grown for rearing silkworms in about 1.66 lakh ha in all the districts of the state. The crop requirements for growing mulberry (Table 7.16) 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 7.15.

Highly suitable (Class S1) lands for growing mulberry occur in an area of 84 ha (12%) and distributed in the northern and southern part of the microwatershed. Moderately suitable (Class S2) lands occupy a major area of about 410 ha (60%) and occur in the major part of the microwatershed. They have minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 55 ha (8%) and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing mulberry and occur in the northern part of the microwatershed with severe limitation of rooting depth.

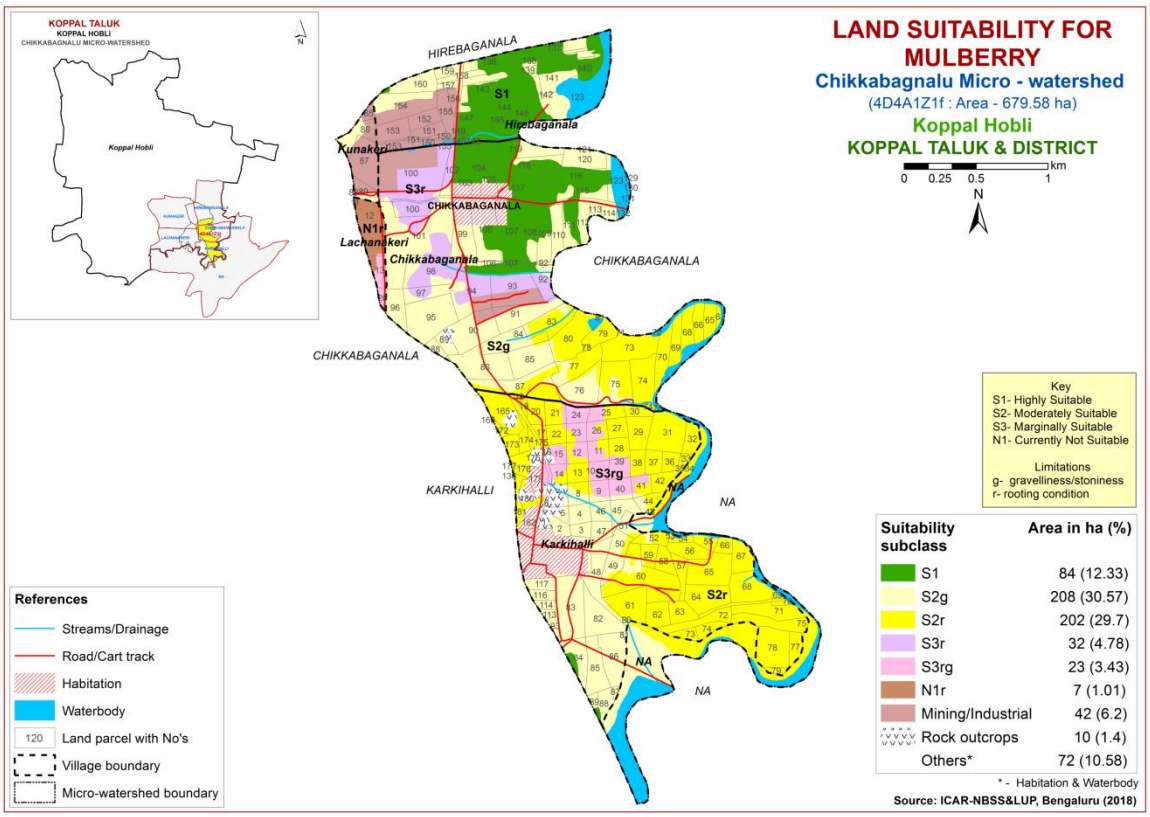


Fig. 7.15 Land Suitability map of Mulberry

7.16 Land Suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in about 1.73 lakh ha in almost all the districts of the State. The crop requirements (Table 7.17) 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 are given in Figure 7.16.

An area of about 37 ha (5%) is highly suitable (Class S1) for growing mango and distributed in the northern and southern part of the microwatershed. Moderately suitable (Class S2) lands occupy an area of about 47 ha (7%) and occur in the northern part of the microwatershed. They have minor limitation of rooting depth. Marginally suitable (Class S3) lands cover a major area of about 409 ha (60%) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 63 ha (9%) is currently not suitable (Class N1) for growing mango and occur in the central, northern and southern part of the microwatershed with severe limitation of rooting depth.

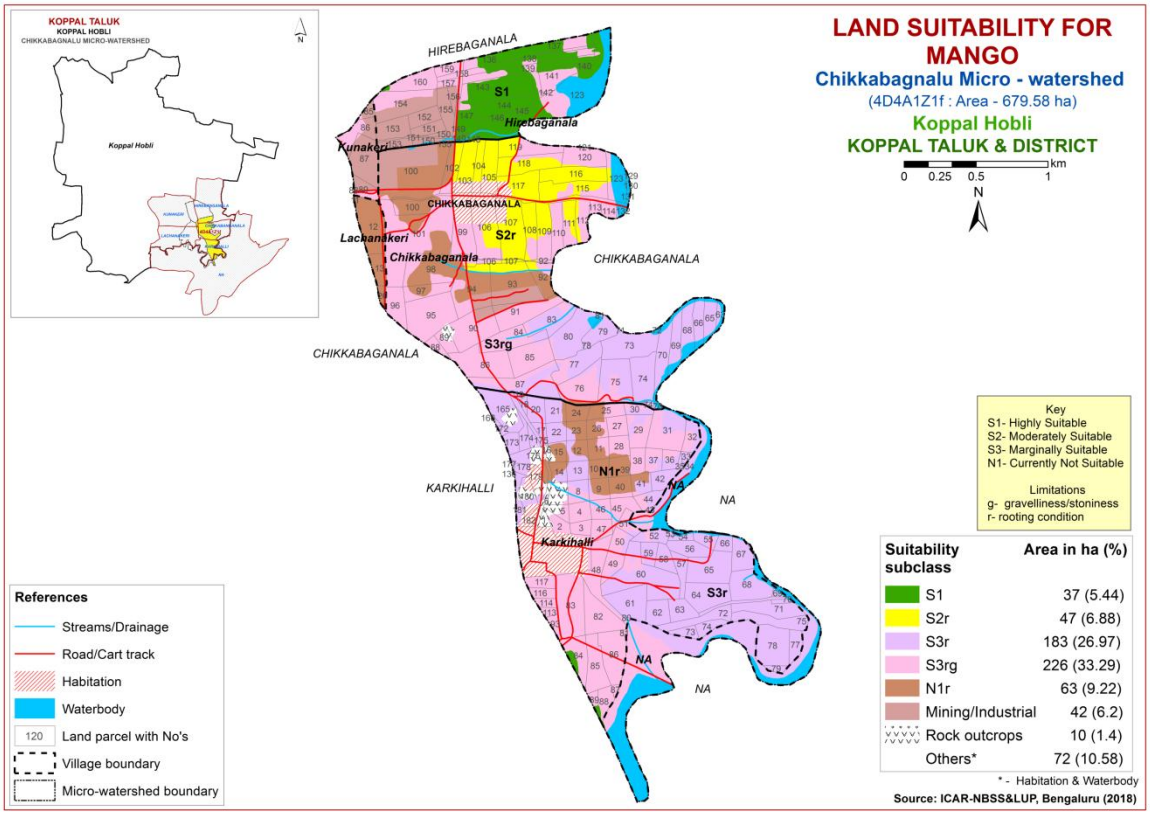


Fig. 7.16 Land Suitability map of Mango

7.17 Land Suitability for Sapota (*Manilkara zapota*)

Sapota is one of the most important fruit crop grown in an area of about 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.17.

An area of about 84 ha (12%) is highly suitable (Class S1) for growing sapota and distributed in the northern and southern part of the microwatershed. Maximum area of about 317 ha (47%) is moderately suitable (Class S2) for growing sapota and distributed in the central, northern and southern part of the microwatershed with minor limitations of gravelliness and rooting depth. An area of about 147 ha (22%) is marginally (Class S3) suitable for growing sapota and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing sapota and occur in the northern part of the microwatershed with severe limitation of rooting depth.

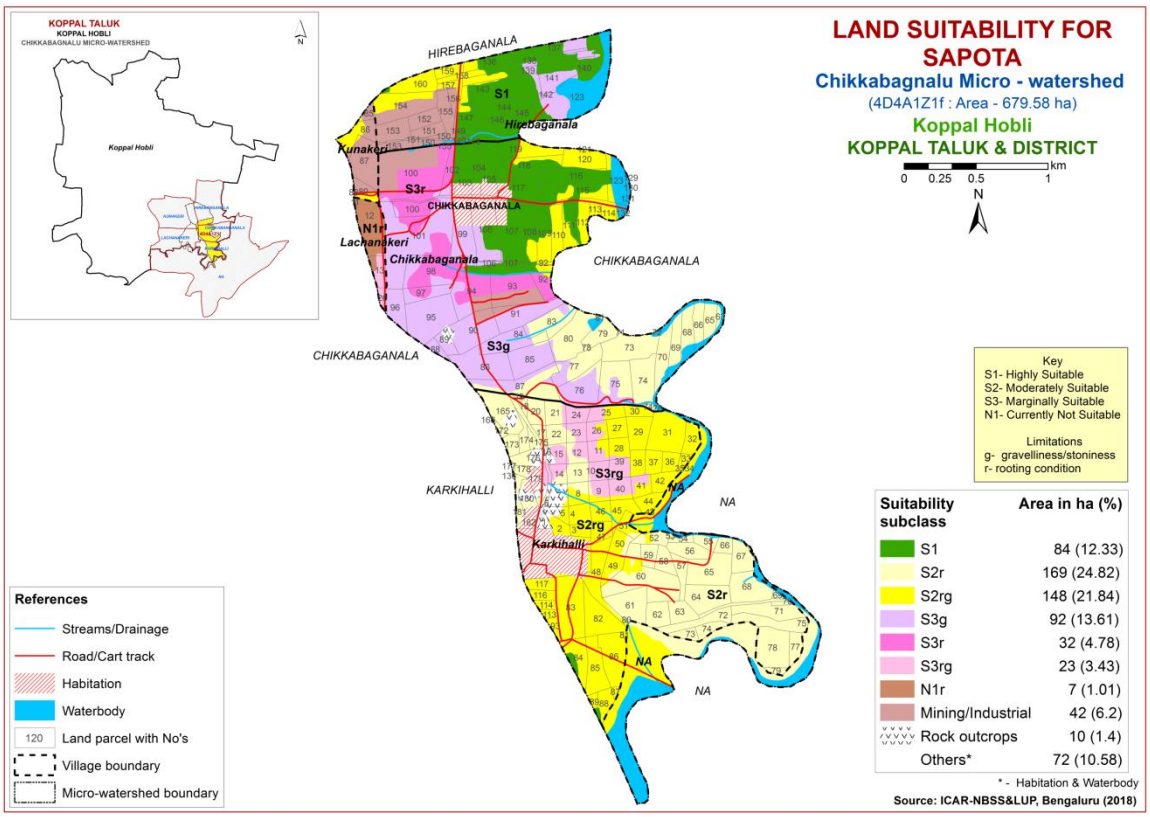


Fig. 7.17 Land Suitability map of Sapota

7.18 Land Suitability for Pomegranate (*Punica granatum*)

Pomegranate is one of the commercially grown fruit crop 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) of the soils of the microwatershed and a land suitability map for growing pomegranate was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.18.

Highly suitable (Class S1) lands for growing pomegranate occur in an area of about 84 ha (12%) and distributed in the northern and southern part of the microwatershed. Maximum area of about 317 ha (47%) is moderately suitable (Class S2) for growing pomegranate and occur in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 147 ha (22%) and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing pomegranate and occur in the northern part of the microwatershed with severe limitation of rooting depth.

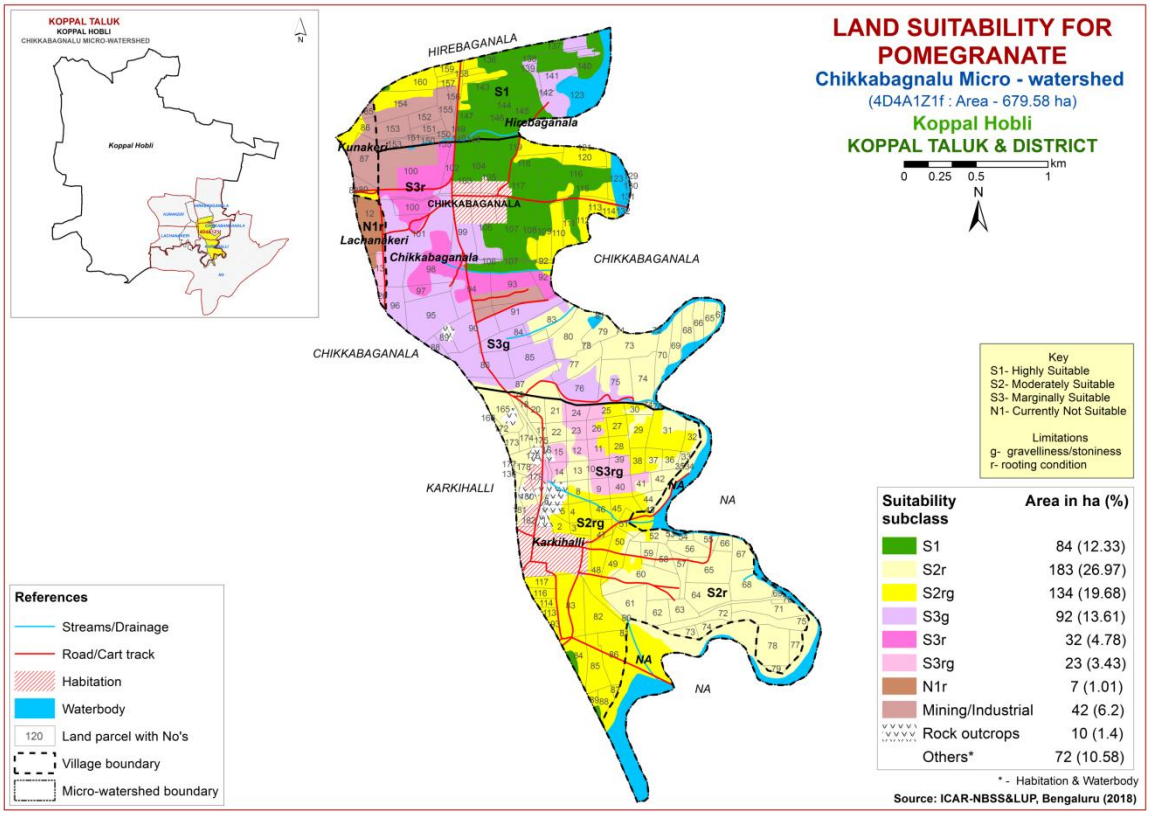


Fig. 7.18 Land Suitability map of Pomegranate

7.19 Land Suitability for Guava (*Psidium guajava*)

Guava is one of the most important fruit crop grown in an area of about 6558 ha in almost all the districts of the state. The crop requirements (Table 7.20) for growing guava were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing guava was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.19.

An area of about 1 ha (<1%) is highly suitable (Class S1) for growing guava and distributed in the southern part of the microwatershed. Maximum area of about 400 ha (59%) is moderately suitable (Class S2) for growing guava and distributed in the major part of the microwatershed with minor limitations of rooting depth, texture and gravelliness. An area of 147 ha (22%) is marginally (Class S3) suitable for growing guava and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing guava and occur in the northern part of the microwatershed with severe limitation of rooting depth.

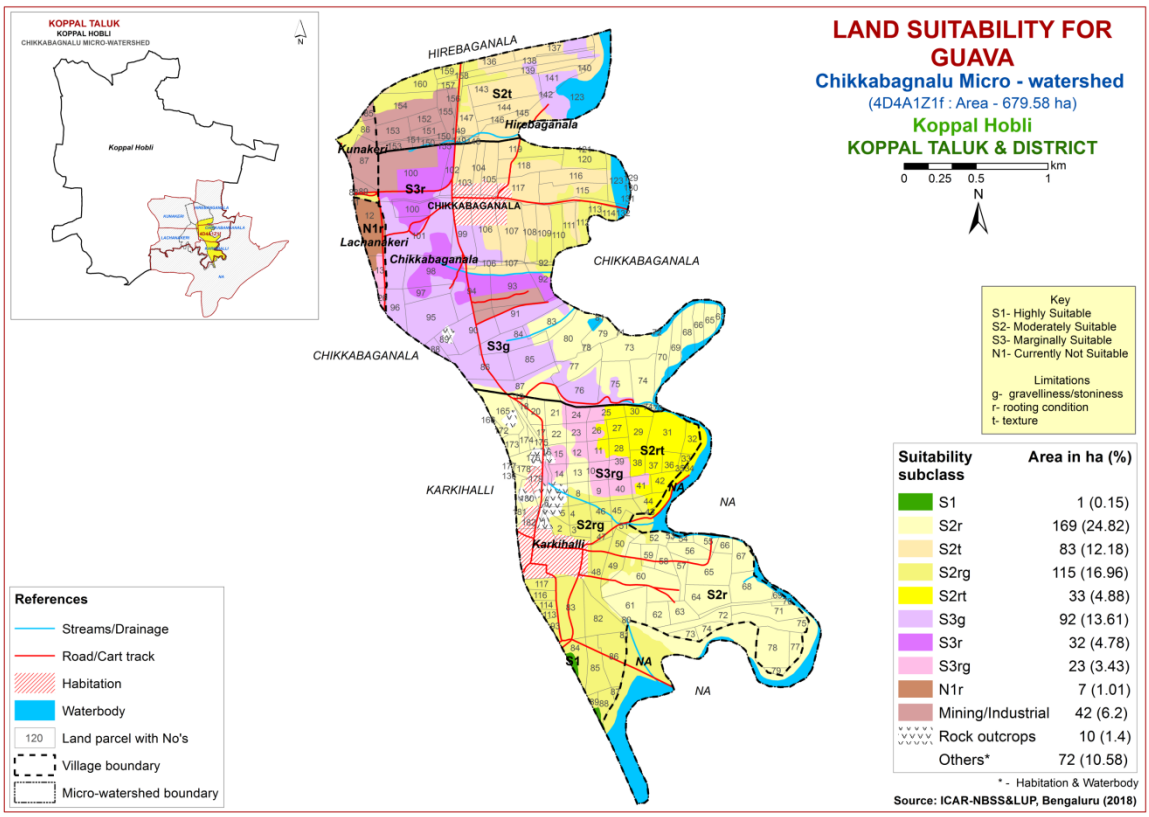


Fig. 7.19 Land Suitability map of Guava

7.20 Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

Jackfruit is one of the most important fruit crop grown in 5368 ha in all the districts of the state. The crop requirements (Table 7.21) for growing jackfruit 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 geographic distribution of different suitability subclasses in the microwatershed are given in figure 7.20.

Highly suitable (Class S1) lands for growing jackfruit occur in an area of about 84 ha (12%) and distributed in the northwestern, northern and southern part of the microwatershed. Maximum area of about 317 ha (47%) is moderately suitable (Class S2) for growing jackfruit and distributed in the central, northern and southern part of the microwatershed with minor limitations of gravelliness and rooting depth. An area of about 147 ha (22%) is marginally (Class S3) suitable for growing jackfruit and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing jackfruit and occur in the northern part of the microwatershed with severe limitation of rooting depth.

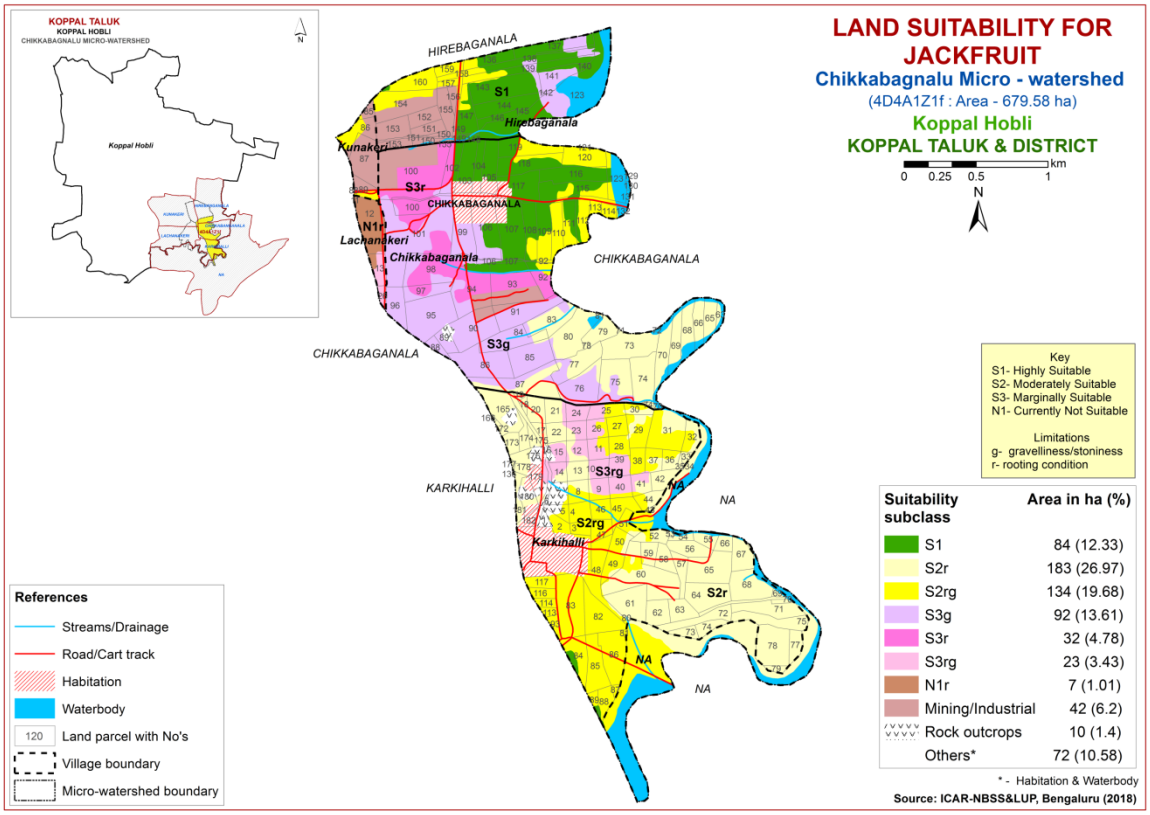


Fig. 7.20 Land Suitability map of Jackfruit

7.21 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is one of the important fruit crop grown in almost all the districts of the state. The crop requirements (Table 7.22) for growing jamun 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.21.

An area of about 37 ha (5%) is highly suitable (Class S1) for growing jamun and distributed in the northern and southern part of the microwatershed. Maximum area of 301 ha (44%) is moderately suitable (Class S2) for growing jamun and occur in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 210 ha (31%) and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing jamun and occur in the northern part of the microwatershed with severe limitation of rooting depth.

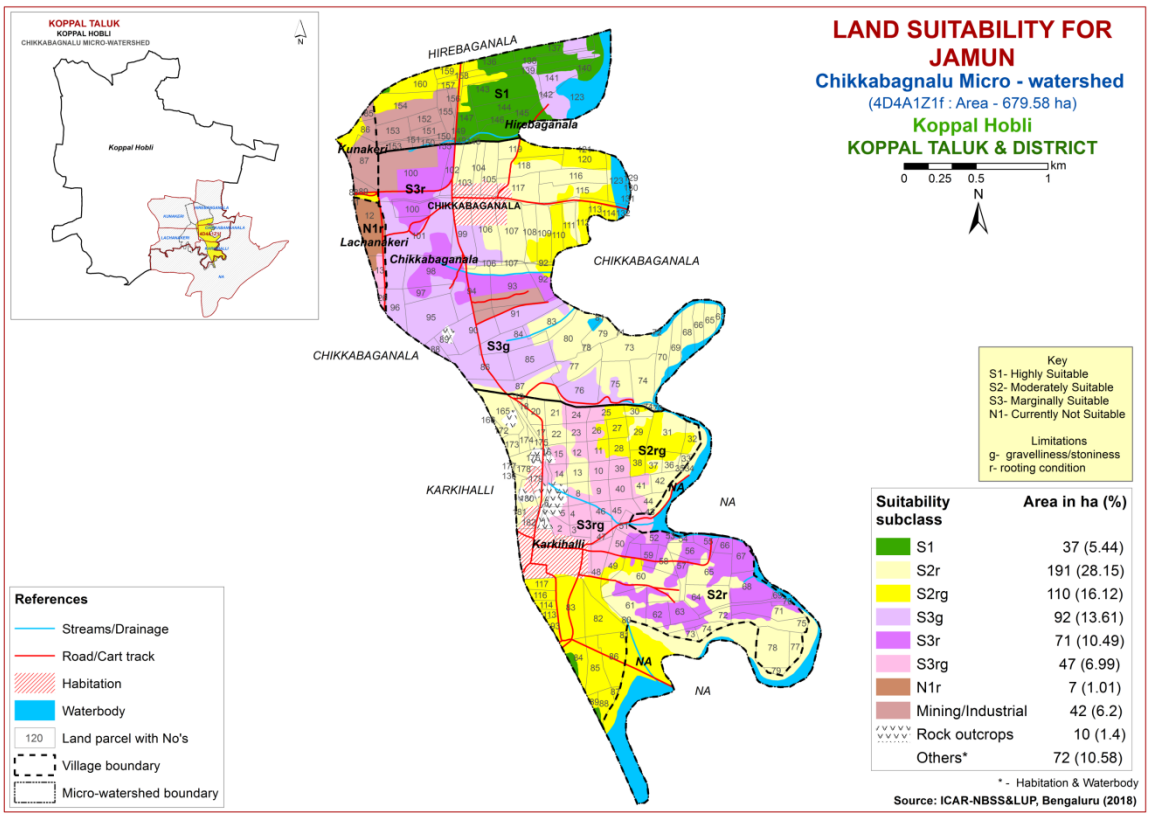


Fig. 7.21 Land Suitability map of Jamun

7.22 Land Suitability for Musambi (*Citrus limetta*)

Musambi is one of the most important fruit crop grown in an area of 5446 ha in almost all the districts of the state. The crop requirements (Table 7.23) for growing musambi 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.22.

Highly suitable (Class S1) lands for growing musambi cover an area of about 84 ha (12%) and occur in the northern and southern part of the microwatershed. Maximum area of about 293 ha (43%) is moderately suitable (Class S2) for growing musambi and occur in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 171 ha (25%) and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing musambi and occur in the northern part of the microwatershed with severe limitation of rooting depth.

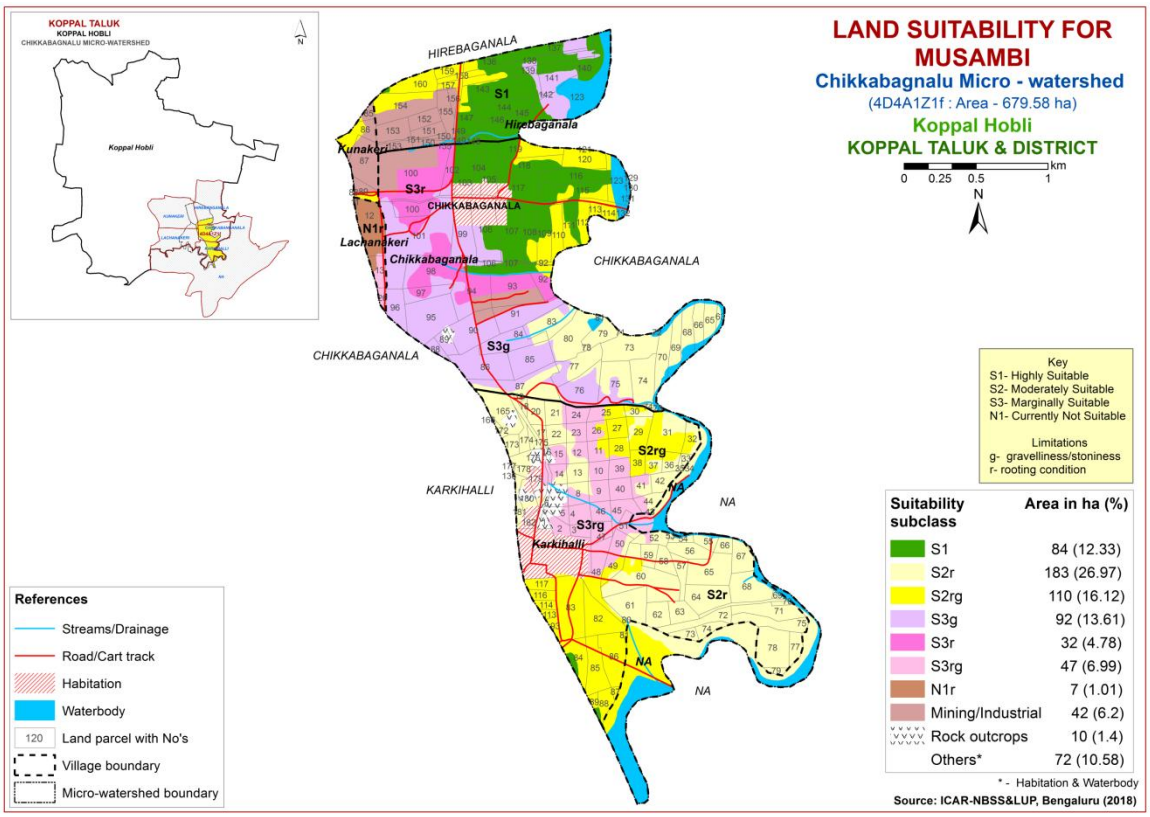


Fig. 7.22 Land Suitability map of Musambi

7.23 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 11752 ha in almost all the districts of the State. The crop requirements (Table 7.24) for growing lime (Table 7.15) 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.23.

An area of about 84 ha (12%) is highly suitable (Class S1) for growing lime and occur in the northern and southern part of the microwatershed. Maximum area of about 293 ha (43%) is moderately suitable (Class S2) for growing lime and occur in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 171 ha (25%) and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is currently not suitable (Class N1) for growing lime and occur in the northern part of the microwatershed with severe limitation of rooting depth.

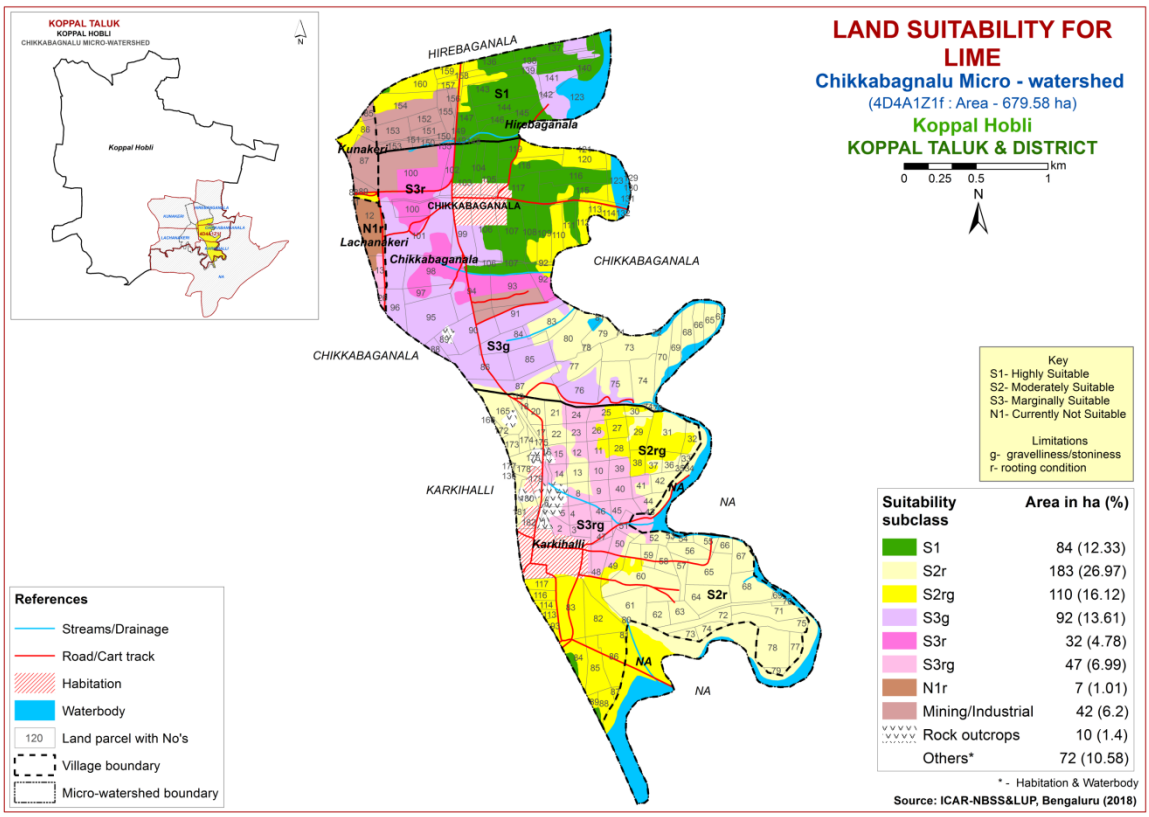


Fig. 7.23 Land Suitability map of Lime

7.24 Land Suitability for Cashew (*Anacardium occidentale)*

Cashew is one of the most important nut crop grown in an area of 7052 ha in almost all the districts of the State. The crop requirements (Table 7.25) for growing cashew 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.24.

Highly suitable (Class S1) lands for growing cashew cover an area of about 40 ha (6%) and occur in the southern part of the microwatershed. Maximum area of about 361 ha (53%) is moderately suitable (Class S2) for growing cashew and distributed in the major part of the microwatershed with minor limitations of rooting depth, texture and gravelliness. An area of about 147 ha (22%) is marginally suitable (Class S3) for growing cashew and distributed in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness. Currently not suitable (Class N1) lands cover an area of about 7 ha (1%) and distributed in the northern part of the microwatershed with severe limitation of rooting depth.

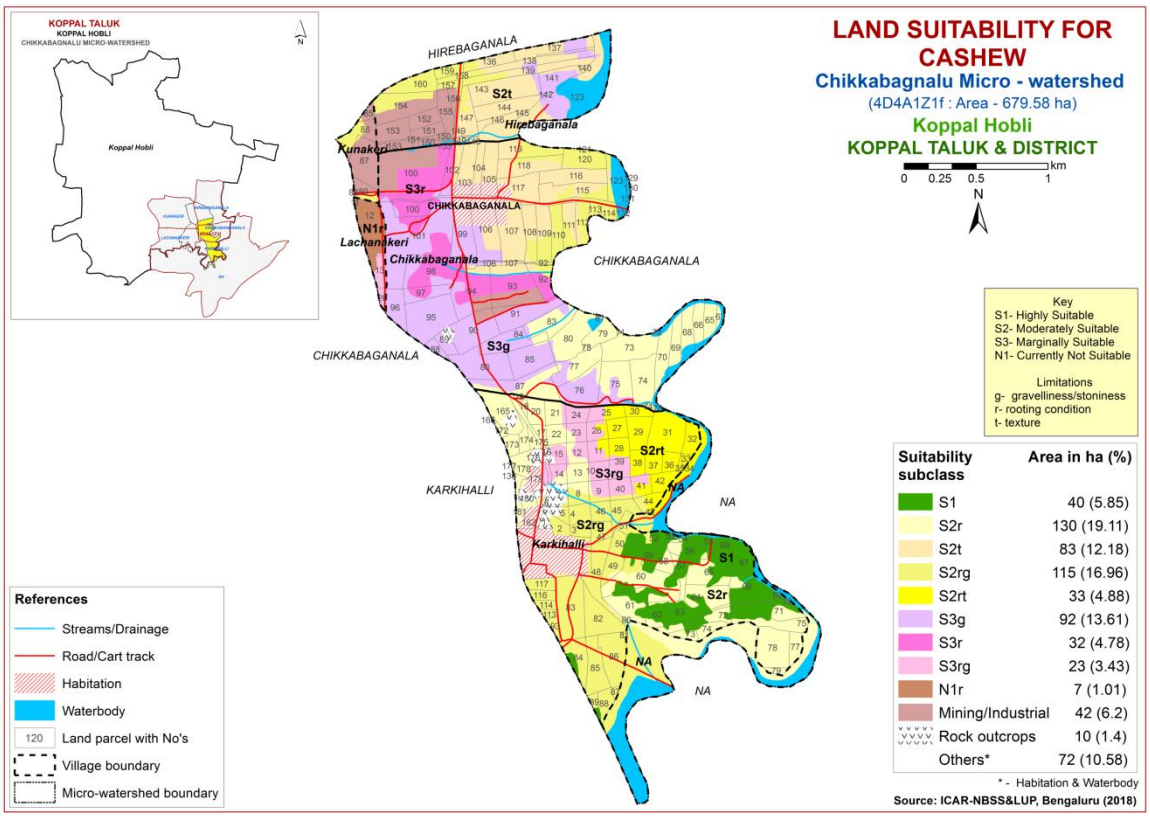


Fig. 7.24 Land Suitability map of Cashew

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

Custard apple is one of the most important fruit crop grown in 1426 ha in almost all the districts of the State. The crop requirements (Table 7.26) for growing custard apple 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.25.

Maximum area of about 286 ha (42%) is highly suitable (Class S1) for growing custard apple and occur in the central, northern and southern part of the microwatershed. An area of about 264 ha (39%) is moderately suitable (Class S2) for growing custard apple and occur in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 7 ha (1%) for growing custard apple and occur in the northern part of the microwatershed. They have moderate limitations of rooting depth.

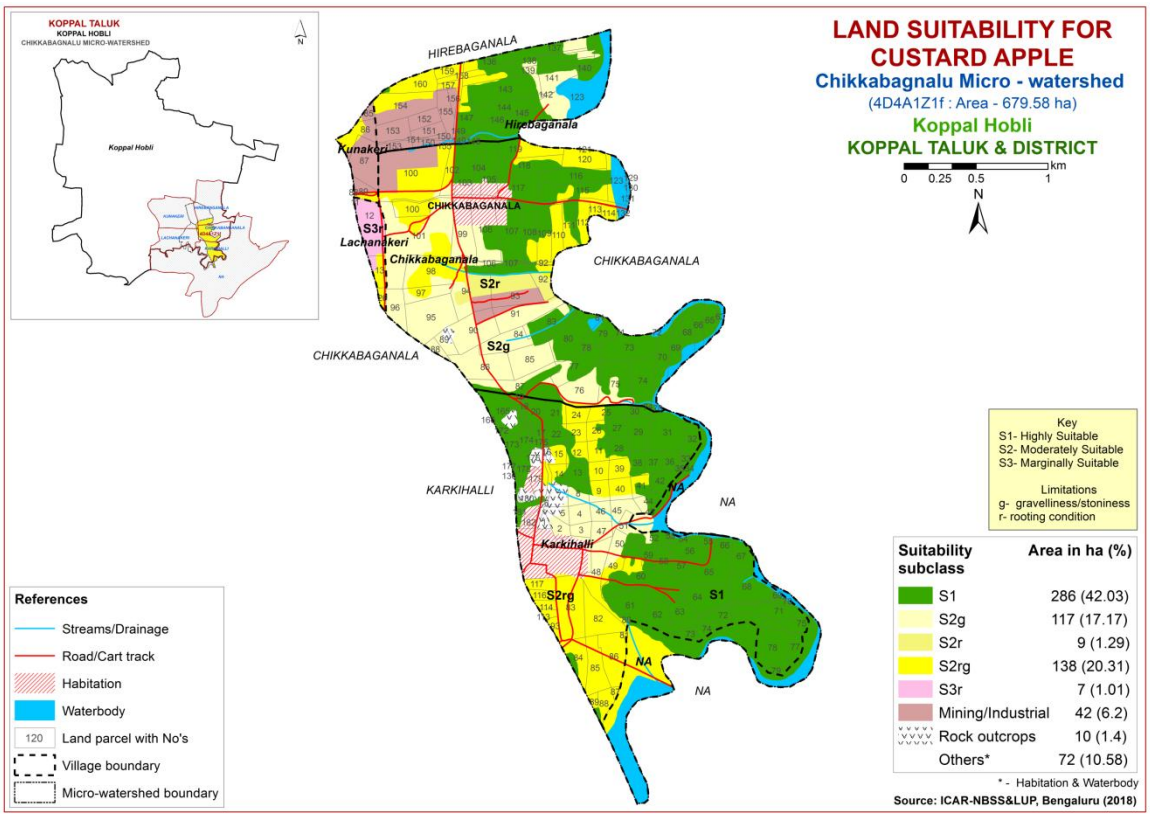


Fig. 7.25 Land Suitability map of Custard Apple

7.26 Land Suitability for Amla (*Phyllanthus emblica*)

Amla is one of the most important fruit and medicinal crop grown in an area of 151 ha and distributed in almost all the districts of the state. The crop requirements for (Table 7.27) growing amla 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 geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.26.

Highly suitable (Class S1) lands for growing amla cover a major area of about 286 ha (42%) and occur in the central, northern and southern part of the microwatershed. An area of about 264 ha (39%) is moderately suitable (Class S2) for growing amla and occur in the central, northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. An area of about 7 ha (1%) is marginally suitable (Class S3) for growing amla and occur in the northern part of the microwatershed with moderate limitation of rooting depth.

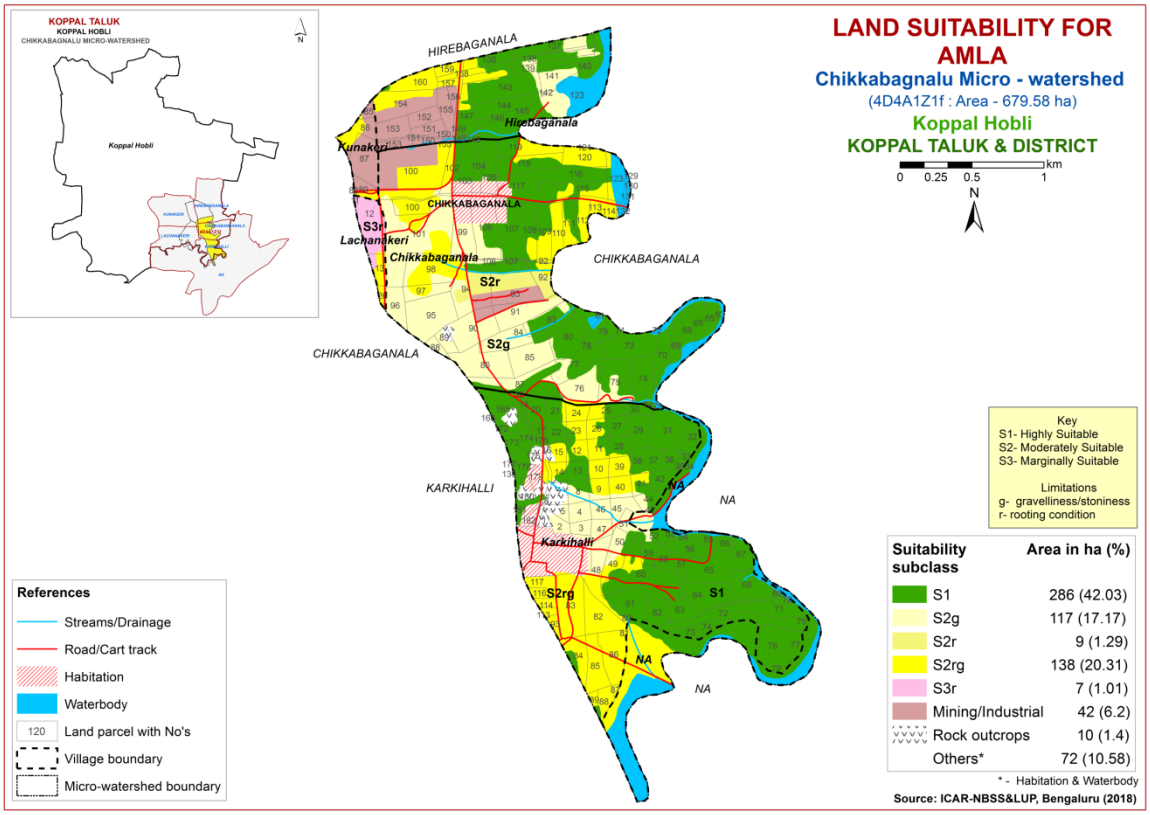


Fig. 7.26 Land Suitability map of Amla

7.27 Land Suitability for Tamarind (*Tamarindus indica*)

Tamarind is one of the most important spice crop grown in 14897 ha in all the districts of the state. The crop requirements (Table 7.28) for growing tamarind 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 Figure 7.27.

An area of about 37 ha (5%) is highly suitable (Class S1) for growing tamarind and occur in the northern and southern part of the microwatershed. An area of about 82 ha (12%) is moderately suitable (Class S2) for growing tamarind and occur in the northern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover a major area of 374 ha (55%) for growing tamarind and occur in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 63 ha (9%) is currently not suitable (Class N1) for growing tamarind and distributed in the central, northern and southern part of the microwatershed. They have severe limitations of rooting depth.

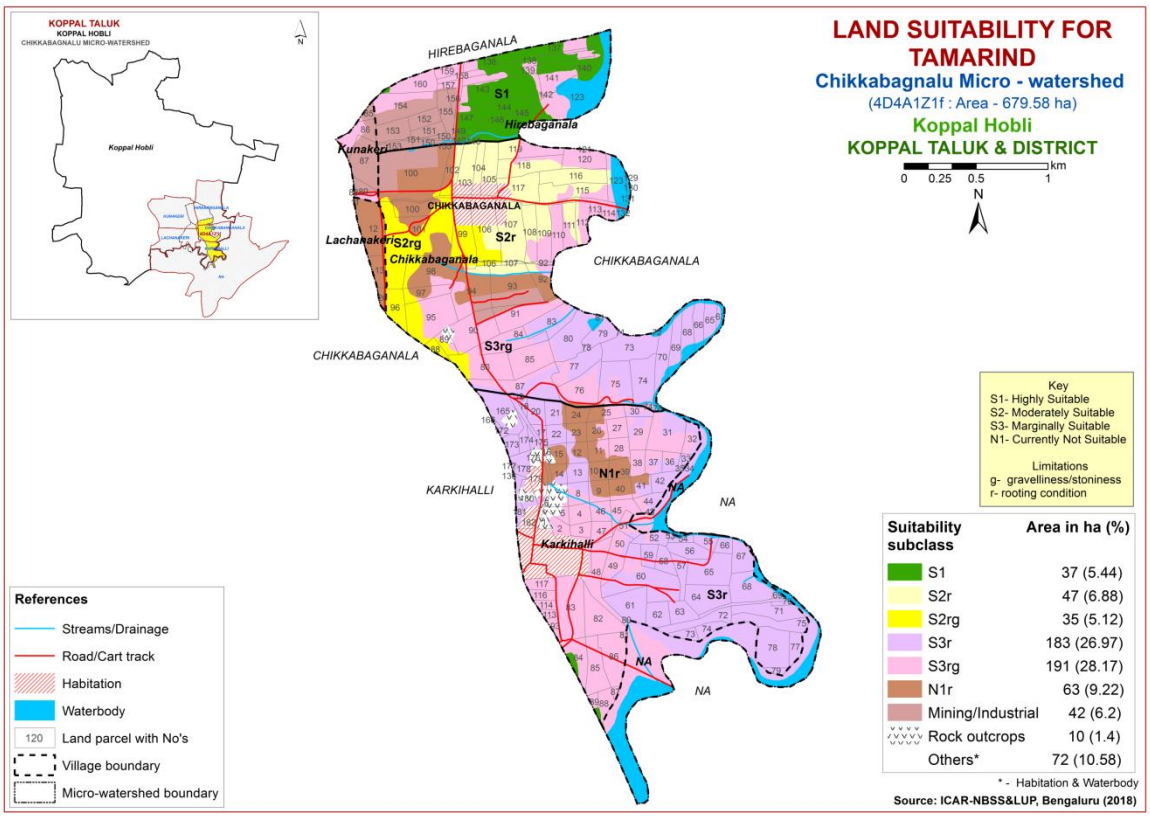


Fig. 7.27 Land Suitability map of Tamarind

7.28 Land Suitability for Marigold (*Tagetes erecta*)

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 is given in Figure 7.28.

Highly suitable (Class S1) lands for growing marigold cover an area of about 65 ha (10%) and occur in the northern and southern part of the microwatershed. Maximum area of about 301 ha (44%) is moderately suitable (Class S2) for growing marigold and distributed in the central, northern and southern part of the microwatershed with minor limitations of texture, rooting depth and gravelliness. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing marigold and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

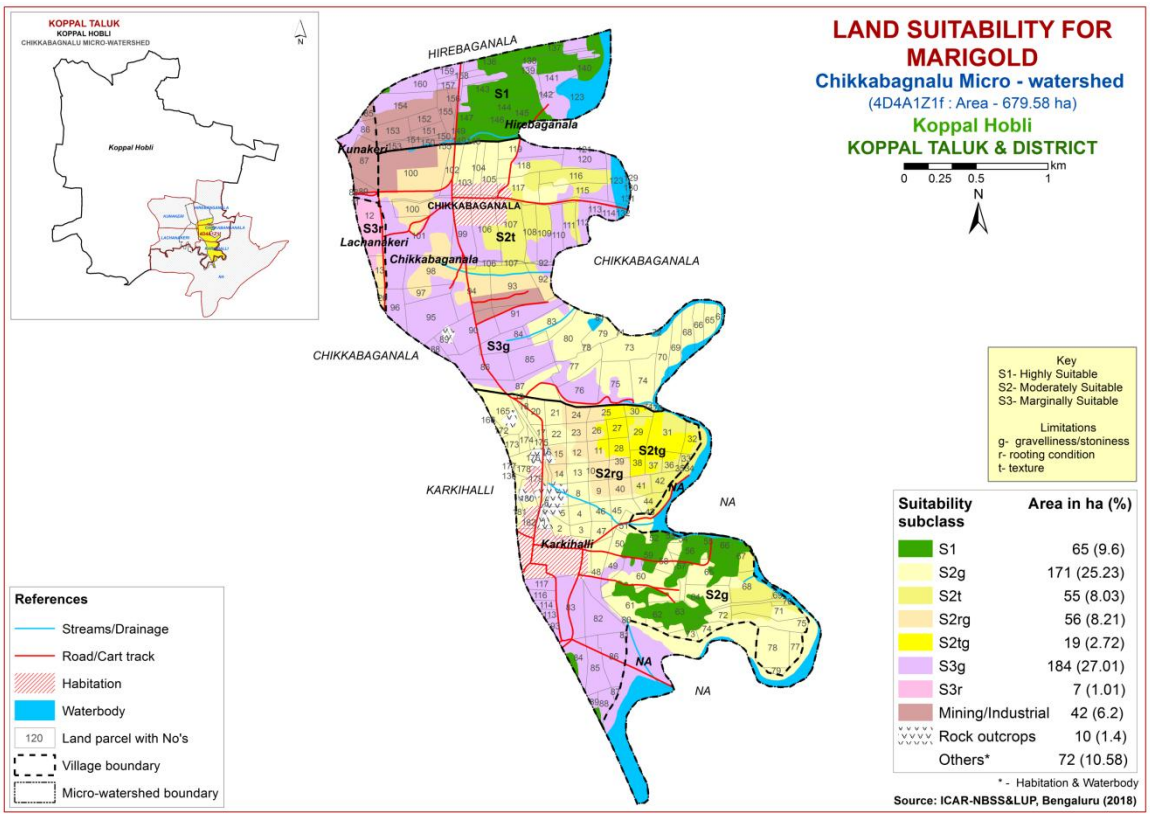


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Chrysanthemum indicum*)

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 geographic distribution of different suitability subclasses in the microwatershed is given in Figure 7.29.

An area of about 65 ha (10%) is highly suitable (Class S1) for growing chrysanthemum and occur in the northern and southern part of the microwatershed. Maximum area of about 301 ha (44%) is moderately suitable (Class S2) for growing chrysanthemum and distributed in the central, northern and southern part of the microwatershed with minor limitations of texture, rooting depth and gravelliness. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing chrysanthemum and occur in the central, northern and southern part of the microwatershed with moderate limitations of rooting depth and gravelliness.

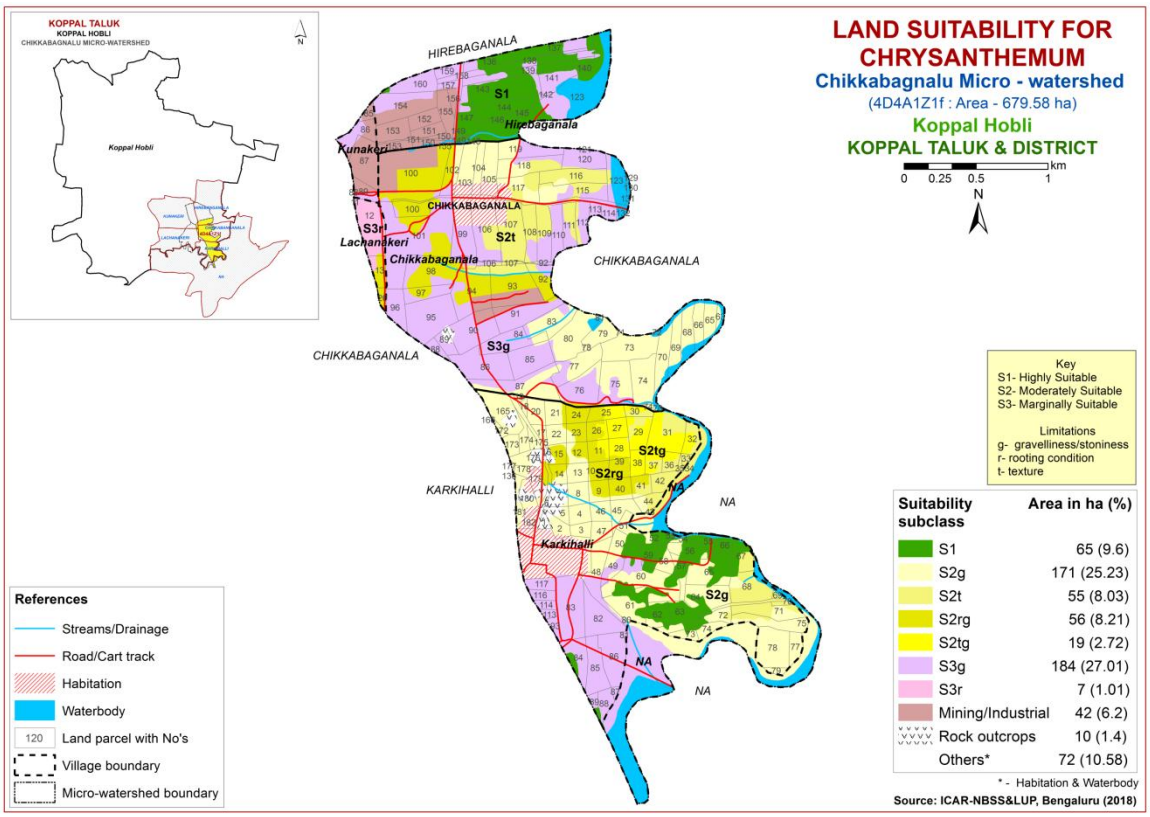


Fig. 7.29 Land Suitability map of Chrysanthemum

7.30 Land Suitability for Jasmine *(Jasminum sp.)*

Jasmine is one of the most important flower crop grown in an area of 803 ha in almost all the districts of the State. The crop requirements (Table 7.31) for growing jasmine were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jasmine was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.30.

Highly suitable (Class S1) lands for growing jasmine cover an area of about 65 ha (10%) and occur in the northern and southern part of the microwatershed. Maximum area of about 301 ha (44%) is moderately suitable (Class S2) for growing jasmine and occur in the central, northern and southern part of the microwatershed. They have minor limitations of gravelliness, texture and rooting depth. An area of about 191 ha (28%) is marginally suitable (Class S3) for growing jasmine and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness.

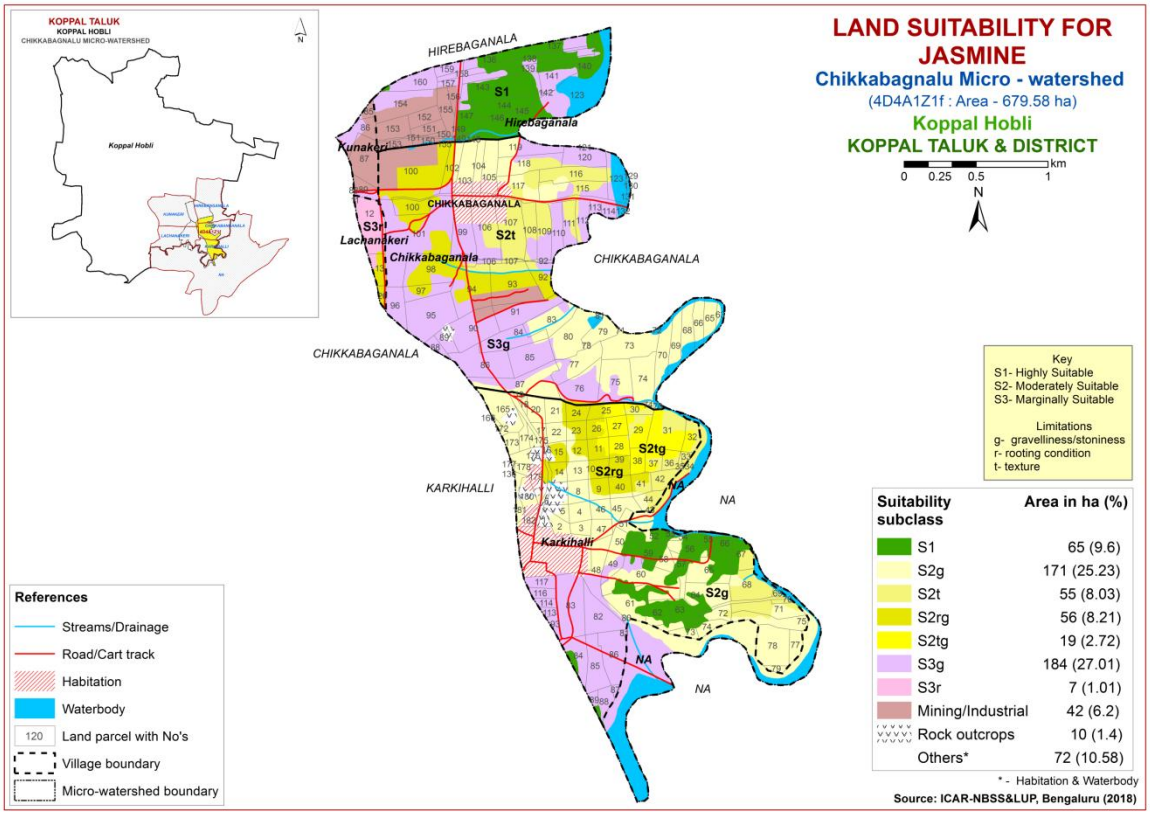


Fig. 7.30 Land Suitability map of Jasmine

7. 31 Land Suitability for Crossandra *(Crossandra infundibuliformis.)*

Crossandra is one of the most important flower crop grown in all the districts of the state. The crop requirements (Table 7.32) for growing crossandra were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing crossandra was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.31.

An area of about 65 ha (10%) is highly suitable (Class S1) for growing crossandra and occur in the northern and southern part of the microwatershed. Maximum area of about 277 ha (41%) is moderately suitable (Class S2) for growing crossandra and occur in the central, northern and southern part of the microwatershed. They have minor limitations of gravelliness, texture and rooting depth. An area of about 215 ha (32%) is marginally suitable (Class S3) for growing crossandra and occur in the central, northern and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness.

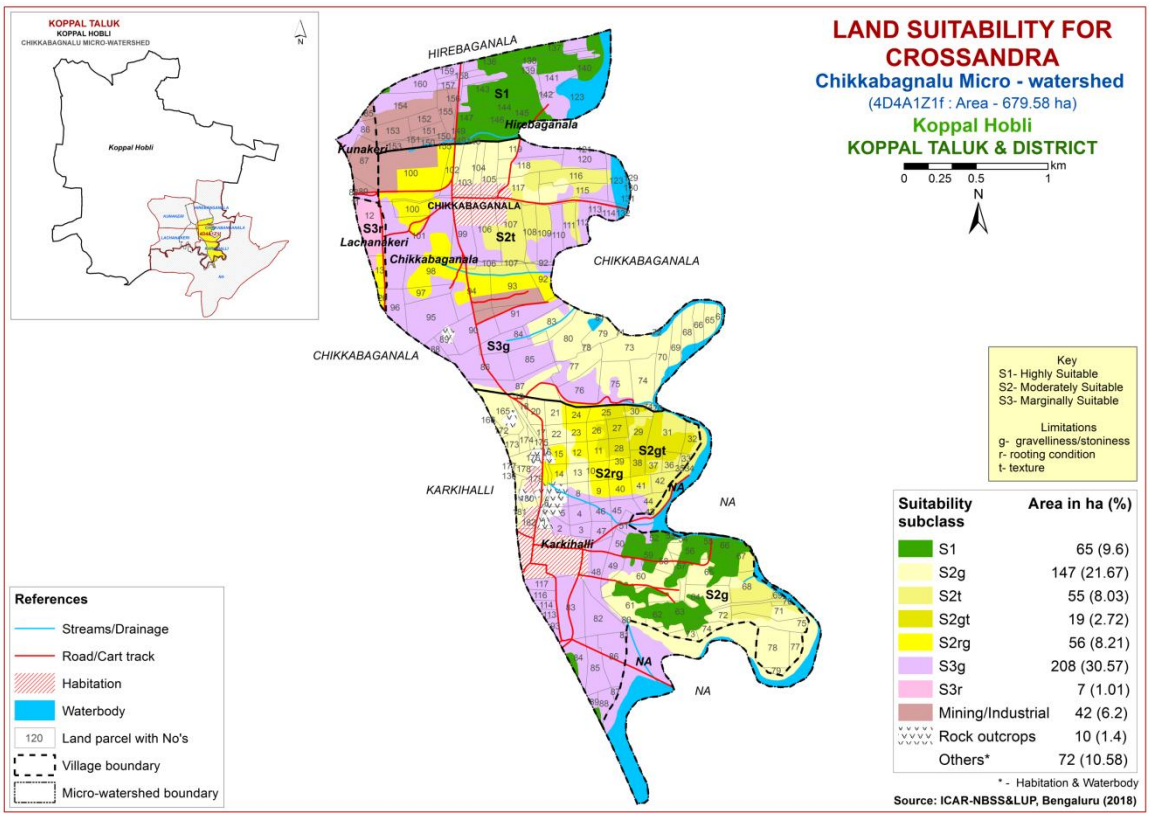


Fig. 7.31 Land Suitability map of Crossandra

Table 7.1 Soil-Site Characteristics of Chikkabagnalu Microwatershed

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m	Slope (%)	Erosion	pH	EC	ESP	CEC [Cmol (p+)kg-1]	BS (%)
					Surf-ace	Sub-surface	Sur-face	Sub-surface								
KNHiB1g1	662	<90	WD	25-50	sc	sc	15-35	<15	51-100	1-3	Slight	-	-	-	-	-
MKHcB2	662	<90	WD	50-75	sl	gsc	<15	>35	51-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHcB2g1	662	<90	WD	50-75	sl	gsc	15-35	>35	51-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
HTIcB2g1	662	<90	WD	50-75	sl	gsc	15-35	15-35	51-100	1-3	Moderate	7.11	0.109	0.30	20.19	147
HTIhB1g1	662	<90	WD	50-75	scl	gsc	15-35	15-35	51-100	1-3	Slight	7.11	0.109	0.30	20.19	147
HDHcA1g1	662	<90	WD	75-100	sl	gsc-gc	15-35	>35	51-100	0-1	Slight	6.54	0.07	7.11	5.84	84.07
HDHcB2g1	662	<90	WD	75-100	sl	gsc-gc	15-35	>35	51-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
HDHhA2	662	<90	WD	75-100	scl	gsc-gc	<15	>35	51-100	0-1	Moderate	6.54	0.07	7.11	5.84	84.07
HDHhB1g1	662	<90	WD	75-100	scl	gsc-gc	15-35	>35	51-100	1-3	Slight	6.54	0.07	7.11	5.84	84.07
HDHhB2	662	<90	WD	75-100	scl	gsc-gc	<15	>35	51-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
HDHhB2g1	662	<90	WD	75-100	scl	gsc-gc	15-35	>35	51-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
GHTcB2	662	<90	WD	75-100	sl	gscl	<15	15-35	101-150	1-3	Moderate	5.70	0.06	4.10	3.17	73
GHTcB2g1	662	<90	WD	75-100	sl	gscl	15-35	15-35	101-150	1-3	Moderate	5.70	0.06	4.10	3.17	73
GHThA1g2	662	<90	WD	75-100	scl	gscl	35-60	15-35	101-150	0-1	Slight	5.70	0.06	4.10	3.17	73
GHThB1	662	<90	WD	75-100	scl	gscl	<15	15-35	101-150	1-3	Slight	5.70	0.06	4.10	3.17	73
GHThB2g1	662	<90	WD	75-100	scl	gscl	15-35	15-35	101-150	1-3	Moderate	5.70	0.06	4.10	3.17	73
BSRcB1	662	<90	WD	75-100	sl	gsc	<15	15-35	51-100	1-3	Slight	6.59	0.12	6.00	8.80	77.55
BSRhB2	662	<90	WD	75-100	scl	gsc	<15	15-35	51-100	1-3	Moderate	6.59	0.12	6.00	8.80	77.55
BSRiB1	662	<90	WD	75-100	sc	gsc	<15	15-35	51-100	1-3	Slight	6.59	0.12	6.00	8.80	77.55
CKMcB2g1	662	<90	WD	75-100	sl	sc	15-35	<15	101-150	1-3	Moderate	7.99	0.326	1.73	12.50	119
CKMhB2	662	<90	WD	75-100	scl	sc	<15	<15	101-150	1-3	Moderate	7.99	0.326	1.73	12.50	119

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m	Slope (%)	Erosion	pH	EC	ESP	CEC [Cmol (p+)kg-1]	BS (%)
					Surf-ace	Sub-surface	Sur-face	Sub-surface								
JDGhB1g1	662	<90	WD	100-150	scl	sc-c	15-35	<15	>200	1-3	Slight	6.11	0.078	2.06	9.41	90
JDGiB1	662	<90	WD	100-150	sc	sc-c	<15	<15	>200	1-3	Slight	6.11	0.078	2.06	9.41	90
BPRcB2g1	662	<90	WD	100-150	sl	gsc-gc	15-35	>35	101-150	1-3	Moderate	6.64	0.03	0.51	5.45	63.48
BPRhB2g1	662	<90	WD	100-150	scl	gsc-gc	15-35	>35	101-150	1-3	Moderate	6.64	0.03	0.51	5.45	63.48
BPRiB2	662	<90	WD	100-150	sc	gsc-gc	<15	>35	101-150	1-3	Moderate	6.64	0.03	0.51	5.45	63.48
GDPcB2	662	<90	WD	100-150	sl	gsc-gc	<15	35-60	51-100	1-3	Moderate	7.88	0.103	2.87	7.8	97
GDPiB2	662	<90	WD	100-150	sc	gsc-gc	<15	35-60	51-100	1-3	Moderate	7.88	0.103	2.87	7.8	97
RTRhA1	662	<90	WD	>150	scl	c	<15	<15	151-200	0-1	Slight	6.47	0.03	0.41	7.07	100

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

Table 7.2 Land suitability criteria for Sorghum

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	26–30	30–34; 24–26	34–40; 20–24	>40; <20
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristics					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sc, c (red), c (black)	scl, cl	ls, sl	-
	pH	1:2.5	5.5-7.8	5.0-5.5 7.8-9.0	>9.0	-
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	10-15
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	5-10	10-15	>15	
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.3 Land suitability criteria for Maize

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	30-34	35-38 26-30	38-40 26-20	
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	Very poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc	c (red), c (black)	ls, sl	-
	pH	1:2.5	5.5-7.8	5.0-5.5 7.8-9.0	>9.0	-
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	5-10	10-15	>15	-
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.4 Land suitability criteria for Bajra

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-32	33-38 24-27	39-40 20-23	<20
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm	500-750	400-500	200-400	<200
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	Very poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	Sl, scl, cl,sc,c (red)	C (black)	ls	-
	pH	1:2.5	6.0-7.8	5.0-5.5 7.8-9.0	5.5-6.0 >9.0	
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	15-35	35-60	>60	
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	5-10	10-15	>15	
Erosion hazard	Slope	%	1-3	3-5	5-10	>10

Table 7.5 Land suitability criteria for Groundnut

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	24–33	22–24; 33–35	20–22; 35–40	<20; >40
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. Well drained	Poorly drained	Very Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl	sl,cl, sc	c (red), c (black), ls	-
	pH	1:2.5	6.0-7.8	5.5-6.0 7.8-8.4	5.0-5.5 8.4-9.0	>9.0
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<35	35-60	>60	
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.6 Land suitability criteria for Sunflower

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	24–30	30–34; 20–24	34–38; 16–20	>38; <16
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	mod. Well drained	-	Poorly to very drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	cl, sc,c (red), c (black)	scl	ls, sl	-
	pH	1:2.5	6.5-7.8	7.8-8.4 5.5-6.5	8.4-9.0; 5.0-5.5	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.7 Land suitability criteria for Cotton

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	22-32	>32	<19	-
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well to moderately well	Poorly drained/Somewhat excessively drained	-	very poorly/excessively drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sc, c (red,black)	cl	scl	ls, sl
	pH	1:2.5	6.5-7.8	7.8-8.4	5.5-6.5 8.4->9.0	<5.5
	CEC	C mol (p+)Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	50-100	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	5-10	10-15	>15	
Erosion hazard	Slope	%	<3	3-5	-	>5

Table 7.8 Land suitability criteria for Red gram

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	30-35(G) 20-25(AV) 15-18 (F&PS) 35-40(M)	25-30(G) 20-25 (AV) 12-15 (F&PS) 30-35(M)	20-25(G) 15-20(AV) 10-12 (F&PS) 25-30(M)	< 20 <15 <10 <25
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. Well drained	Poorly drained	Very Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sc, c (red)	c (black),sl, scl, cl	ls	-
	pH	1:2.5	6.0-7.8	5.5-6.0 7.8-9.0	5.0-5.5 >9.0	-
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-50	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<1.0	1.0-2.0	>2.0	
	Sodicity (ESP)	%	5-10	10-15	>15	
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.9 Land suitability criteria for Bengal gram

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	20–25	25–30; 15–20	30–35; 10–15	>35; <10
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. Well drained	Poorly drained	Very Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	C (black)	-	c (red), scl, cl, sc	ls, sl
	pH	1:2.5	6.0-7.8	5.0-6.0 7.8-9.0	>9.0	-
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	5-10	10-15	>15	-
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.10 Land suitability criteria for Chilli

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	25-32	33-35 20-25	35-38 <20	>38
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	Very poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc	c (black), sl	ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.11 Land suitability criteria for Tomato

Land use requirement			Rating			
Soil –site characteristics		Unit	Highly suitable (S1)	Moderately suitable (S2)	Marginally suitable (S3)	Not suitable (N1)
Climatic regime	Mean temperature in growing season	°C	25-28	29-32 20-24	15-19 33-36	<15 >36
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sl, scl, cl, sc, c (red)	-	ls, c(black)	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.12 Land suitability criteria for Brinjal

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	Well drained	Moderately well drained	Poorly drained	V. Poorly drained
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class				
	Water logging in growing season	Days				
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 5.0-6.0	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	>60
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.13 Land suitability criteria for Onion

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	20-30	30-35	35-40	>40
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately /imperfectly	-	Poorly to V poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sl,scl,cl,sc,c (red)	-	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
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	ds/m	<1.0	1.0-2.0	2.0-4.0	<4
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.14 Land suitability criteria for Bhendi

Land use requirement			Rating			
Soil –site characteristics		Unit	Highly suitable (S1)	Moderately suitable (S2)	Marginally suitable (S3)	Not suitable (N1)
Climatic regime	Mean temperature in growing season	°C	25-28	29-32 20-24	15-19 33-36	<15 >36
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Imperfectly drained	Poorly to very poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl,sc, c (red)	c (black)	ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.15 Land suitability criteria for Drumstick

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sc, scl, cl, c (red)	sl, c (black)	ls	s
	pH	1:2.5	6.0-7.3	5.0-5.5 7.3-7.8	5.5-6.0 7.8-8.4	>8.4
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<35	35-60	60-80	>80
Soil toxicity	Salinity (EC saturation extract)	dS/m				
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-10	-	>10

Table 7.16 Land suitability criteria for Mulberry

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	24–28	22–24; 28–32	32–38; 22–18	>38; <18
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V. Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sc, cl, scl	c (red)	c (black), sl, ls	-
	pH	1:2.5	5.5-7.3	5.0-5.5 7.8-8.4	7.3-8.4	>8.4
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	0-35	35-60	60-80	>80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Note: Suitability evaluation only for Mulberry leaf not for Silk worm rearing

Table 7.17 Land suitability criteria for Mango

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-32	24-27 33-35	36-40	20-24
	Min temp. before flowering	^{0}C	10-15	15-22	>22	-
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration	Days				
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	-	ls, sl, c (black)	-
	pH	1:2.5	5.5-7.3	5.0-5.5 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>150	100-150	75-100	<75
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.18 Land suitability criteria for Sapota

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-32	33-36 24-27	37-42 20-23	>42 <18
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	-	Poorly to very drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	sl	ls, c (black)	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.19 Land suitability criteria for Pomegranate

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	30-34	35-38 25-29	39-40 15-24	
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl,cl, sc, c (red)	c (black),sl	ls	-
	pH	1:2.5	5.5-7.8	7.8-8.4	5.0-5.5 8.4-9.0	>9.0
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.20 Land suitability criteria for Guava

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-32	33-36 24-27	37-42 20-23	
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
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
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.21 Land suitability criteria for Jackfruit

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. well	Poorly	V. Poorly
	Water logging in growing season	Days				
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
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	>60
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10-

Table 7.22 Land suitability criteria for Jamun

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well	Mod. well	Poorly	V.Poorly
	Water logging in growing season	Days				
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
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>150	100-150	50-100	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	>60
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.23 Land suitability criteria for Musambi

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-30	31-35 24-27	36-40 20-23	>40 <20
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately drained	poorly	Very poorly
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c	sl	ls	-
	pH	1:2.5	6.0-7.8	5.5-6.0 7.8-8.4	5.0-5.5 8.4-9.0	>9.0
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.24 Land suitability criteria for Lime

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-30	31-35 24-27	36-40 20-23	>40 <20
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately drained	poorly	Very poorly
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c	sl	ls	-
	pH	1:2.5	6.0-7.8	5.5-6.0 7.8-8.4	5.0-5.5 8.4-9.0	>9.0
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.25 Land suitability criteria for Cashew

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	32 to 34	28 to 32; 34 to 38	24 to 28; 38 to 40	<20; >40
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	moderately well drained	Poorly drained	Very poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	-	sl, ls	c (black)
	pH	1:2.5	5.5-6.5	5.0-5.5 6.5-7.3	7.3-7.8	>7.8
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-10	>10	-

Table 7.26 Land suitability criteria for Custard apple

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	Scl, cl, sc, c (red), c (black)	-	Sl, ls	-
	pH	1:2.5	6.0-7.3	5.5-6.0 7.3-8.4	5.0-5.5 8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15-35	35-60	60-80	-
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	>5	-

Table 7.27 Land suitability criteria for Amla

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod.well drained	Poorly drained	V. Poorly drained
	Water logging in growing season	Days				
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 7.3-7.8	7.8-8.4	>8.4
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15-35	35-60	60-80	-
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.28 Land suitability criteria for Tamarind

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod.well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
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
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>150	100-150	75-100	<75
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.29 Land suitability criteria for Marigold

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	18-23	17-15 24-35	35-40 10-14	>40 <10
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sl,scl, cl, sc, c (red)	c (black)	ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%				
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.30 Land suitability criteria for Chrysanthemum

Land use requirement			Rating			
Soil –site characteristics		Unit	Highly suitable (S1)	Moderately suitable (S2)	Marginally suitable (S3)	Not suitable (N1)
Climatic regime	Mean temperature in growing season	°C	18-23	17-15 24-35	35-40 10-14	>40 <10
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sl,scl, cl, sc, c (red)	c (black)	ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%				
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.31 Land suitability criteria for Jasmine (irrigated)

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	18-23	17-15 24-35	35-40 10-14	-
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	sl	ls, c (black)	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%				
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.32 Land suitability criteria for Crossandra

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	-	Poorly to very poorly drained
	Water logging in growing season	Days				
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 7.3-8.4	8.4-9.0	>9.0
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%				
Erosion hazard	Slope	%	<3	3-5	5-10	>10

7.32 Land Management Units (LMUs)

The 29 soil map units identified in Chikkabagnalu microwatershed have been grouped into 5 Land Management Units (LMUs) 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 Unit map (Fig.7.32) 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 5 Land Management Units along with brief description of soil and site characteristics are given below.

LMU	Mapping unit	Soil and site characteristics
1	137.GHTcB2 138.GHTcB2g1 139.GHThA1g2 140.GHThB1 142.GHThB2g1 159.BSRcB1 161.BSRhB2 164.BSRiB1 172.CKMcB2g1 175.CKMhB2 211.JDGhB1g1 286.RTRhA1 458.JDGiB1	Moderately deep to very deep, sandy clay to sandy clay loam soils, 0-3% slope, slight to moderate erosion, non-gravelly to very gravelly (<15-60%).
2	106.HDHcA1g1 111.HDHcB2g1 118.HDHhA2 120.HDHhB1g1 122.HDHhB2 123.HDHhB2g1 225.BPRcB2g1 231.BPRhB2g1 239.BPRiB2 267.GDPcB2 269.GDPiB2	Moderately deep to deep, red gravelly sandy clay to clay soils, 0-3% slope, slight to moderate erosion, non-gravelly to gravelly (<15-35%).
3	92.HTIcB2g1 94.HTIhB1g1	Moderately shallow, red sandy clay soils, 1-3% slope, slight to moderate erosion, gravelly (15-35%).
4	76.MKHcB2 77.MKHcB2g1	Moderately shallow, red gravelly loamy soils, 1-3% slope, moderate erosion, non-gravelly to gravelly (<15-35%).
5	467.KNHiB1g1	Shallow, red sandy clay soils, 1-3% slope, slight to moderate erosion, gravelly (15-35%).

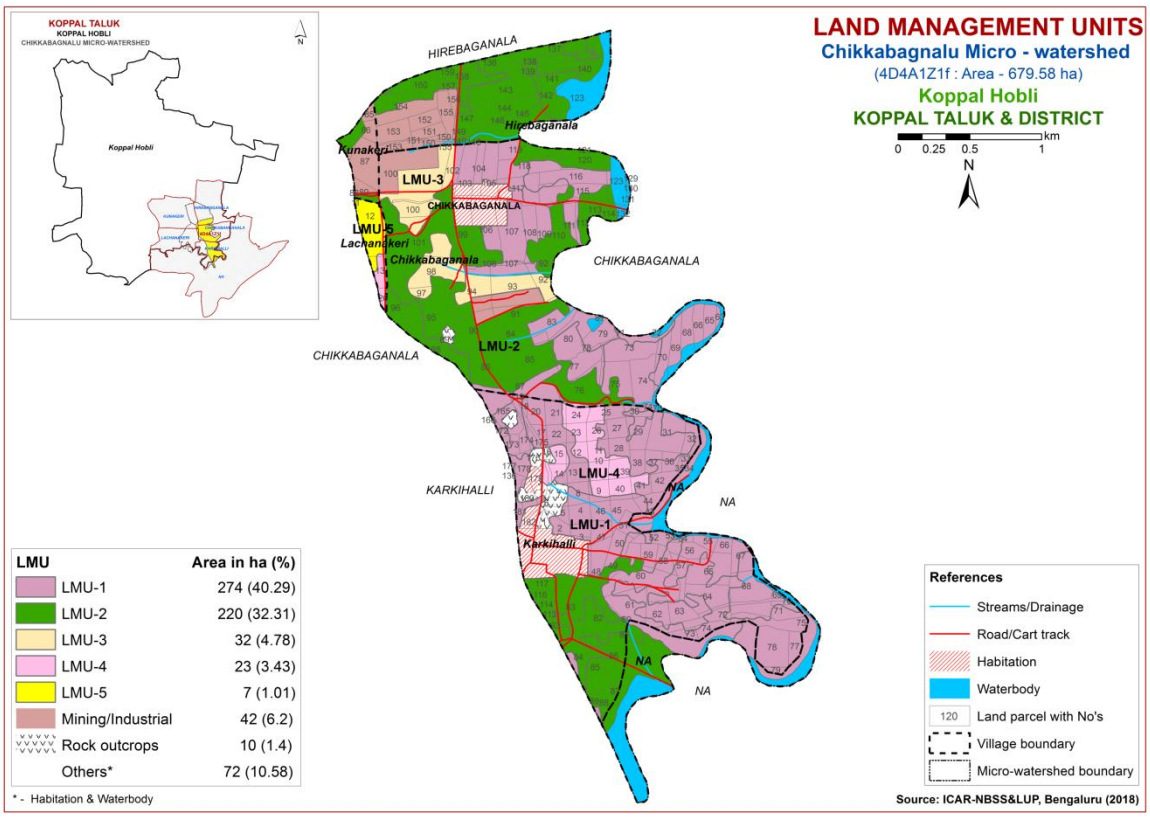


Fig 7.32 Land Management Units map of Chikkabagnalu microwatershed

7.33 Proposed Crop Plan for Chikkabagnalu Microwatershed

After assessing the land suitability for the 31 crops, the proposed crop plan has been prepared for the 5 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 31 crops. The resultant proposed crop plan is presented in Table 7.33.

Table 7.33 Proposed Crop Plan for Chikkabagnalu Microwatershed

LMU	Soil Map Units	Survey Number	Soil and site characteristics	Field Crops	Horticulture Crops	Suitable Interventions
1	137.GHTcB2 138.GHTcB2g1 139.GHThA1g2 140.GHThB1 142.GHThB2g1 159.BSRcB1 161.BSRhB2 164.BSRiB1 172.CKMcB2g1 175.CKMhB2 211.JDGhB1g1 286.RTRhA1 458.JDGiB1	**Chikkabaganala**:65,66,68,69,70,71,73,74,75,77,78,79,80,81,83,103,104,105,107,108,109,111,115,116,117,118 **Karkihalli**:2,3,4,5,8,13,16,17,18,19,20,21,22,25,27,28,29,30,31,32,33,34,35,36,37,38,41,42,43,44,45,46,47,48,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,77,78,79,80,136,165,166,172,173,174,175,177,178, 181	Moderately deep to very deep, sandy clay to sandy clay loam soils, 0-3% slope, slight to moderate erosion, non-gravelly to very gravelly (<15-60%).	Maize, Sorghum, Sunflower, Bajra, Finger millet, Groundnut, Red gram, Cowpea, Field bean, Castor, Mulberry	**Fruit crops**: Mango, Pomegranate, Guava, Sapota, Jackfruit, Jamun, Tamarind, Lime, Musambi, Amla, Custard apple, Cashew **Vegetable crops**: Drumstick, Tomato, Bhendi, Chilli, Brinjal, Onion, Curry leaves **Flower crops**: Marigold, Chrysanthemum, Jasmine, Crossandra	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
2	106.HDHcA1g1 111.HDHcB2g1 118.HDHhA2 120.HDHhB1g1 122.HDHhB2 123.HDHhB2g1 225.BPRcB2g1 231.BPRhB2g1 239.BPRiB2 267.GDPcB2 269.GDPiB2	**Chikkabaganala**:101,110,112,113,114,119,120,121,76,84,85,86,87,88,89,90,91,95,96,97,99 **Hirebaganala**:136,137,138,139,140,141,142,143,144,145,146,147,148,149,157,158,159,160 **Karkihalli**:113,114,116,117,49,81, 82,83,84,85,86,87,88,89,93 **Kunakeri** : 86,88	Moderately deep to deep, red gravelly sandy clay to clay soils, 0-3% slope, slight to moderate erosion, non-gravelly to gravelly (<15-35%).	Groundnut, Bajra, Horse gram, Castor, Mulberry	**Fruit crops**: Musambi, Lime, Jamun, Jackfruit, Amla, Custard apple, Tamarind **Vegetable crops**: Drumstick, Curry leaves	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
3	92.HTIcB2g1 94.HTIhB1g1	**Chikkabaganala** :100,102,92,94,98	Moderately shallow, red sandy clay soils, 1-3% slope, slight to moderate erosion,	Sorghum, Groundnut, Bajra, Green gram, Black	**Fruit crops**: Lime, Musambi, Amla, Custard apple, Cashew **Flower crops**: Marigold,	Drip irrigation, mulching, suitable soil and water conservation

LMU	Soil Map Units	Survey Number	Soil and site characteristics	Field Crops	Horticulture Crops	Suitable Interventions
			gravelly (15-35%).	gram, Cowpea, Horse gram, Castor	Chrysanthemum, Crossandra, Jasmine	practices (Crescent Bunding with Catch Pit etc)
4	76.MKHcB2 77.MKHcB2g1	**Karkihalli** : 10,11,12,14,15,23,24, 26,39,40,9 **Lachanakeri** : 13,26	Moderately shallow, red gravelly loamy soils, 1-3% slope, moderate erosion, non-gravelly to gravelly (<15-35%).	Sorghum, Groundnut, Bajra, Castor	**Fruit crops**: Lime, Musambi, Amla, Cashew, Custard apple	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
5	467.KNHiB1g1	**Lachanakeri** : 11,12	Shallow, red sandy clay soils, 1-3% slope, slight to moderate erosion, gravelly (15-35%).	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 and split application of nitrogen fertilizers

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 Chikkabagnalu Microwatershed

- The soil phases with sizeable area identified in the microwatershed belonged to the soil series of Gollarahatti (GHT) series occupies major area 154 ha (23%) followed by Balapur (BPR) 93 ha (14%), Hooradhahalli (HDH) 91 ha (13%), Jedigere (JDG) 46 ha (7%), Bisarahalli (BSR) 39 ha (6%), Giddadapalya (GDP) 36 ha (5%), Chikkamegheri (CKM) 34 ha (5%), Hatti (HTI) 33 ha (5%), Mukhadahalli (MKH) 23 ha (3%), Kanchanahalli (KNH) 7 ha (%) and Ranatur (RTR) 1 ha (<1%).
- As per land capability classification, maximum area of about 398 ha (58%) in the microwatershed falls under good lands (Class II) with minor limitations of soil and

erosion. An area of about 159 ha (23%) is under moderately good lands (Class III) with severe limitations of soil and erosion.

- On the basis of soil reaction, an area of about 7 ha (1%) are slightly acid (pH 6.0-6.5), 288 ha (42%) are neutral (pH 6.5-7.3) and 261 ha (38%) are slightly alkaline to strongly alkaline (pH 7.3-9.0) in soil reaction.

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.

Acid soils

Slightly acid soils occur in about 7 ha (1%) area in the microwatershed.

1. Growing of crops suitable for particular soil pH.
2. Ameliorating the soils through the application of amendments (liming materials).

Liming materials:

1. $CaCO_3$ (Calcium Carbonate).
2. Dolomite [Ca Mg $(Co_3)_2$]
3. Quick lime (Cao)
4. Slaked lime [Ca $(OH)_2$]

For normal pH and pH 4.8 (35 t/ha) and pH 6 .0-7.0 (4 t/ha) lime is required.

Neutral soils

Neutral soils occur in about 288 ha (42%) area in the microwatershed.

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 strongly alkaline soils cover an area of about 261 ha (38%) in the microwatershed.

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 25% extra N and P (125 % RDN&P).
4. Application of ZnSO4 – 12.5 kg/ha (once in three years).
5. Application of Boron – 5 kg/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 365 ha (54%) is suffering from moderate 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 of Benefits

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 in IWMP is focusing on preparation of

1. Soil and Water Conservation Treatment Plans 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 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, radish, 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, erosion and soil are the major constraints in Chikkabagnalu Microwatershed.
- **Organic Carbon:** The OC content is medium (0.5-0.75%) in an area of about 41 ha (6%). These areas needs to be further improved by applying farmyard manure and rotating crops with cereals and legumes or mixed cropping and high (>0.75%) in 515 ha (76%) area of the microwatershed.
- **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 41 ha (6%) area where OC is 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**: Entire cultivated area of the microwatershed is high (>57 kg/ha) in available phosphorus content.
- **Available Potassium:** Entire cultivated area of the microwatershed is medium (145-337 kg/ha) in available potassium content. All the plots, where available potassium is medium, for all the crops, additional 25% of potassium may be applied.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops, Available sulphur content is high (>20 ppm) in 5 ha (1%) area, medium (10-20ppm) in 211 ha (31%) area and low (<10 ppm) in 341 ha (50%) area of the microwatershed. Low and medium areas need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertilizer (13% of sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Boron:** An area of about 332 ha (49%) is low (<0.5 ppm) and 224 ha (33%) is medium (0.5-1.0 ppm) in available boron content. Low and medium (<0.5-1.0 ppm) areas need to be applied with sodium borate @ 10kg/ha as soil application or 0.2% borax as foliar spray to correct the deficiency.
- **Available Iron:** Available iron content is deficient (<4.5 ppm) in an area of about 92 ha (13%) and sufficient (>4.5 ppm) in 464 ha (68%) area of the microwatershed. For

deficient areas, iron sulphate @ 25 kg/ha needs to be applied for 2-3 years to correct the deficiency.

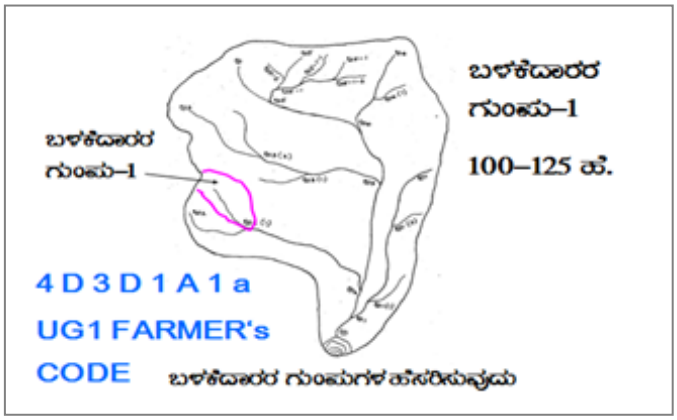
- **Available Manganese:** Entire cultivated area of the microwatershed is sufficient (>1.0 ppm) in the available manganese content.
- **Available Copper:** Entire cultivated area of the microwatershed is sufficient (>0.2 ppm) in the available copper content.
- **Available Zinc:** Available zinc content is deficient (<0.6 ppm) in an area of about 108 ha (16%) and sufficient (>0.6 ppm) in 448 ha (66%) area of the microwatershed. For deficient areas, application of zinc sulphate @ 25kg/ha is recommended.
- **Soil Alkalinity:** An area of about 261 ha (38%) in the microwatershed has soils that are slightly alkaline to 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, Acasia, Neem, Ber etc, are recommended.
- **Land Suitability for various crops:** Areas that are highly, moderately and marginally suitable and 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 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 Chikkabagnalu Microwatershed, 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 maps
- Rainfall map
- 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 needs 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.

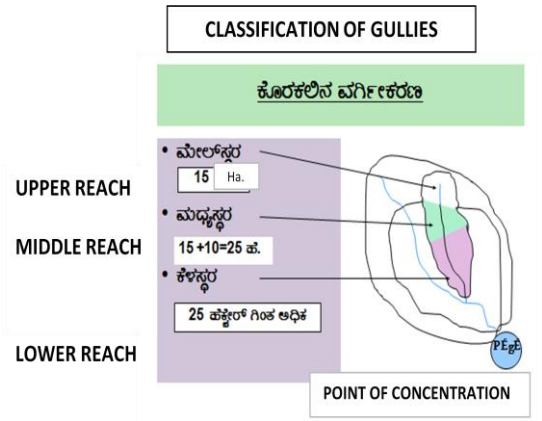
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge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

9.1 Treatment Plan

The treatment plan recommended for arable lands is briefly described below.

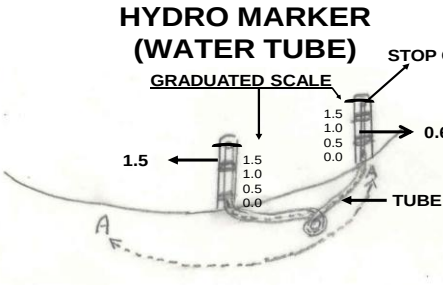
9.1.1 Arable Land Treatment

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.



FALL: 1.5 - 0.6 = 0.9 m.

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 (bg0 .....b= loamy sand, g0 = <15% gravel). The recommended sections for different soils are given below.

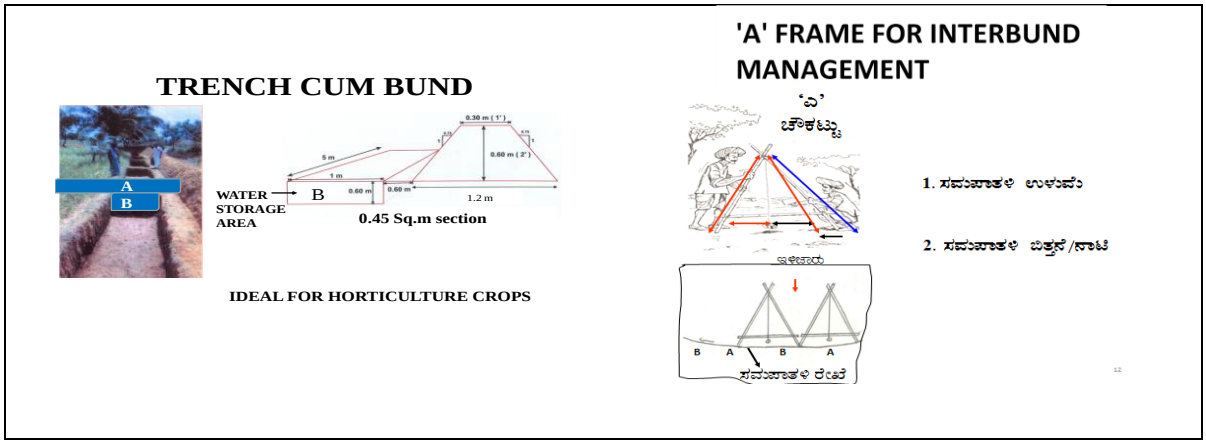
Recommended Bund Section

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
m2	m	m3	L(m)	W(m)	D(m)	Quantity (m3)	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. Waterways

a) Existing waterways are marked on the cadastral map (1:7920 scale) and their dimensions are recorded.

b) Considering the contour plan of the MWS, additional waterways/ modernization of the existing ones can be thought of.

c) 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.
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 in water budgeting and quality of water in the wells and site suitability.
e) Detailed Leveling 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 earthern checks in the natural water course. Location and design details are given in the Manual.

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. 9.1) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. An area of about 478 ha (70%) needs Trench cum Bunding and 78 ha (12%) needs 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.

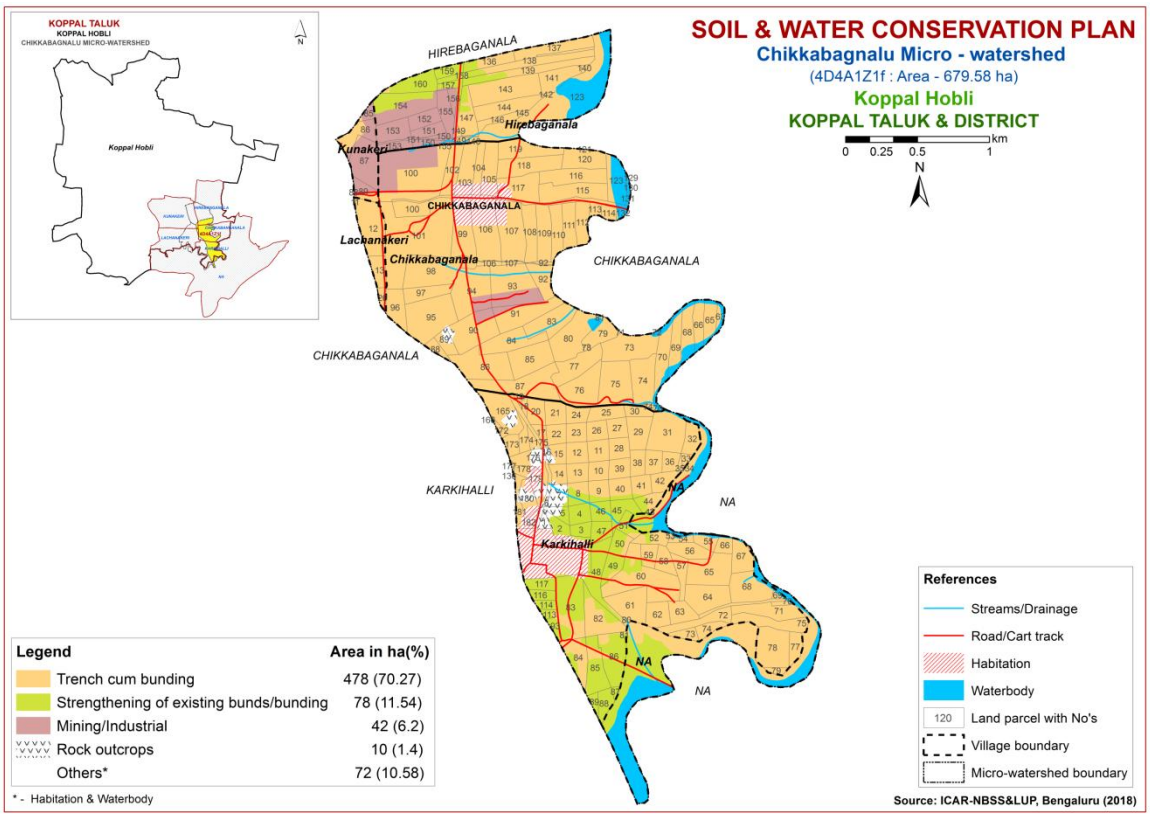


Fig. 9.1 Soil and Water Conservation Plan map of Chikkabagnalu Microwatershed

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 for growing annual and perennial crops. The method of planting these trees is given below.

It is recommended to open the pits during the 1st week of March along the contour and heap the dug-out 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 Neral (*Sizyzium cumini*) 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

Chikkabaganalu (1Z1f) Microwatershed

Soil Phase Information

Village	Survey No	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
Karkihalli	1	0.66	RO	RO	RO	RO	RO	RO	RO	RO	Jowar (Jw)	Not Available	RO	RO
Karkihalli	2	1.78	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Karkihalli	3	1.35	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Karkihalli	4	2.01	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Jowar (Jw)	Not Available	IIs	Graded bunding
Karkihalli	5	1.3	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIs	Graded bunding
Karkihalli	6	0.07	RO	RO	RO	RO	RO	RO	RO	RO	Maize (Mz)	Not Available	RO	RO
Karkihalli	7	2.03	RO	RO	RO	RO	RO	RO	RO	RO	Maize (Mz)	Not Available	RO	RO
Karkihalli	8	2.25	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Jowar (Jw)	Not Available	IIs	Graded bunding
Karkihalli	9	2.11	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIIes	Trench cum bunding
Karkihalli	10	1.87	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIIes	Trench cum bunding
Karkihalli	11	2.18	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	Trench cum bunding
Karkihalli	12	2.2	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	Trench cum bunding
Karkihalli	13	2.01	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	14	1.54	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Karkihalli	15	1.68	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Karkihalli	16	0.03	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	17	0.9	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	18	0.45	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	19	0.3	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	20	2.23	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	21	2.37	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	22	1.87	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	1 Borewell	IIes	Trench cum bunding
Karkihalli	23	1.88	MKHcB2g	LMU-4	Moderately shallow	Sandy loam	Gravelly (15-	Very Low (<50	Very gently	Moderate	Redgram (Rg)	Not	IIIes	Trench cum

Village	Survey No	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
			1		(50-75 cm)		35%)	mm/m)	sloping (1-3%)			Available		bunding
Karkihalli	24	1.81	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Karkihalli	25	2.46	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Karkihalli	26	1.94	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Karkihalli	27	1.91	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Karkihalli	28	2.09	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	29	3.42	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Karkihalli	30	1.42	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	31	6.59	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram (Mz+Rg)	Not Available	IIes	Trench cum bunding
Karkihalli	32	2.21	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Karkihalli	33	0.47	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	34	0.05	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	35	0.27	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	36	1.54	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	37	1.94	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Karkihalli	38	1.85	CKMcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	1 Borewell	IIes	Trench cum bunding
Karkihalli	39	2.03	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIIes	Trench cum bunding
Karkihalli	40	2.34	MKHcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Karkihalli	41	1.98	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	42	2.08	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	43	0.16	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Karkihalli	44	1.79	CKMhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Karkihalli	45	2.45	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Jowar (Jw)	Not Available	IIs	Graded bunding
Karkihalli	46	1.94	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Jowar (Jw)	Not Available	IIs	Graded bunding

Village	Survey No	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
Karkihalli	47	1.98	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Jowar (Jw)	Not Available	IIs	Graded bunding
Karkihalli	48	5.16	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Karkihalli	49	2.13	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	1 Borewell	IIes	Graded bunding
Karkihalli	50	2.08	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	1 Borewell	IIs	Graded bunding
Karkihalli	51	1.57	GHThA1g2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Very gravelly (35-60%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Karkihalli	52	1.94	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	53	0.14	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	54	0.84	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	55	1.57	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	56	2.78	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	57	1.97	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	58	2.04	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	59	1.74	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	1 Borewell	IIs	Trench cum bunding
Karkihalli	60	10.85	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	61	5.02	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	62	2.79	BSRcB1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Paddy (Pd)	Not Available	IIs	Trench cum bunding
Karkihalli	63	2.51	BSRcB1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	64	5.15	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	1 Borewell	IIes	Trench cum bunding
Karkihalli	65	6.1	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Jowar (Jw)	Not Available	IIs	Trench cum bunding
Karkihalli	66	1.32	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	67	3	BSRiB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	68	5.21	BSRhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	69	0.43	BSRhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	70	0.41	BSRhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding

Village	Survey No	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
Karkihalli	71	4.12	BSRhB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	1 Borewell	IIes	Trench cum bunding
Karkihalli	72	3.23	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	73	1.21	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	74	1.51	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	75	3.93	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	77	1.8	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIs	Trench cum bunding
Karkihalli	78	6.11	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIs	Trench cum bunding
Karkihalli	79	0.62	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIs	Trench cum bunding
Karkihalli	80	0.11	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	81	0.12	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	82	5.44	HDHhB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	1 Borewell	IIes	Trench cum bunding
Karkihalli	83	8.12	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	3 Borewell	IIes	Graded bunding
Karkihalli	84	3.87	HDHhB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	85	4.61	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	86	5.56	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	1 Borewell	IIes	Graded bunding
Karkihalli	87	0.34	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	88	1.86	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	89	0.72	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	93	0.94	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	113	0.64	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	114	0.91	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Karkihalli	116	1.28	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	117	1.75	HDHhA2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Karkihalli	136	0.001	GHTcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding

Village	Survey No	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
Karkihalli	165	5.25	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Karkihalli	166	0.08	GHTcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	Trench cum bunding
Karkihalli	172	0.43	GHTcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	173	1.41	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	174	1.32	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	175	0.75	GHThB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Karkihalli	176	3.8	RO	RO	RO	RO	RO	RO	RO	RO	Maize+Current fallow (Mz+Cf)	Not Available	RO	RO
Karkihalli	177	0.15	GHTcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	Trench cum bunding
Karkihalli	178	0.91	GHTcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	Trench cum bunding
Karkihalli	179	1.05	Habitation	Others	Others	Others	Others	Others	Others	Others	Current fallow (Cf)	Not Available	Others	Others
Karkihalli	180	2.35	Habitation	Others	Others	Others	Others	Others	Others	Others	Bajra+Current fallow (Bj+Cf)	Not Available	Others	Others
Karkihalli	181	1.45	GHTcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	Trench cum bunding
Karkihalli	182	1.02	Habitation	Others	Others	Others	Others	Others	Others	Others	Current fallow (Cf)	Not Available	Others	Others
Kunakeri	85	0.84	MI	MI	MI	MI	MI	MI	MI	MI	Current fallow (Cf)	Not Available	MI	MI
Kunakeri	86	3.35	HDHhB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Kunakeri	87	5.58	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Kunakeri	88	0.09	HDHhB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Industrial area (Ia)	Not Available	IIes	Trench cum bunding
Kunakeri	89	1.87	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Lachanakeri	11	0.09	KNHiB1g1	LMU-5	Shallow (25-50 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow+Maize (Cf+Mz)	Not Available	IIIs	Trench cum bunding
Lachanakeri	12	6.39	KNHiB1g1	LMU-5	Shallow (25-50 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	Trench cum bunding
Lachanakeri	13	2.07	MKHcB2	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Lachanakeri	26	0.73	MKHcB2	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabaganala	63	0.9	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Chikkabaganala	65	2.39	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding

Village	Survey No	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
Chikkabagan ala	66	2.43	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	68	3.35	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	69	3.14	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	70	4.38	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	71	0.01	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	72	0.1	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Chikkabagan ala	73	6.33	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane (Sc)	1 Borewell	IIes	Trench cum bunding
Chikkabagan ala	74	5.37	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane (Sc)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	75	6.82	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	76	6.09	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	77	4.82	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	78	0.15	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Paddy (Pd)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	79	2.93	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Paddy (Pd)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	80	6.76	GHTcB2g1	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	1 Borewell	IIes	Trench cum bunding
Chikkabagan ala	81	0.15	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	83	4.82	GHThB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	84	4.85	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	85	5.5	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	86	7.15	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	87	8.01	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram +Current fallow (Mz+Rg+Cf)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	88	1	BPRhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	89	1.65	BPRhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	90	7.03	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	91	5.96	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	2 Borewell	IIIes	Trench cum bunding

Village	Survey No	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
Chikkabagan ala	92	3.23	HTIcB2g1	LMU-3	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane (Sc)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	93	8.76	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Industrial area (Mz+Ia)	Not Available	MI	MI
Chikkabagan ala	94	8.19	HTIcB2g1	LMU-3	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	95	8.7	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	96	3.21	BPRhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	97	2.88	BPRcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	98	7.62	HTIhB1g1	LMU-3	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane+Maize (Sc+Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	99	6.63	BPRhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	100	19.16	HTIhB1g1	LMU-3	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Industrial area (Mz+Ia)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	101	18.9	BPRhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIIes	Trench cum bunding
Chikkabagan ala	102	3.4	HTIhB1g1	LMU-3	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	103	3.91	JDGhB1g1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	1 Borewell	IIs	Trench cum bunding
Chikkabagan ala	104	2.09	JDGhB1g1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	105	3.85	JDGhB1g1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabagan ala	106	8.08	Habitation	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Chikkabagan ala	107	7.71	JDGiB1	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	1 Borewell	IIes	Trench cum bunding
Chikkabagan ala	108	3.51	JDGiB1	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	109	3.92	JDGiB1	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	110	2.92	HDHcB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	111	2.89	JDGiB1	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	1 Borewell	IIes	Trench cum bunding
Chikkabagan ala	112	2.74	HDHhB2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	113	0.74	HDHhB2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	114	0.99	HDHhB2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabagan ala	115	5.35	JDGhB1g1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane+Maize (Sc+Mz)	2 Borewell	IIs	Trench cum bunding

Village	Survey No	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
Chikkabaganala	116	4.7	JDGiB1	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabaganala	117	4.93	JDGhB1g1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIs	Trench cum bunding
Chikkabaganala	118	5.23	JDGhB1g1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Chikkabaganala	119	4.32	HDHcB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabaganala	120	3.98	HDHcB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabaganala	121	0.01	HDHcB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chikkabaganala	123	3.96	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Chikkabaganala	128	0.03	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Chikkabaganala	129	0.09	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Chikkabaganala	130	0.19	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Chikkabaganala	131	0.24	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Chikkabaganala	132	0.47	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Hirebaganala	123	19.4	Waterbody	Others	Others	Others	Others	Others	Others	Others	Waterbody	Not Available	Others	Others
Hirebaganala	136	2.59	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane (Sc)	Not Available	IIIes	Trench cum bunding
Hirebaganala	137	4.11	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	Trench cum bunding
Hirebaganala	138	4.46	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	139	4.7	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	140	0.22	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	141	3.35	BPRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	142	0.13	BPRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	143	7.56	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	144	4.35	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	145	0.18	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	146	1.46	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding

Village	Survey No	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
Hirebaganala	147	3.45	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	1 Borewell	IIIes	Trench cum bunding
Hirebaganala	148	0.11	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Hirebaganala	149	0.43	GDPcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Sugarcane (Mz+Sc)	Not Available	IIIes	Trench cum bunding
Hirebaganala	150	1.45	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Hirebaganala	151	1.75	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Hirebaganala	152	2.26	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Hirebaganala	153	4.6	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Hirebaganala	154	7.3	MI	MI	MI	MI	MI	MI	MI	MI	Marigold (Mg)	Not Available	MI	MI
Hirebaganala	155	2.63	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Hirebaganala	156	0.83	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area (Ia)	Not Available	MI	MI
Hirebaganala	157	0.75	HDHcA1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Slight	Current fallow (Cf)	Not Available	IIs	Graded bunding
Hirebaganala	158	0.58	HDHcA1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Slight	Current fallow (Cf)	Not Available	IIs	Graded bunding
Hirebaganala	159	1.28	HDHcA1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Slight	Current fallow (Cf)	Not Available	IIs	Graded bunding
Hirebaganala	160	3.77	HDHcA1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Slight	Current fallow (Cf)	Not Available	IIs	Graded bunding

RO-RO, MI-MI area

Appendix II

Chikkabaganalu (1Z1f) Microwatershed

Soil Fertility Information

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Karkihalli	1	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	2	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	3	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	4	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	5	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	6	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	7	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	8	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	9	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	10	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	11	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	12	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	13	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	14	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	15	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	16	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	17	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	18	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	19	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	20	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	21	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	22	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	23	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Karkihalli	24	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	25	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	26	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	27	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	28	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	29	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	30	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	31	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	32	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	33	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	34	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	35	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	36	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	37	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Karkihalli	38	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	39	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	40	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	41	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	42	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)
Karkihalli	43	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	44	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	45	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	46	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	47	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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 Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Karkihalli	48	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	49	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	50	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	51	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	52	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	53	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	54	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	55	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	56	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	57	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	58	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	59	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	60	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	61	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	62	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	63	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)
Karkihalli	64	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	65	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	66	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	67	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	68	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	69	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 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)
Karkihalli	70	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 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)
Karkihalli	71	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 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 Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Karkihalli	72	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	73	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	74	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	75	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 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)
Karkihalli	77	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	78	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	79	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 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)
Karkihalli	80	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	81	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	82	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	83	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	84	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	85	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	86	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	87	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	88	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	89	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	93	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karkihalli	113	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	114	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	116	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	117	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	136	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	165	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Karkihalli	166	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	172	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	173	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	174	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	175	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	176	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	177	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	178	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	179	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Karkihalli	180	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Karkihalli	181	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Karkihalli	182	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Kunakeri	85	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kunakeri	86	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Kunakeri	87	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kunakeri	88	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Kunakeri	89	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Lachanakeri	11	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Lachanakeri	12	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Lachanakeri	13	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Lachanakeri	26	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	63	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	65	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	66	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	68	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	69	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Chikkabaganala	70	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	71	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	72	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	73	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	74	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	75	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	76	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	77	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	78	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	79	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	80	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	81	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	83	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	84	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	85	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	86	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	87	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	88	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	89	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	90	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	91	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	92	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	93	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Chikkabaganala	94	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Chikkabaganala	95	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	96	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	97	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	98	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	99	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	100	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	101	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	102	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	103	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	104	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	105	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	106	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	107	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	108	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	109	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	110	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	111	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	112	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	113	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	114	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	115	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	116	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	117	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	118	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Chikkabaganala	119	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	120	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	121	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Chikkabaganala	123	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	128	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	129	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	130	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	131	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Chikkabaganala	132	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Hirebaganala	123	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Hirebaganala	136	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	137	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Hirebaganala	138	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Hirebaganala	139	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	140	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Hirebaganala	141	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Hirebaganala	142	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	143	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	144	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	145	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	146	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	147	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	148	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Hirebaganala	149	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Hirebaganala	150	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	151	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	152	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	153	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	154	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	155	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	156	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	157	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	158	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	159	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hirebaganala	160	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Appendix III

Chikkabaganalu (1Z1f) Microwatershed

Soil Suitability Information

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Karkihalli	1	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	2	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	3	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	4	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	5	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	6	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	7	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	8	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	9	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	10	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	11	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	12	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	13	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	14	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	15	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	16	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	17	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	18	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	19	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Karkihalli	20	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	21	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	22	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	23	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	24	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	25	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	26	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	27	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	28	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	29	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	30	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	31	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	32	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	33	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	34	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	35	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	36	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	37	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	38	S3rg	S2tg	S2rg	S2g	S2rt	S2rg	S3rg	S2rg	S2gt	S2r	S2gt	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2g	S2g	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Karkihalli	39	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Karkihalli	40	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Karkihalli	41	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	42	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	43	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	44	S3r	S2t	S2rg	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S2rt	S2r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	45	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	46	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	47	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	48	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	49	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	50	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	51	S3rg	S2g	S2rg	S2g	S2rg	S3g	S3rg	S3rg	S3g	S2rg	S3g	S2g	S2rg	S2g	S2rg	S3rg	S3rg	S2g	S2g	S2g	S2g	S2g	S2rg	S2g	S2g	S1	S1	S3g	S2rg	S2g	S1
Karkihalli	52	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	53	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	54	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	55	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	56	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	57	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	58	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	59	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	60	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	61	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Karkihalli	62	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	63	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	64	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	65	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	66	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	67	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Karkihalli	68	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	69	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	70	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	71	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Karkihalli	72	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	73	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	74	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	75	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	77	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	78	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	79	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	80	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	81	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	82	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	83	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Karkihalli	84	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	85	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	86	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	87	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	88	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	89	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	93	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	113	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	114	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	116	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	117	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Karkihalli	136	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	165	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	166	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	172	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	173	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	174	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	175	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	176	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Karkihalli	177	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	178	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Karkihalli	179	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	Others	Others
Karkihalli	180	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	Others	Others
Karkihalli	181	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Karkihalli	182	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	Others	Others
Kunakeri	85	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kunakeri	86	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Kunakeri	87	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kunakeri	88	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Kunakeri	89	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Lachanakeri	11	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S2w	S2w	S3r	N1r	N1r	S2w
Lachanakeri	12	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S2w	S2w	S3r	N1r	N1r	S2w
Lachanakeri	13	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Lachanakeri	26	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Chikkabaganala	63	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	Others	Others
Chikkabaganala	65	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkabaganala	66	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkabaganala	68	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkabaganala	69	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkabaganala	70	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkabaganala	71	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkabaganala	72	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	Others	Others

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Chikkaba ganala	73	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	74	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	75	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	76	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	77	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	78	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	79	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	80	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	81	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	83	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Chikkaba ganala	84	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	85	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	86	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	87	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	88	S3rg	S3g	S3g	S3g	S3g	S3g	S2rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	89	S3rg	S3g	S3g	S3g	S3g	S3g	S2rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	90	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	91	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	92	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rt	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Chikkaba ganala	93	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Chikkaba ganala	94	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rt	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Chikkaba ganala	95	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	96	S3rg	S3g	S3g	S3g	S3g	S3g	S2rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	97	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	98	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Chikkaba ganala	99	S3rg	S3g	S3g	S3g	S3g	S3g	S2rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	100	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Chikkaba ganala	101	S3rg	S3g	S3g	S3g	S3g	S3g	S2rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Chikkaba ganala	102	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Chikkaba ganala	103	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Chikkaba ganala	104	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Chikkaba ganala	105	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Chikkaba ganala	106	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	Others	Others
Chikkaba ganala	107	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Chikkaba ganala	108	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Chikkaba ganala	109	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Chikkaba ganala	110	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaba ganala	111	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Chikkaba ganala	112	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaba ganala	113	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaba ganala	114	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaba ganala	115	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S1	S2g	S1	S1	S2t

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Chikkaganala	116	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Chikkaganala	117	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Chikkaganala	118	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Chikkaganala	119	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaganala	120	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaganala	121	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chikkaganala	123	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	Others	Others
Chikkaganala	128	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	Others	Others
Chikkaganala	129	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	Others	Others
Chikkaganala	130	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	Others	Others
Chikkaganala	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	Others	Others
Chikkaganala	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	Others	Others
Hirebaganala	123	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	Others	Others
Hirebaganala	136	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	137	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	138	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	139	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	140	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	141	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2gt	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Hirebaganala	142	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2gt	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Hirebaganala	143	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Hirebaganala	144	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	145	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	146	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	147	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	148	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	149	S1	S1	S1	S1	S2t	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S2tg	S2g	S1	S1	S1	S2tg
Hirebaganala	150	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	151	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	152	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	153	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	154	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	155	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	156	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hirebaganala	157	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Hirebaganala	158	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Hirebaganala	159	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Hirebaganala	160	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g

MI- Mining/Industrial, RO-Rock outcrops

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

CONTENTS

LIST OF TABLES

Chapter 1

SALIENT FEATURES OF THE SURVEY

- *The data on households sampled for socio economic survey in Chikkabagnalu micro indicated that 30 farmers were sampled in Chikkabagnalu micro watershed among them 6 (20%) were marginal farmers, 8 (26.67%) were small farmers, 9(30%) were semi medium farmers, 6(20%) were medium farmers and 1(3.33%) landless farmer was also interviewed for the survey.*
- *The data indicated that there were 150 population households were there in the studied micro watershed. Among them 92 (61.33%) men and 58 (38.67 %) were women. The average family size of landless was 5, marginal farmers were 5, small farmers were 7, semi medium farmers were 4 and medium farmers were 4. On an average the family size was 5.*
- *The data indicated that 26(17.33%) people were in 0-15 years of age, 69 (46%) were in 16-35 years of age, 45 (30 %) were in 36-60 years of age and 10 (6.67%) were above 61 years of age.*
- *The results indicated that the Chikkabagnalu had 34 per cent illiterates, 26 per cent of them had primary school education, 9.33 per cent of them had both middle school, 13.33 per cent them had high school education, 7.33 per cent of them had PUC education, 2 per cent them had ITI education, 4.67 per cent of them had degree education and 3.33 per cent them had others.*
- *The results indicated that, 93.33 per cent of households practicing agriculture and 3.33 per cent of the household heads were agricultural labour.*
- *The results indicated that agriculture was the major occupation for 50.67 per cent of the household members, 17.33 per cent were agricultural labourers, 2.67 per cent were general labours, 0.67 per cent household industry, 1.33 percent were in government service, 0.67 per cent of them were in private sector, 22 per cent of them were students, 3.33 per cent of them were children and 1.33 per cent were housewives. In case of landless households 20 per cent were agricultural labourers, 60 per cent were general labourers and 20 per cent were household industry. In case of marginal farmers 42.86 per cent were agriculturist, 21.43 percent was in agricultural labour and 25 per cent of them were students. In case of small farmers 54.72 per cent of them were agriculturist, 20.75 percent was in agricultural labour and 18.87 per cent of them were students. In case of semi medium farmers 43.24 per cent of the family members were agriculturist, 21.62 per cent were agricultural labourers and 24.32 per cent of them were students. In case of medium farmers 70.37 per cent of the family members were agriculturist, 25.93 per cent of them were students and 3.70 per cent were housewives.*
- *The results showed that 0.67 per cent of them participated in user groups and 99.33 per cent of them have not participated in any local institutions. Landless, marginal, semi medium and medium farmers were found to have no participation*

in any local institutions. Small farmers were found to participate in one or the other local institutions.

- *The results indicated that 43.33 per cent of the households possess Katcha house, 20 per cent of the households possess Pucca house, 33.33 per cent of the households possess Semi Pacca house and 3.33 per cent of them possess Thatched house. 100 percent of the landless farmers possess Katcha house.*
- *The results showed that, 86.67 per cent of the households possess TV, 3.33 per cent of the households possess DVD/VCD Player, 63.33 per cent of the households possess Mixer grinder, 10 per cent of the households possess bicycle, 36.67 per cent of the households possess motor cycle, 3.33 per cent of the households possess Auto and 96.67 per cent of the households possess mobile phones.*
- *The results showed that the average value of television was Rs.5673; DVD/VCD Player was Rs. 2000, mixer grinder was Rs.1647, bicycle was Rs.3000, motor cycle was Rs.44545, Auto was Rs. 300000 and mobile phone was Rs.2022.*
- *The results indicated that about 23.33 per cent of the households possess bullock cart, 43.33 per cent of them possess plough, 13.33 per cent of the households possess tractor, 40 per cent of the households possess sprayer, 3.33 per cent of the households possess sprinkler, 56.67 per cent of the households possess weeder and 3.33 per cent of the households possess harvester.*
- *The results showed that the average value of bullock cart was Rs. 14921; the average value of plough was Rs. 1573, the average value of tractor was Rs. 351250, the average value of sprayer was Rs. 3958, the average value of sprinkler was Rs. 200, the average value of weeder was Rs. 213 and the average value of harvester was Rs. 100.*
- *The results indicated that, average own labour men available in the micro watershed was 1.83, average own labour (women) available was 1.13, average hired labour (men) available was 7.87 and average hired labour (women) available was 11.97.*
- *In case of marginal farmers, average own labour men available was 1.67, average own labour (women) was also 1.17, average hired labour (men) was 8.83 and average hired labour (women) available was 16.83. In case of small farmers, average own labour men available was 2.88, average own labour (women) was 1.25, average hired labour (men) was 10.38 and average hired labour (women) available was 10.75. In case of semi medium farmers, average own labour men available was 1.11, average own labour (women) was 1, average hired labour (men) was 7.78 and average hired labour (women) available was 13.56. In medium farmers average own labour men available was 2, average own labour (women) was 1.33, average hired labour (men) was 5 and average hired labour (women) available was 8.33.*

- *The results indicated that, 73.33 per cent of the household opined that hired labour was adequate and 26.67 per cent of the household opined that hired labour was inadequate.*
- *The results indicated that, households of the Chikkabagnalu micro watershed possess 11.59 ha (27.32 %) of dry land and 30.82 ha (72.68%) of irrigated land. Marginal farmers possess 2.08 ha (67.41%) of dry land and 1.01 ha (32.59%) of irrigated land. Small farmers possess 4.65 ha (55.41 %) of dry land and 3.74 ha (44.59 %) of irrigated land. Semi medium farmers possess 2.83 ha (19.85 %) of dry land and 11.44 ha (80.15 %) of irrigated land. Medium farmers possess 2.02 ha (12.15 %) of dry land and 14.63 (87.85%) of irrigated land.*
- *The results indicated that, the average value of dry land was Rs. 345,092.56 and average value of irrigated was Rs. 387,934.60. In case of marginal famers, the average land value was Rs. 623,495.16 for dry land and Rs. 1,289,558.23 for irrigated land. In case of small famers, the average land value was Rs. 322,735.19 for dry land Rs. 657,597.40 for irrigated land. In case of semi medium famers, the average land value was Rs. 247,000 for dry land and Rs. 401,910.16 for irrigated land. In case of medium famers, the average land value was Rs. 247,000 for dry land and was Rs. 245,975.65 for irrigated land.*
- *The results indicated that, there were 30 functioning and 8 defunctioning bore wells in the micro watershed.*
- *The results indicated that, bore well was the major irrigation source for 96.66 per cent of the farmers and 3.33 per cent of the households were using tank as a source of irrigation.*
- *The results indicated that on an average the depth of the bore well was 68.15 meters and tank was 2.54 meters.*
- *The results indicated that, in case of marginal farmers there was 1.01 ha of irrigated land, in case of small farmers there was 54.25 ha of irrigated land, semi medium farmers were having 11.12 ha of irrigated land and medium farmers were having 6.88 ha of irrigated land.*
- *The results indicated that, farmers have grown banana (0.40ha), groundnut (4.05ha), maize (19.14ha), paddy (1.62ha), bajra (0.81ha), red gram (1.31ha) in kharif season and also grown red gram (0.44 ha) in Rabi season. Marginal farmers have grown banana, groundnut and maize. Small farmers have grown groundnut, maize and red gram. Semi medium farmers have grown groundnut, maize, paddy and red gram and medium farmers grown groundnut, paddy and maize.*
- *The results indicated that, the cropping intensity in Chikkabagnalu micro watershed was found to be 75.56 per cent. In case of marginal farmers it was 100 per cent, in small farmers it was 83.55, in semi medium farmers it was 88.05 and in medium farmers it was 60.77 per cent.*

- *The results indicated that, 93.33 per cent of the households have both bank account and savings respectively. Among marginal farmers 100 percent of them possess both bank account and savings. 87.50 per cent of small farmers possess both bank account and savings correspondingly. Semi medium farmers possess 100 per cent of both bank account and savings respectively and medium category of farmers also possess 100 per cent of bank account and also savings correspondingly.*
- *The results indicated that, 50 per cent of marginal, 12.50 per cent of small, 22.22 per cent of the semi medium and 66.67 per cent of medium farmers have borrowed credit from different sources.*
- *The results indicated that, 40 per cent have availed loan in commercial bank, 20 per cent have availed loan from Cooperative Bank and Grameena Bank, and 10 per cent have availed loan from Friends/Relatives and money lender respectively.*
- *The results indicated that the average amount availed from marginal, small, semi medium and medium farmer were Rs.74250, Rs. 24750, Rs. 28400 and Rs. 71250 respectively. Overall average credit amount availed by households in the micro watershed is 54,235.29.*
- *The results indicated that, 90 per cent of the households have borrowed loan for agriculture production and 10 per cent of the households have borrowed loan for land purchase.*
- *The results indicated that, agriculture production and household consumption were the purpose for which marginal and small farmers borrowed loan from private credit. About 25 percent of loan was taken for agriculture production and 75 per cent of the farmers taken loan for household consumption.*
- *Results indicated that 40 per cent of the households have repaid their institutional credit partially, 50 percent of the households have unpaid their loan and 10 percent of the households have fully paid their loan.*
- *. Results indicated that 100 per cent of the households have repaid their private credit partially.*
- *The results indicated that 30 per cent of the households were opined that they were helped to perform timely agricultural operations, 10 households were opined that easy accessibility of credit and 60 per cent of the farmers did not give any opinion on credit.*
- *The results indicated that, the total cost of cultivation for bajra was Rs. 56355.49. The gross income realized by the farmers was Rs. 40014.00. The net income from bajra cultivation was Rs. -16341.49, thus the benefit cost ratio was found to be 1:0.71.*
- *The results indicated that, the total cost of cultivation for maize was Rs. 44337.39. The gross income realized by the farmers was Rs. 40198.74. The net income from*

maize cultivation was Rs. -4138.65. Thus the benefit cost ratio was found to be 1:0.91.

- *The results indicated that, the total cost of cultivation for paddy was Rs. 58309.08. The gross income realized by the farmers was Rs. 55266.25. The net income from paddy cultivation was Rs. -3042.83. Thus the benefit cost ratio was found to be 1:0.95.*
- *The results indicated that, the total cost of cultivation for groundnut was Rs. 60025.95. The gross income realized by the farmers was Rs. 91159.47. The net income from groundnut cultivation was Rs. 31133.51. Thus the benefit cost ratio was found to be 1:1.52.*
- *The results indicated that, the total cost of cultivation for Banana was Rs. 288143.50. The gross income realized by the farmers was Rs. 247000. The net income from Banana cultivation was Rs. -41143.50. Thus the benefit cost ratio was found to be 1:0.86.*
- *The results indicated that, the total cost of cultivation for red gram was Rs. 34365.65. The gross income realized by the farmers was Rs. 58404.41. The net income from red gram cultivation was Rs. 24038.76. Thus the benefit cost ratio was found to be 1:1.7.*
- *The results indicated that, 33.33 per cent of the households opined that dry fodder was adequate and inadequate respectively. Similarly 60 per cent of the households opined that green fodder was adequate and 6.67 per cent of the households opined that green fodder was inadequate.*
- *The results indicated that, in case of landless farmers, the average income from wage was Rs. 120000, in marginal farmers the average income from service/salary was Rs.61666.67, wage was Rs.15500, agriculture was Rs.32100 and dairy farm was Rs. 8400. In case of small farmers average income from service/salary was Rs. 25000, Wage Rs.12500, agriculture was Rs. 62375 and goat farming was Rs.3750. In semi medium farmers the average income from wage was Rs. 13444.44, agriculture was Rs. 84888.89 and dairy farming was Rs.5222.22. In medium farmers the average income from wage was Rs. 17166.67, agriculture was Rs. 137583.33 and dairy farming was Rs. 11333.33. Over all, the average income from the salary was Rs.19000, wage was Rs.17900, agriculture was Rs.76036.67, dairy farm was Rs.5513.33 and goat farming was Rs.1000.*
- *The results indicated that, in case of landless, the average expenditure from wage Rs. 50,000. In case of marginal farmers the average expenditure from service/salary was Rs.140000, wage was Rs.14750, agriculture was Rs.19666.67 and dairy farm was Rs. 30000. In case of small farmers the average expenditure from service/salary was Rs.37500, wage was Rs.11000, agriculture was Rs.38125 and goat farming was Rs.5000. In semi medium farmers the average expenditure from wage was Rs.7125, agriculture was Rs.50000 and dairy farm was*

Rs.8333.33. Similarly in medium farmers the average expenditure from wage was Rs. 12000, agriculture was Rs.80000 and dairy farm was Rs.7875.

- *The results indicated that, sampled households have grown 57 coconut trees, 12 mango trees and 3 Sapota trees in their field.*
- *The results indicated that, 3.33 per cent of the households are interested in growing horticultural crops which include 16.67 per cent medium farmers.*
- *The results indicated that, households have planted 77 neem trees, 2 tamarind tress, 6 acacia trees and 5 banyan trees in their field.*
- *The results indicated that, Bajra, coriander, cotton, cowpea, groundnut, sorghum, paddy, red gram and sunflower crops were sold to the extent of 100 per cent. Only maize was sold to the extent of 56.32 per cent.*
- *The results indicated that, 30 percent of the households have sold their produce to agent/traders, 50 percent of the households have sold their produce to local/village merchant, 30 percent of the households sold their produce in regulated markets and 3.33 percent of the households sold their produce to cooperative marketing society.*
- *The results indicated that 3.33 per cent of the households have used head load as a mode of transport, 6.67 per cent of them have used cart, 90 per cent have used tractor and 10 per cent of them have used truck.*
- *The results indicated that, 66.67 per cent of the households have experienced the soil and water erosion problems i.e. 66.67 percent of marginal farmers, 75 per cent of small farmers, 55.56 per cent semi medium farmers and 83.33 percent medium farmers.*
- *The results indicated that, 60 per cent of the households have shown interest in soil testing i.e. 66.67 per cent of marginal, 62.50 per cent of small, 44.44 per cent of semi medium and 83.33 per cent of medium farmers have shown interest towards soil testing.*
- *The results indicated that, 83.33 percent used fire wood as a source of fuel and 23.33 percent of the households used LPG as a source of fuel.*
- *The results indicated that, piped supply was the source of drinking water for 6.67 per cent, 76.67 per cent of them were using bore well and 16.67 per cents of the households were using lake/tank for drinking water.*
- *The results indicated that, electricity was the major source of light for 93.33 per cent of the households and 3.33 per cent of the households were using kerosene lamp.*
- *The results indicated that, 20 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, 16.67 per cent of marginal, 12.50 per cent of small, 22.22 per cent of semi medium and 16.67 per cent of medium had sanitary toilet facility.*

- *The results indicated that, 90 per cent of the sampled households possessed BPL card and 6.67 per cent of the sampled households have not possessed BPL card.*
- *The results indicated that, 46.67 per cent of the households participated in NREGA programme which included 100 per cent of the landless, 16.67 percent of the marginal, 100 per cent of the small, 33.33 per cent of the semi medium and 16.67 percent of the medium farmers.*
- *The results indicated that, cereals, pulses, oilseeds, vegetables, milk, egg and meat were adequate for 96.67 per cent, 46.67 per cent, 53.33 per cent, 43.33 per cent, 73.33 per cent, 36.67 per cent, and 23.33 per cent respectively.*
- *The results indicated that, cereals, pulses, oilseeds, vegetables and milk were inadequate for 3.33 per cent, 53.33 per cent, 26.67 per cent, 40 per cent and 13.33 of the households. Fruits, egg and meat were inadequate for 23.33 per cent of the households.*
- *The results indicated that, Lower fertility status of the soil was the constraint experienced by 3.33 per cent of the households, wild animal menace on farm field (40%), frequent incidence of pest and diseases (13.33%), inadequacy of irrigation water (6.67%), high cost of Fertilizers and plant protection chemicals (6.67%), high rate of interest on credit (60%), low price for the agricultural commodities (6.67%), lack of marketing facilities in the area (60%), lack of transport for safe transport of the agricultural produce to the market (26.67%), less rainfall (93.33%) and Source of Agri-technology information(Newspaper /TV/Mobile (63.33 %).*

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, labour 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.

Description of the study area

Koppal district is an administrative district in the state of Karnataka in India. In the past Koppal was referred to as 'Kopana Nagara'. Koppal, now a district headquarters is ancient Kopana a major holy place of the Jainas. The district occupies an area of 7,190 km² and has a population of 1,196,089, which 16.58% were urban as of 2001. The Koppal district was formed after split of Raichur district.

Geographers are very particular about the physiography or relief of a region. It plays a very important role in the spatial analysis of agricultural situation of the study area. The undulating topography with black cotton soil shrips, cut across by numerous nalas or streams is the major characteristic feature of the study region. Three physiographic divisions have made considering the local conditions of landforms and crops grown in the district. On the basis of physiography, Koppal district can be divided into three major divisions.3 They are (a) Koppal & Yelburga plateau, (b) Maidan division, (c) Tungabhadra valley. The district is part of Krishna basin the main streams draining the area are Maskinala, Ilkal-nadi and Hirenala. These are Ephemaral in nature, these come under Tungabhadra sub-basin. The drainage exhibit dentritic to subdentric with drainage density varies from 1.4 to7.0kms/sq.km.

According to the 2011 census Koppal district has a population of 1,391,292, roughly equal to the nation of Swaziland or the US state of Hawaii. This gives it a ranking of 350th in India (out of a total of 640). The district has a population density of 250 inhabitants per square kilometre (650/sq mi). Its population growth rate over the decade 2001-2011 was 16.32%.Koppal has a sex ratio of 983 females for every 1000 males, and a literacy rate of 67.28%.

Description of the micro watershed

Chikkabagnalu micro-watershed (Karkihalli sub-watershed, Koppal Taluk and District) is located at North latitude $15^0$14’16.875’’ to$15^0$17’9.412’’ and East longitude $76^0$13’59.088’’ to$76^0$15’47.04’’ covering an area of 679.79 ha and spread across Hirebaganala, Kunakeri, Lachanakeri, Karkihalli and Chikkabagnala villages.

Methodology followed in assessing socio-economic status of households

In order to assess the socio-economic condition of the farmers in the watershed a comprehensive questionnaire was prepared. Major components such as demographic conditions, migration details, food consumption and family expenditure pattern, material possession, land holding, land use management, cropping pattern, cost of cultivation of crops, livestock management. The statistical components such as frequency and percentage were used to analyze the data. About 30 households located in the micro watershed were interviewed for the survey.

Chapter 4

SALIENT FEATURES OF THE SURVEY

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Chikkabagnalu micro watershed is presented in Table 1 and it indicated that 30 farmers were sampled in Chikkabagnalu micro watershed among them 6 (20%) were marginal farmers, 8 (26.67%) were small farmers, 9(30%) were semi medium farmers, 6(20%) were medium farmers and 1(3.33%) landless farmer was also interviewed for the survey.

Table 1: Households sampled for socio economic survey in Chikkabagnalu micro watershed

Sl. No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	1	3.33	6	20	8	26.67	9	30	6	20	30	100

Population characteristics: The population characteristics of households sampled for socio-economic survey in Chikkabagnalu micro watershed is presented in Table 2. The data indicated that there were 150 population households were there in the studied micro watershed. Among them 92 (61.33%) men and 58 (38.67 %) were women. The average family size of landless was 5, marginal farmers were 5, small farmers were 7, semi medium farmers were 4 and medium farmers were 4.

Table 2: Population characteristics of Chikkabagnalu micro-watershed

Sl. No.	Particulars	LL (5)		MF (28)		SF (53)		SMF (37)		MDF (27)		All (150)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Male	2	40	15	53.57	37	69.81	21	56.76	17	62.96	92	61.33
2	Female	3	60	13	46.43	16	30.19	16	43.24	10	37.04	58	38.67
Total		5	100	28	100	53	100	37	100	27	100	150	100
Average size of the family		5		5		7		4		4		5	

Age wise classification of population: The age wise classification of household members in Chikkabagnalu micro watershed is presented in Table 3. The data indicated that 26(17.33%) people were in 0-15 years of age, 69 (46%) were in 16-35 years of age, 45 (30 %) were in 36-60 years of age and 10 (6.67%) were above 61 years of age.

Table 3: Age wise classification of household members in Chikkabagnalu micro watershed

S.N.	Particulars	LL (5)		MF (28)		SF (53)		SMF (37)		MDF (27)		All (150)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years	0	0	4	14.29	7	13.21	11	29.73	4	14.81	26	17.33
2	16-35 years	2	40	17	60.71	27	50.94	12	32.43	11	40.74	69	46
3	36-60 years	2	40	5	17.86	17	32.08	12	32.43	9	33.33	45	30
4	> 61 years	1	20	2	7.14	2	3.77	2	5.41	3	11.11	10	6.67
Total		5	100	28	100	53	100	37	100	21	100	150	100

Education level of household members: Education level of household members in Chikkabagnalu micro watershed is presented in Table 4. The results indicated that the

Chikkabagnalu had 34 per cent illiterates, 26 per cent of them had primary school education, 9.33 per cent of them had both middle school, 13.33 per cent them had high school education, 7.33 per cent of them had PUC education, 2 per cent them had ITI education, 4.67 per cent of them had degree education and 3.33 per cent them had others.

Table 4: Education level of household members in Chikkabagnalu micro watershed

S.N.	Particulars	LL (5)		MF (28)		SF (53)		SMF (37)		MDF (27)		All (150)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	3	60	10	35.71	19	35.85	10	27.03	9	33.33	51	34
2	Primary School	2	40	6	21.43	11	20.75	15	40.54	5	18.52	39	26
3	Middle School	0	0	0	0	5	9.43	4	10.81	5	18.52	14	9.33
4	High School	0	0	3	10.71	11	20.75	1	2.70	5	18.52	20	13.33
5	PUC	0	0	3	10.71	5	9.43	2	5.41	1	3.70	11	7.33
6	ITI	0	0	1	3.57	0	0	2	5.41	0	0	3	2
7	Degree	0	0	4	14.29	1	1.89	0	0	2	7.41	7	4.67
8	Others	0	0	1	3.57	1	1.89	3	8.11	0	0	5	3.33
Total		5	100	28	100	53	100	37	100	21	100	150	100

Occupation of household heads: The data regarding the occupation of the household heads in Chikkabagnalu micro watershed is presented in Table 5. The results indicated that, 93.33 per cent of households practicing agriculture and 3.33 per cent of the household heads were agricultural labour.

Table 5: Occupation of household heads in Chikkabagnalu micro watershed

Sl. No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	5	83.33	8	100	8	88.89	6	100	28	93.33
2	Agricultural Labou	1	100	0	0	0	0	0	0	0	0	1	3.33
Total		1	100	5	100	8	100	8	100	5	100	29	100

Table 6: Occupation of family members in Chikkabagnalu micro watershed

S. N.	Particulars	LL (5)		MF (28)		SF (53)		SMF (37)		MDF (27)		All (150)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	12	42.86	29	54.72	16	43.24	19	70.37	76	50.67
2	Agricultural Labour	1	20	6	21.43	11	20.75	8	21.62	0	0	26	17.33
3	General Labour	3	60	0	0	1	1.89	0	0	0	0	4	2.67
4	Household industry	1	20	0	0	0	0	0	0	0	0	1	0.67
6	Government Servic	0	0	2	7.14	0	0	0	0	0	0	2	1.33
7	Private Service	0	0	0	0	0	0	1	2.70	0	0	1	0.67
10	Student	0	0	7	25	10	18.87	9	24.32	7	25.93	33	22
12	Housewife	0	0	0	0	1	1.89	0	0	1	3.70	2	1.33
13	Children	0	0	1	3.57	1	1.89	3	8.11	0	0	5	3.33
Total		5	100	28	100	53	100	37	100	21	100	150	100

Occupation of the household members: The data regarding the occupation of the household members in Chikkabagnalu micro watershed is presented in Table 6. The results indicated that agriculture was the major occupation for 50.67 per cent of the household members, 17.33 per cent were agricultural labourers, 2.67 per cent were

general labours, 0.67 per cent household industry, 1.33 percent were in government service, 0.67 per cent of them were in private sector, 22 per cent of them were students, 3.33 per cent of them were children and 1.33 per cent were housewives. In case of landless households 20 per cent were agricultural labourers, 60 per cent were general labourers and 20 per cent were household industry. In case of marginal farmers 42.86 per cent were agriculturist, 21.43 percent was in agricultural labour, 7.14 per cent were in government service, 25 per cent of them were students and 3.57 per cent of them were children. In case of small farmers 54.72 per cent of them were agriculturist, 20.75 percent was in agricultural labour, 18.87 per cent of them were students and 1.89 per cent of them were general labour, housewife and children respectively. In case of semi medium farmers 43.24 per cent of the family members were agriculturist, 21.62 per cent were agricultural labourers and 24.32 per cent of them were students. In case of medium farmers 70.37 per cent of the family members were agriculturist, 25.93 per cent of them were students and 3.70 per cent were housewives.

Institutional participation of the household members: The data regarding the institutional participation of the household members in Chikkabagnalu micro-watershed is presented in Table 7. The results showed that 0.67 per cent of them participated in user groups and 99.33 per cent of them have not participated in any local institutions. Landless, marginal, semi medium and medium farmers were found to have no participation in any local institutions. Small farmers were found to participate in one or the other local institutions.

Table 7: Institutional Participation of household members in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (5)		MF (28)		SF (53)		SMF (37)		MDF (27)		All (150)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	User Group	0	0	0	0	1	1.89	0	0	0	0	1	0.67
2	No Participation	5	100	28	100	52	98.11	37	100	27	100	149	99.33
Total		5	100	28	100	53	100	37	100	27	100	150	100

Table 8: Type of house owned by households in Chikkabagnalu micro watershed

S.N.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	0	0	0	0	0	0	0	0	1	16.67	1	3.33
2	Katcha	1	100	2	33.33	4	50	3	33.33	3	50	13	43.33
3	Pucca/RCC	0	0	2	33.33	0	0	3	33.33	1	16.67	6	20
4	Semi pacca	0	0	2	33.33	4	50	3	33.33	1	16.67	10	33.33
Total		1	100	6	100	8	100	9	100	5	100	30	100

Type of house owned: The data regarding the type of house owned by the households in Chikkabagnalu micro watershed is presented in Table 8. The results indicated that 43.33 per cent of the households possess Katcha house, 20 per cent of the households possess Pucca house, 33.33 per cent of the households possess Semi Pacca house and 3.33 per

cent of them possess Thatched house. 100 percent of the landless farmers possess Katcha house.

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Chikkabagnalu micro watershed is presented in Table 9. The results showed that, 86.67 per cent of the households possess TV, 3.33 per cent of the households possess DVD/VCD Player, 63.33 per cent of the households possess Mixer grinder, 10 per cent of the households possess bicycle, 36.67 per cent of the households possess motor cycle, 3.33 per cent of the households possess Auto and 96.67 per cent of the households possess mobile phones.

Table 9: Durable Assets owned by households in Chikkabagnalu micro watershed

Sl. No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	1	100	5	83.33	8	100	6	66.67	6	100	26	86.67
2	DVD/VCD Player	0	0	0	0	0	0	1	11.11	0	0	1	3.33
3	Mixer/Grinder	0	0	4	66.67	6	75	4	44.44	5	83.33	19	63.33
4	Bicycle	0	0	0	0	1	12.50	2	22.22	0	0	3	10
5	Motor Cycle	0	0	3	50	4	50	1	11.11	3	50	11	36.67
6	Auto	0	0	0	0	0	0	0	0	1	16.67	1	3.33
7	Mobile Phone	1	100	5	83.33	8	100	9	100	5	100	29	96.67
8	Blank	0	0	1	16.67	0	0	0	0	0	0	1	3.33

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Chikkabagnalu micro watershed is presented in Table 10. The results showed that the average value of television was Rs.5673; DVD/VCD Player was Rs. 2000, mixer grinder was Rs.1647, bicycle was Rs.3000, motor cycle was Rs.44545, Auto was Rs. 300000 and mobile phone was Rs.2022.

Table 10: Average value of durable assets owned by households in Chikkabagnalu micro watershed **Average value (Rs.)**

Sl.No.	Particulars	LL (1)	MF (6)	SF (8)	SMF (9)	MDF (6)	LF (1)	All (30)
1	Television	2,500	5,200	6,625	5,166	5833	5,000	5,673
2	DVD/VCD Player	0	0	0	2,000	0	0	2,000
3	Mixer/Grinder	0	1,750	1,666	1,700	1,500	0	1,647
4	Bicycle	0	0	3,000	3,000	0	0	3,000
5	Motor Cycle	0	48,333	47,500	35,000	40000	50,000	44,545
6	Auto	0	0	0	0	300,000	0	300,000
7	Mobile Phone	2,700	2,071	2,000	1,863	2,000	2,500	2,022

Farm Implements owned: The data regarding the farm implements owned by the households in Chikkabagnalu micro watershed is presented in Table 11. About 23.33 per cent of the households possess bullock cart, 43.33 per cent of them possess plough, 13.33 per cent of the households possess tractor, 40 per cent of the households possess sprayer, 3.33 per cent of the households possess sprinkler, 56.67 per cent of the households possess weeder and 3.33 per cent of the households possess harvester.

Table 11: Farm Implements owned by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	0	0	2	25	3	33.33	2	33.33	7	23.33
2	Plough	0	0	6	75	5	55.56	2	33.33	13	43.33
3	Tractor	0	0	0	0	2	22.22	2	33.33	4	13.33
4	Sprayer	1	16.67	3	38	4	44.44	4	66.67	12	40
5	Sprinkler	0	0	0	0	0	0	1	16.67	1	3.33
6	Weeder	1	16.67	6	75	5	55.56	5	83.33	17	56.67
7	Harvester	1	16.67	0	0	0	0.00	0	0	1	3.33
8	Blank	5	83.33	1	12.50	1	11.11	0	0	8	26.67

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Chikkabagnalu micro watershed is presented in Table 12. The results showed that the average value of bullock cart was Rs. 14921; the average value of plough was Rs. 1573, the average value of tractor was Rs. 351250, the average value of sprayer was Rs. 3958, the average value of sprinkler was Rs. 200, the average value of weeder was Rs. 213 and the average value of harvester was Rs. 100.

Table 12: Average value of farm implements owned by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
1	Bullock Cart	0	10225	16000	18000	14921
2	Plough	0	1575	1400	2000	1573
3	Tractor	0	0	400000	302500	351250
4	Sprayer	5000	4333	3000	4375	3958
5	Sprinkler	0	0	0	200	200
6	Weeder	100	400	145	134	213
7	Harvester	100	0	0	0	100

Livestock possession by the households: The data regarding the Livestock possession by the households in Chikkabagnalu micro watershed is presented in Table 13. The results indicated that, 26.67 per cent of the households possess bullocks, 20 per cent of the households possess local cow, 26.67 per cent of the households possess crossbred cow, 23.33 per cent of the households possess buffalo, 10 per cent of the households possess sheep and 3.33 per cent of the households possess poultry birds respectively.

Table 13: Livestock possession by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Bullock	0	0	3	37.50	3	33.33	2	33.33	8	26.67
2	Local cow	1	16.67	1	12.50	2	22.22	2	33.33	6	20
3	Crossbred cow	1	16.67	1	12.50	4	44.44	2	33.33	8	26.67
4	Buffalo	1	16.67	1	12.50	3	33.33	2	33.33	7	23.33
5	Sheep	1	16.67	1	12.50	1	11.11	0	0	3	10
6	Poultry birds	0	0	0	0	1	11.11	0	0	1	3.33
7	blank	3	50	2	25	2	22.22	2	33.33	10	33.33

Average Labour availability: The data regarding the average labour availability in Chikkabagnalu micro watershed is presented in Table 14. The results indicated that, average own labour men available in the micro watershed was 1.83, average own labour (women) available was 1.13, average hired labour (men) available was 7.87 and average hired labour (women) available was 11.97.

Table 14: Average Labour availability in Chikkabagnalu micro watershed

S. N.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
		N	N	N	N	N
1	Own labour Male	1.67	2.88	1.11	2	1.83
2	Own Labour Female	1.17	1.25	1.00	1.33	1.13
3	Hired labour Male	8.83	10.38	7.78	5.00	7.87
4	Hired labour Female	16.83	10.75	13.56	8.33	11.97

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Chikkabagnalu micro watershed is presented in Table 15. The results indicated that, 73.33 per cent of the household opined that hired labour was adequate which include 66.67 per cent of marginal farmers, 75 per cent of the small, 66.67 per cent of the semi medium and 83.33 per cent of the medium farmers and 26.67 per cent of the household opined that hired labour was inadequate i.e. 33.33 per cent of the small, 66.67 per cent of the marginal, 25 per cent of the small, 66.67 per cent of the small, 33.33 per cent of the small, 66.67 per cent of the semi medium and 16.67 per cent of the small, 66.67 per cent of the medium farmers.

Table 15: Adequacy of Hired Labour in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate	4	66.67	6	75	6	66.67	5	83.33	22	73.33
2	Inadequate	2	33.33	2	25	3	33.33	1	16.67	8	26.67

Distribution of land (ha): The results (Table 16) indicated that, households of the Chikkabagnalu micro watershed possess 11.59 ha (27.32 %) of dry land and 30.82 ha (72.68%) of irrigated land. Marginal farmers possess 2.08 ha (67.41%) of dry land and 1.01 ha (32.59%) of irrigated land. Small farmers possess 4.65 ha (55.41 %) of dry land and 3.74 ha (44.59 %) of irrigated land. Semi medium farmers possess 2.83 ha (19.85 %) of dry land and 11.44 ha (80.15 %) of irrigated land. Medium farmers possess 2.02 ha (12.15 %) of dry land and 14.63 (87.85%) of irrigated land.

Table 16: Distribution of land (Ha) in Chikkabagnalu micro watershed

Sl. No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	2.08	67.41	4.65	55.41	2.83	19.85	2.02	12.15	11.59	27.32
2	Irrigated	1.01	32.59	3.74	44.59	11.44	80.15	14.63	87.85	30.82	72.68
Total		3.09	100	8.39	100	14.27	100	14.23	100	39.98	100

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Chikkabagnalu micro watershed is presented in Table 17. The results indicated that, the

average value of dry land was Rs. 345,092.56 and average value of irrigated was Rs. 387,934.60.

Table 17: Average land value (Rs. /ha) in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
		N	N	N	N	N
1	Dry	623,495.16	322,735.19	247,000	247,000	345,092.56
2	Irrigated	1,289,558.23	657,597.40	401,910.16	245,975.65	387,934.60

Status of bore wells: The data regarding the status of bore wells in Chikkabagnalu micro watershed is presented in Table 18. The results indicated that, there were 30 functioning and 8 defunctioning bore wells in the micro watershed.

Table 18: Status of bore wells in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
		N	N	N	N	N
1	De-functioning	0	1	2	5	8
2	Functioning	2	16	7	5	30

Source of irrigation: The data regarding the source of irrigation in Chikkabagnalu micro watershed is presented in Table 19. The results indicated that, bore well was the major irrigation source for 96.66 per cent of the farmers and 3.33 per cent of the households were using tank as a source of irrigation.

Table 19: Source of irrigation in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Bore Well	2	33.33	8	200	7	77.78	5	83.33	29	96.66
2	Tank	0	0	0	0	0	0	1	16.67	1	3.33

Depth of water: The data regarding the depth of water in Chikkabagnalu micro watershed is presented in Table 20.The results indicated that on an average the depth of the bore well was 68.15 meters and tank was 2.54 meters.

Table 20: Depth of water in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
		N	N	N	N	N
1	Bore Well	35.56	71.44	81.28	88.04	68.15
2	Tank	0	0	0	12.70	2.54

Irrigated Area (ha): The data regarding the irrigated area (ha) in Chikkabagnalu micro watershed is presented in Table 21. The results indicated that, in case of marginal farmers there was 1.01 ha of irrigated land, in case of small farmers there was 54.25 ha of irrigated land, semi medium farmers were having 11.12 ha of irrigated land and medium farmers were having 6.88 ha of irrigated land.

Table 21: Irrigated Area (ha) in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
1	Kharif	1.01	53.44	11.12	6.88	72.45
2	Summer	0	0.81	0	0	0.81
Total		1.01	54.25	11.12	6.88	73.26

Cropping pattern: The data regarding the cropping pattern in Chikkabagnalu micro watershed is presented in Table 22. The results indicated that, farmers have grown banana (0.40ha), groundnut (4.05ha), maize (19.14ha), paddy (1.62ha), bajra (0.81ha), red gram (1.31ha) in kharif season and also grown red gram (0.44 ha) in Rabi season. Marginal farmers have grown banana, groundnut and maize. Small farmers have grown groundnut, maize and red gram. Semi medium farmers have grown groundnut, maize, paddy and red gram and medium farmers grown groundnut, paddy and maize.

Table 22: Cropping pattern in Chikkabagnalu micro watershed Area (ha)

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
1	Kharif - Banana	0.40	0	0	0	0.40
2	Kharif - Groundnut	0.00	1.62	0.40	2.02	4.05
3	Kharif - Maize	2.69	5.02	4.96	6.48	19.14
4	Kharif - Paddy	0	0	0.81	0.81	1.62
5	Kharif - bajra	0	0	0.81	0	0.81
6	Kharif - Red gram (togari)	0	0	1.31	0	1.31
7	Rabi - Red gram (togari)	0	0.44	0	0	0.44
Total		3.09	8.39	11.93	13.36	36.77

Cropping intensity: The data regarding the cropping intensity in Chikkabagnalu micro watershed is presented in Table 23. The results indicated that, the cropping intensity in Chikkabagnalu micro watershed was found to be 75.56 per cent. In case of marginal farmers it was 100 per cent, in small farmers it was 83.55, in semi medium farmers it was 88.05 and in medium farmers it was 60.77 per cent.

Table 23: Cropping intensity (%) in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
1	Cropping Intensity	100.00	83.55	88.05	60.77	75.56

Possession of Bank account: The data regarding the possession of Bank account and savings in Chikkabagnalu micro watershed is presented in Table 24. The results indicated that, 93.33 per cent of the households have both bank account and savings respectively. Among marginal farmers 100 percent of them possess both bank account and savings. 87.50 per cent of small farmers possess both bank account and savings correspondingly. Semi medium farmers possess 100 per cent of both bank account and savings respectively and medium category of farmers also possess 100 per cent of bank account and also savings correspondingly.

Table 24: Possession of Bank account and savings in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Account	6	100	7	87.50	9	100	6	100	28	93.33
2	Savings	6	100	7	87.50	9	100	6	100	28	93.33

Borrowing status: The data regarding the possession of borrowing status in Chikkabagnalu micro watershed is presented in Table 25. The results indicated that, 50

per cent of marginal, 12.50 per cent of small, 22.22 per cent of the semi medium and 66.67 per cent of medium farmers have borrowed credit from different sources.

Table 25: Borrowing status in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Credit Availed	3	50	1	12.50	2	22.22	4	66.67	10	33.33

Source of credit: The results (Table 26) indicated that, 40 per cent have availed loan in commercial bank, 20 per cent have availed loan from Cooperative Bank and Grameena Bank, and 10 per cent have availed loan from Friends/Relatives and money lender respectively.

Table 26: Source of credit availed by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (3)		SF (1)		SMF (2)		MDF (4)		All (10)	
		N	%	N	%	N	%	N	%	N	%
1	Commercial Bank	1	33.33	1	100	0	0	2	50	4	40
2	Cooperative Bank	1	33.33	0	0	0	0	1	25	2	20
3	Friends/Relatives	0	0	0	0	0	0	1	25	1	10
4	Grameena Bank	0		0	0	2	40	0	0	2	20
5	Money Lender	1	33.33	0	0	0	0	0	0	1	10

Average credit amount: The results (Table 27) indicated that the average amount availed from marginal, small, semi medium and medium farmer were Rs.74250, Rs. 24750, Rs. 28400 and Rs. 71250 respectively. Overall average credit amount availed by households in the micro watershed is 54,235.29.

Table 27: Average Credit amount availed by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (3)	SF (1)	SMF (2)	MDF (4)	All (10)
		N	N	N	N	N
1	Average Credit	74250	24750	28,400	71,250	54,235.29

Purpose of credit borrowed (institutional Source): The data regarding the purpose of credit borrowed from institutional sources by households in Chikkabagnalu micro watershed is presented in Table 28. The results indicated that, 90 per cent of the households have borrowed loan for agriculture production and 10 per cent of the households have borrowed loan for land purchase.

Table 28: Purpose of credit borrowed (institutional Source) by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (3)		SF (1)		SMF (2)		MDF (4)		All (10)	
		N	%	N	%	N	%	N	%	N	%
1	Agriculture production	2	66.66	1	100	2	100	4	100	9	90
2	Purchase-land	1	33.33	0	0	0	0	0	0	1	10

Purpose of credit borrowed (Private Credit): The data regarding the purpose of credit borrowed from private sources by households in Chikkabagnalu micro watershed is presented in Table 29. The results indicated that, agriculture production and household

consumption were the purpose for which marginal and small farmers borrowed loan from private credit. About 25 percent of loan was taken for agriculture production and 75 per cent of the farmers taken loan for household consumption.

Table 29: Purpose of credit borrowed (Private Credit) by households in Chikkabagnalu micro watershed

Sl.No.	Particulars	SF (1)		MDF (2)		All (3)	
		N	%	N	%	N	%
1	Agriculture production	1	100	0	0	1	25
2	Household consumption	0	0	2	100	2	75

Repayment status of households (Institutional): The data regarding the repayment status of credit borrowed from institutional sources by households in Chikkabagnalu micro watershed is presented in Table 30. Results indicated that 40 per cent of the households have repaid their institutional credit partially, 50 percent of the households have unpaid their loan and 10 percent of the households have fully paid their loan.

Table 30: Repayment status of households (Institutional) in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (3)		SF (1)		SMF (2)		MDF (4)		All (10)	
		N	%	N	%	N	%	N	%	N	%
1	Partially paid	2	25	1	100	0	0	1	25	4	40
2	Un paid	1	0	0	0	2	100	2	50	5	50
3	Fully paid	0	0	0	0	0	0	1	25	1	10

Repayment status of households (Private): The data regarding the repayment status of credit borrowed from private sources by households in Chikkabagnalu micro watershed is presented in Table 31. Results indicated that 100 per cent of the households have repaid their private credit partially.

Table 31: Repayment status of households (Private) in Chikkabagnalu micro watershed

Sl.No.	Particulars	SF (1)		MDF (2)		All (3)	
		N	%	N	%	N	%
1	Partially paid	1	100	2	50	3	100

Opinion on institutional sources of credit: The results (Table 32) indicated that 30 per cent of the households were opined that they were helped to perform timely agricultural operations, 10 households were opined that easy accessibility of credit and 60 per cent of the farmers did not give any opinion on credit.

Table 32: Opinion on institutional sources of credit in Chikkabagnalu micro watershed

S. N.	Particulars	MF (3)		SF (1)		SMF (2)		MDF (4)		All (10)	
		N	%	N	%	N	%	N	%	N	%
1	Helped to perform timely agricultural operations	0	0	0	0	1	50	2	50	3	30
2	Easy accessibility of credit	0	0	1	25	0	0	0	0	1	10
3	None	3	100	0	0	1	50	2	50	6	60

Cost of Cultivation of Bajra: The data regarding the cost of cultivation of bajra in Chikkabagnalu micro watershed is presented in Table 33. The results indicated that, the total cost of cultivation for bajra was Rs. 56355.49. The gross income realized by the farmers was Rs. 40014.00. The net income from bajra cultivation was Rs. -16341.49, thus the benefit cost ratio was found to be 1:0.71.

Table 33: Cost of Cultivation of Bajra in Chikkabagnalu micro watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	208.72	31677.75	56.21
2	Bullock		Pairs/day	2.47	1482.00	2.63
3	Tractor		Hours	0.00	0.00	0.00
4	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	8.65	1037.40	1.84
5	FYM		Quintal	2.47	2470.00	4.38
6	Fertilizer + micronutrients		Quintal	9.88	8583.25	15.23
7	Pesticides (PPC)		Kgs / liters	0.00	0.00	0.00
8	Irrigation		Number	0.00	0.00	0.00
9	Depreciation charges			0.00	491.53	0.87
10	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
11	Interest on working capital				1451.00	2.57
12	**Cost B1 = (Cost A1 + sum of 15 and 16)**				47192.93	83.74
III	**Cost B2**					
13	Rental Value of Land				333.33	0.59
14	**Cost B2 = (Cost B1 + Rental value)**				47526.26	84.33
IV	**Cost C1**					
15	Family Human Labour			17.29	3705.00	6.57
16	**Cost C1 = (Cost B2 + Family Labour)**				51231.26	90.91
V	**Cost C2**					
17	Risk Premium				1.00	0.00
18	**Cost C2 = (Cost C1 + Risk Premium)**				51232.26	90.91
VI	**Cost C3**					
19	Managerial Cost				5123.23	9.09
20	**Cost C3 = (Cost C2 + Managerial Cost)**				56355.49	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		18.53	37050.00	
		b) Main Crop Sales Price (Rs.)			2000.00	
	By Product	e) Main Product (q)		3.71	2964.00	
		f) Main Crop Sales Price (Rs.)			800.00	
b.	Gross Income (Rs.)				40014.00	
c.	Net Income (Rs.)				-16341.49	
d.	Cost per Quintal (Rs./q.)				3042.13	
e.	Benefit Cost Ratio (BC Ratio)				1:0.71	

Cost of Cultivation of Maize: The data regarding the cost of cultivation of maize in Chikkabagnalu micro watershed is presented in Table 34. The results indicated that, the total cost of cultivation for maize was Rs. 44337.39. The gross income realized by the farmers was Rs. 40198.74. The net income from maize cultivation was Rs. -4138.65. Thus the benefit cost ratio was found to be 1:0.91.

Table 34: Cost of Cultivation of Maize in Chikkabagnalu micro watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	50.83	8473.69	19.11
2	Bullock		Pairs/day	1.83	1074.04	2.42
3	Tractor		Hours	3.87	3027.35	6.83
4	Machinery		Hours	0.32	162.64	0.37
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	19.16	2299.72	5.19
6	FYM		Quintal	2.93	3127.06	7.05
7	Fertilizer + micronutrients		Quintal	13.75	11634.10	26.24
8	Pesticides (PPC)		Kgs / liters	1.41	1209.45	2.73
9	Irrigation		Number	9.47	0.00	0.00
10	Depreciation charges			0.00	114.82	0.26
11	Land revenue and Taxes			0.00	4.94	0.01
II	**Cost B1**					
12	Interest on working capital				2192.92	4.95
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				33320.74	75.15
III	**Cost B2**					
14	Rental Value of Land				335.42	0.76
15	**Cost B2 = (Cost B1 + Rental value)**				33656.15	75.91
IV	**Cost C1**					
16	Family Human Labour			31.72	6646.57	14.99
17	**Cost C1 = (Cost B2 + Family Labour)**				40302.72	90.90
V	**Cost C2**					
18	Risk Premium				4.00	0.01
19	**Cost C2 = (Cost C1 + Risk Premium)**				40306.72	90.91
VI	**Cost C3**					
20	Managerial Cost				4030.67	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				44337.39	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		31.88	37062.47	
		b) Main Crop Sales Price (Rs.)			1162.50	
	By Product	e) Main Product (q)		3.69	3136.28	
		f) Main Crop Sales Price (Rs.)			850.00	
b.	Gross Income (Rs.)				40198.74	
c.	Net Income (Rs.)				-4138.65	
d.	Cost per Quintal (Rs./q.)				1390.68	
e.	Benefit Cost Ratio (BC Ratio)				1:0.91	

Cost of Cultivation of Paddy: The data regarding the cost of cultivation of paddy in Chikkabagnalu micro watershed is presented in Table 35. The results indicated that, the total cost of cultivation for paddy was Rs. 58309.08. The gross income realized by the farmers was Rs. 55266.25. The net income from paddy cultivation was Rs. -3042.83. Thus the benefit cost ratio was found to be 1:0.95.

Table 35: Cost of Cultivation of Paddy in Chikkabagnalu micro watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	62.99	12109.18	20.77
2	Bullock		Pairs/day	6.79	3735.88	6.41
3	Tractor		Hours	3.71	3241.88	5.56
4	Machinery		Hours	1.85	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	98.80	13955.50	23.93
6	FYM		Quintal	1.85	1852.50	3.18
7	Fertilizer + micronutrients		Quintal	11.12	8379.48	14.37
8	Pesticides (PPC)		Kgs /liters	1.24	1235.00	2.12
9	Irrigation		Number	8.03	0.00	0.00
10	Depreciation charges			0.00	92.63	0.16
11	Land revenue and Taxes			0.00	45.28	0.08
II	**Cost B1**					
12	Interest on working capital				3051.36	5.23
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				47698.67	81.80
III	**Cost B2**					
14	Rental Value of Land				666.67	1.14
15	**Cost B2 = (Cost B1 + Rental value)**				48365.33	82.95
IV	**Cost C1**					
16	Family Human Labour			19.14	4637.43	7.95
17	**Cost C1 = (Cost B2 + Family Labour)**				53002.76	90.90
V	**Cost C2**					
18	Risk Premium				5.50	0.01
19	**Cost C2 = (Cost C1 + Risk Premium)**				53008.26	90.91
VI	**Cost C3**					
20	Managerial Cost				5300.83	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				58309.08	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		30.88	52487.50	
		b) Main Crop Sales Price (Rs.)			1700.00	
	By Product	e) Main Product (q)		3.09	2778.75	
		f) Main Crop Sales Price (Rs.)			900.00	
b.	Gross Income (Rs.)				55266.25	
c.	Net Income (Rs.)				-3042.83	
d.	Cost per Quintal (Rs./q.)				1888.55	
e.	Benefit Cost Ratio (BC Ratio)				1:0.95	

Cost of Cultivation of Groundnut: The data regarding the cost of cultivation of groundnut in Chikkabagnalu micro watershed is presented in Table 36. The results indicated that, the total cost of cultivation for groundnut was Rs. 60025.95. The gross income realized by the farmers was Rs. 91159.47. The net income from groundnut cultivation was Rs. 31133.51. Thus the benefit cost ratio was found to be 1:1.52.

Table 36: Cost of Cultivation of Groundnut in Chikkabagnalu micro watershed

Sl. No	Particulars		Units	Phy Units	Value (Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	53.02	8724.04	14.53
2	Bullock		Pairs/day	2.22	1284.40	2.14
3	Tractor		Hours	4.03	3614.43	6.02
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	197.60	16796.00	27.98
6	FYM		Quintal	2.80	3293.33	5.49
7	Fertilizer + micronutrients		Quintal	12.19	9908.82	16.51
8	Pesticides (PPC)		Kgs /liters	1.40	1218.53	2.03
9	Irrigation		Number	10.87	0.00	0.00
10	Depreciation charges			0.00	222.80	0.37
11	Land revenue and Taxes			0.00	7.57	0.01
II	**Cost B1**					
12	Interest on working capital				3746.31	6.24
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				48816.24	81.33
III	**Cost B2**					
14	Rental Value of Land				346.67	0.58
15	**Cost B2 = (Cost B1 + Rental value)**				49162.91	81.90
IV	**Cost C1**					
16	Family Human Labour			26.84	5403.54	9.00
17	**Cost C1 = (Cost B2 + Family Labour)**				54566.45	90.90
V	**Cost C2**					
18	Risk Premium				2.60	0.00
19	**Cost C2 = (Cost C1 + Risk Premium)**				54569.05	90.91
VI	**Cost C3**					
20	Managerial Cost				5456.90	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				60025.95	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		22.23	88920.00	
		b) Main Crop Sales Price (Rs.)			4000.00	
	By Product	e) Main Product (q)		2.80	2239.47	
		f) Main Crop Sales Price (Rs.)			800.00	
b.	Gross Income (Rs.)				91159.47	
c.	Net Income (Rs.)				31133.51	
d.	Cost per Quintal (Rs./q.)				2700.22	
e.	Benefit Cost Ratio (BC Ratio)				1:1.52	

Cost of Cultivation of Banana: The data regarding the cost of cultivation of Banana in Chikkabagnalu micro watershed is presented in Table 37. The results indicated that, the total cost of cultivation for Banana was Rs. 288143.50. The gross income realized by the farmers was Rs. 247000. The net income from Banana cultivation was Rs. -41143.50. Thus the benefit cost ratio was found to be 1:0.86.

Table 37: Cost of Cultivation of Banana in Chikkabagnalu micro watershed

Sl. No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	74.10	10472.80	3.63
2	Bullock	Pairs/day	0.00	0.00	0.00
3	Tractor	Hours	7.41	4446.00	1.54
4	Machinery	Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	2223.00	177840.00	61.72
6	FYM	Quintal	9.88	19760.00	6.86
7	Fertilizer + micronutrients	Quintal	14.82	13486.20	4.68
8	Pesticides (PPC)	Kgs / liters	2.47	2470.00	0.86
9	Irrigation	Number	2.47	0.00	0.00
10	Depreciation charges		0.00	0.05	0.00
11	Land revenue and Taxes		0.00	2.47	0.00
II	**Cost B1**				
12	Interest on working capital			25626.98	8.89
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**			254104.50	88.19
III	**Cost B2**				
14	Rental Value of Land			333.33	0.12
15	**Cost B2 = (Cost B1 + Rental value)**			254437.84	88.30
IV	**Cost C1**				
16	Family Human Labour		44.46	7508.80	2.61
17	**Cost C1 = (Cost B2 + Family Labour)**			261946.64	90.91
V	**Cost C2**				
18	Risk Premium			2.00	0.00
19	**Cost C2 = (Cost C1 + Risk Premium)**			261948.64	90.91
VI	**Cost C3**				
20	Managerial Cost			26194.86	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**			288143.50	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	123.50	247000.00	
		b) Main Crop Sales Price (Rs.)		2000.00	
b.	Gross Income (Rs.)			247000.00	
c.	Net Income (Rs.)			-41143.50	
d.	Cost per Quintal (Rs./q.)			2333.15	
e.	Benefit Cost Ratio (BC Ratio)			1:0.86	

Cost of Cultivation of Red gram: The data regarding the cost of cultivation of red gram in Chikkabagnalu micro watershed is presented in Table 38. The results indicated that, the total cost of cultivation for red gram was Rs. 34365.65. The gross income realized by the farmers was Rs. 58404.41. The net income from red gram cultivation was Rs. 24038.76. Thus the benefit cost ratio was found to be 1:1.7.

Table 38: Cost of Cultivation of Red gram in Chikkabagnalu micro watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	38.14	6509.59	18.94
2	Bullock		Pairs/day	1.14	800.46	2.33
3	Tractor		Hours	2.29	1600.93	4.66
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	12.60	1237.12	3.60
6	FYM		Quintal	1.53	3051.74	8.88
7	Fertilizer + micronutrients		Quintal	9.55	9527.31	27.72
8	Pesticides (PPC)		Kgs / liters	1.53	1220.70	3.55
9	Irrigation		Number	4.59	0.00	0.00
10	Depreciation charges			0.00	48.03	0.14
11	Land revenue and Taxes			0.00	3.29	0.01
II	**Cost B1**					
12	Interest on working capital				1804.67	5.25
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				25803.85	75.09
III	**Cost B2**					
14	Rental Value of Land				333.33	0.97
15	**Cost B2 = (Cost B1 + Rental value)**				26137.18	76.06
IV	**Cost C1**					
16	Family Human Labour			25.57	5102.32	14.85
17	**Cost C1 = (Cost B2 + Family Labour)**				31239.50	90.90
V	**Cost C2**					
18	Risk Premium				2.00	0.01
19	**Cost C2 = (Cost C1 + Risk Premium)**				31241.50	90.91
VI	**Cost C3**					
20	Managerial Cost				3124.15	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				34365.65	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		12.98	58404.41	
		b) Main Crop Sales Price (Rs.)			4500.00	
b.	Gross Income (Rs.)				58404.41	
c.	Net Income (Rs.)				24038.76	
d.	Cost per Quintal (Rs./q.)				2647.84	
e.	Benefit Cost Ratio (BC Ratio)				1:1.7	

Adequacy of fodder: The data regarding the adequacy of fodder in Chikkabagnalu micro watershed is presented in Table 39. The results indicated that, 33.33 per cent of the households opined that dry fodder was adequate and inadequate respectively. Similarly 60 per cent of the households opined that green fodder was adequate and 6.67 per cent of the households opined that green fodder was inadequate.

Table 39: Adequacy of fodder in Chikkabagnalu micro watershed

S.N.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	2	33.33	3	37.50	2	22.22	3	50	10	33.33
2	Inadequate-Dry Fodder	2	33.33	3	37.50	5	55.56	0	0	10	33.33
3	Adequate-Green Fodder	4	66.67	5	62.50	7	77.78	2	33.33	18	60
4	Inadequate-Green Fodder	0	0	1	12.50	0	0	1	16.67	2	6.67

Average Annual gross income of households: The results of the overall average annual gross income of the household in Chikkabagnalu is presented in table 40. The table indicated that, in case of landless farmers, the average income from wage was Rs. 120000, in marginal farmers the average income from service/salary was Rs.61666.67, wage was Rs.15500, agriculture was Rs.32100 and dairy farm was Rs. 8400. In case of small farmers average income from service/salary was Rs. 25000, Wage Rs.12500, agriculture was Rs. 62375 and goat farming was Rs.3750. In semi medium farmers the average income from wage was Rs. 13444.44, agriculture was Rs. 84888.89 and dairy farming was Rs.5222.22. In medium farmers the average income from wage was Rs. 17166.67, agriculture was Rs. 137583.33 and dairy farming was Rs. 11333.33. Over all, the average income from the salary was Rs.19000, wage was Rs.17900, agriculture was Rs.76036.67, dairy farm was Rs.5513.33 and goat farming was Rs.1000.

Table 40: Average Annual gross income (Rs.) of households in Chikkabagnalu micro watershed

S.N.	Particulars	LL (1)	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
1	Service/salary	0	61666.67	25000	0	0	19000
2	Wage	120000	15500	12500	13444.44	17166.67	17900
3	Agriculture	0	32100	62375	84888.89	137583.33	76036.67
4	Dairy Farm	0	8400	0.00	5222.22	11333.33	5513.33
5	Goat Farming	0	0	3750	0	0	1000
Income(Rs.)		120000	117666.67	103625	103555.56	166083.33	119450

Average Annual expenditure of households: The results of the overall average annual expenditure of the household in Chikkabagnalu were presented in Table 41. The results indicated that, in case of landless, the average expenditure from wage Rs. 50,000. In case of marginal farmers the average expenditure from service/salary was Rs.140000, wage was Rs.14750, agriculture was Rs.19666.67 and dairy farm was Rs. 30000. In case of small farmers the average expenditure from service/salary was Rs.37500, wage was Rs.11000, agriculture was Rs.38125 and goat farming was Rs.5000. In semi medium farmers the average expenditure from wage was Rs.7125, agriculture was Rs.50000 and

dairy farm was Rs.8333.33. Similarly in medium farmers the average expenditure from wage was Rs. 12000, agriculture was Rs.80000 and dairy farm was Rs.7875.

Table 41: Average Annual expenditure of households in Chikkabagnalu micro watershed

Sl. No.	Particulars	LL (1)	MF (6)	SF (8)	SMF (9)	MDF (6)	All (30)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0	140,000	37,500	0	0	11,833.33
2	Wage	50,000	14,750	11,000	7,125.00	12,000	9,366.67
3	Agriculture	0	19,666.67	38,125	50,000.00	80,000	45,100
4	Dairy Farm	0	30,000	0	8,333.33	7,875	2,883.33
5	Goat Farming	0	0	5,000	0	0	166.67
Total		50,000	204,416.67	91,625	65,458.33	99,87	511,375
Average		50,000	34,069.44	11,453.13	7,273.15	16,645.83	17,045.83

Horticulture species grown: The data regarding horticulture species grown in Chikkabagnalu micro watershed is presented in Table 42. The results indicated that, sampled households have grown 57 coconut trees, 12 mango trees and 3 Sapota trees in their field.

Table 42: Horticulture species grown in Chikkabagnalu micro watershed

Sl. No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		F	B	F	B	F	B	F	B	F	B
1	Coconut	3	0	20	0	5	0	29	0	57	0
2	Mango	0	0	0	0	7	0	5	0	12	0
3	Sapota	0	0	0	0	3	0	0	0	3	0

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

Interest towards cultivation of horticulture crops: The data regarding horticulture species grown in Chikkabagnalu micro watershed is presented in Table 43. The results indicated that, 3.33 per cent of the households are interested in growing horticultural crops which include 16.67 per cent medium farmers.

Table 43: Interest towards cultivation of horticulture crops in Chikkabagnalu micro watershed

Sl.No.	Particulars	MDF (6)		All (30)	
		N	%	N	%
1	Interested towards cultivation of horticulture crops	1	16.67	1	3.33

Forest species grown: The data regarding forest species grown in Chikkabagnalu micro watershed is presented in Table 44. The results indicated that, households have planted 77 neem trees, 2 tamarind tress, 6 acacia trees and 5 banyan trees in their field.

Table 44: Forest species grown in Chikkabagnalu micro watershed

Sl. No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		F	B	F	B	F	B	F	B	F	B
1	Neem	18	0	23	0	22	0	14	0	77	0
2	Tamarind	1	0	0	0	1	0	0	0	2	0
3	Acacia	6	0	0	0	0	0	0	0	6	0
4	Banyan	5	0	0	0	0	0	0	0	5	0

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Chikkabagnalu micro watershed is presented in Table 45. The results indicated that, Bajra, coriander, cotton, cowpea, groundnut, sorghum, paddy, red gram and sunflower crops were sold to the extent of 100 per cent. Only maize was sold to the extent of 56.32 per cent.

Table 45: Marketing of the agricultural produce in Chikkabagnalu micro watershed

Sl. No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Bajra	21	0	21	100	1800
2	Coriander	3	0	3	100	15000
3	Cotton	7	0	7	100	4000
4	Cow Pea	24	0	24	100	2575
5	Ground Nut	19	0	19	100	4500
6	Jowar	30	0	30	100	1300
7	Maize	2381	1040	1341	56.32	1276.67
8	Paddy	20	0	20	100	1500
9	Red Gram	30	0	30	100	2500
10	Sunflower	87	0	87	100	3780

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Chikkabagnalu micro watershed is presented in Table 46. The results indicated that, 30 percent of the households have sold their produce to agent/traders, 50 percent of the households have sold their produce to local/village merchant, 30 percent of the households sold their produce in regulated markets and 3.33 percent of the households sold their produce to cooperative marketing society.

Table 46: Marketing Channels used for sale of agricultural produce in Chikkabagnalu micro watershed

S. N.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Agent/Traders	3	50	4	50	2	22.22	0	0	9	30
2	Local/village Merchant	1	16.67	3	37.50	4	44.44	7	116.67	15	50
3	Regulated Market	2	33.33	2	25	4	44.44	1	16.67	9	30
4	Cooperative marketing Society	0	0	0	0	1	11.11	0	0	1	3.33

Table 47: Mode of transport of agricultural produce in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Head Load	0	0.00	1	12.50	0	0	0	0	1	3.33
2	Cart	1	16.67	1	12.50	0	0	0	0	2	6.67
3	Tractor	5	83.33	7	87.50	8	88.89	7	116.67	27	90
4	Truck	0	0	0	0	2	22.22	1	16.67	3	10

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Chikkabagnalu micro watershed is presented in Table 47. The results indicated that 3.33 per cent of the households have used head load as a mode of transport, 6.67 per cent of them have used cart, 90 per cent have used tractor and 10 per cent of them have used truck.

Incidence of soil and water erosion problem: The data regarding incidence of soil and water erosion problems in Chikkabagnalu micro watershed is presented in Table 48. The results indicated that, 66.67 per cent of the households have experienced the soil and water erosion problems i.e. 66.67 percent of marginal farmers, 75 per cent of small farmers, 55.56 per cent semi medium farmers and 83.33 percent medium farmers.

Table 48: Incidence of soil and water erosion problems in Chikkabagnalu micro watershed

Sl. No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Soil and water erosion problems in the farm	4	66.67	6	75	5	55.56	5	83.33	20	66.67

Interest towards soil testing: The data regarding interest shown towards soil testing in Chikkabagnalu micro watershed is presented in Table 49. The results indicated that, 60 per cent of the households have shown interest in soil testing i.e. 66.67 per cent of marginal, 62.50 per cent of small, 44.44 per cent of semi medium and 83.33 per cent of medium farmers have shown interest towards soil testing.

Table 49: Interest shown towards soil testing in Chikkabagnalu micro watershed

Sl.No.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	4	66.67	5	62.50	4	44.44	5	83.33	18	60

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Chikkabagnalu micro watershed is presented in Table 50. The results indicated that, 83.33 percent used fire wood as a source of fuel and 23.33 percent of the households used LPG as a source of fuel.

Table 50: Usage pattern of fuel for domestic use in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	1	100	3	50	8	100	7	77.78	6	100	25	83.33
2	LPG	0	0	3	50	0	0	2	22.22	2	33.33	7	23.33

Table 51: Source of drinking water in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	0	0	0	0	0	0	1	11.11	1	16.67	2	6.67
2	Bore Well	0	0	5	83.33	7	87.50	7	77.78	4	66.67	23	76.67
3	Lake/ Tank	1	100	1	16.67	1	12.50	1	11.11	1	16.67	5	16.67

Source of drinking water: The data regarding source of drinking water in Chikkabagnalu micro watershed is presented in Table 51. The results indicated that, piped supply was the source of drinking water for 6.67 per cent, 76.67 per cent of them were using bore well and 16.67 per cents of the households were using lake/tank for drinking water.

Source of light: The data regarding source of light in Chikkabagnalu micro watershed is presented in Table 52. The results indicated that, electricity was the major source of light for 93.33 per cent of the households and 3.33 per cent of the households were using kerosene lamp.

Table 52: Source of light in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Kerosene Lamp	1	100	0	0	0	0	0	0	0	0	1	3.33
2	Electricity	0	0	6	100	8	100	9	100	5	83.33	28	93.33

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facilit**y** in Chikkabagnalu micro watershed is presented in Table 53. The results indicated that, 20 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, 16.67 per cent of marginal, 12.50 per cent of small, 22.22 per cent of semi medium and 16.67 per cent of medium had sanitary toilet facility.

Table 53: Existence of Sanitary toilet facility in Chikkabagnalu micro watershed

Sl. No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All(30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	1	100	1	16.67	1	12.50	2	22.22	1	16.67	6	20

Possession of PDS card: The data regarding possession of PDS card in Chikkabagnalu micro watershed is presented in Table 54. The results indicated that, 90 per cent of the sampled households possessed BPL card and 6.67 per cent of the sampled households have not possessed BPL card.

Table 54: Possession of PDS card in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (1)		MF (6)		SF (8)		SMF(9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	BPL	1	100	4	66.67	8	100	9	100	5	83.33	27	90
2	Not Possessed	0	0	2	33.33	0	0	0	0	0	0	2	6.67

Participation in NREGA programme: The data regarding participation in NREGA programme in Chikkabagnalu micro watershed is presented in Table 55. The results indicated that, 46.67 per cent of the households participated in NREGA programme which included 100 per cent of the landless, 16.67 percent of the marginal, 100 per cent of the small, 33.33 per cent of the semi medium and 16.67 percent of the medium farmers.

Table 55: Participation in NREGA programme in Chikkabagnalu micro watershed

Sl. No.	Particulars	LL(1)		MF(6)		SF(8)		SMF(9)		MDF(6)		All(30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	1	100	1	16.67	8	100	3	33.33	1	16.67	14	46.67

Adequacy of food items: The data regarding adequacy of food items in Chikkabagnalu micro watershed is presented in Table 56. The results indicated that, cereals, pulses, oilseeds, vegetables, milk, egg and meat were adequate for 96.67 per cent, 46.67 per cent, 53.33 per cent, 43.33 per cent, 73.33 per cent, 36.67 per cent, and 23.33 per cent respectively.

Table 56: Adequacy of food items in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	0	0	6	100	8	100	9	100	6	100	29	96.67
2	Pulses	1	100	2	33.33	3	37.50	4	44.44	4	66.67	14	46.67
3	Oilseed	0	0	5	83.33	5	62.50	4	44.44	2	33.33	16	53.33
4	Vegetables	0	0	5	83.33	3	37.50	3	33.33	2	33.33	13	43.33
6	Milk	0	0	4	66.67	5	62.50	6	66.67	7	116.67	22	73.33
7	Egg	1	100	3	50.00	3	37.50	4	44.44	0	0.00	11	36.67
8	Meat	0	0	3	50.00	2	25.00	1	11.11	1	16.67	7	23.33

Response on Inadequacy of food items: The data regarding inadequacy of food items in Chikkabagnalu micro watershed is presented in Table 57. The results indicated that, cereals, pulses, oilseeds, vegetables and milk were inadequate for 3.33 per cent, 53.33 per cent, 26.67 per cent, 40 per cent and 13.33 of the households. Fruits, egg and meat were inadequate for 23.33 per cent of the households.

Table 57: Response on Inadequacy of food items in Chikkabagnalu micro watershed

Sl.No.	Particulars	LL (1)		MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	1	100	0	0	0	0	0	0	0	0	1	3.33
2	Pulses	0	0	4	66.67	5	62.50	5	55.56	2	33.33	16	53.33
3	Oilseed	1	100	0	0.00	1	12.50	3	33.33	3	50	8	26.67
4	Vegetables	1	100	1	16.67	3	37.50	3	33.33	4	66.67	12	40
5	Fruits	1	100	1	16.67	2	25	2	22.22	1	16.67	7	23.33
6	Milk	1	100	1	16.67	2	25	0	0	0	0	4	13.33
7	Egg	0	0	2	33.33	2	25	1	11.11	2	33.33	7	23.33
8	Meat	1	100	2	33.33	2	25	1	11.11	1	16.67	7	23.33

Farming constraints: The data regarding farming constraints experienced by households in Chikkabagnalu micro watershed is presented in Table 58. The results indicated that, Lower fertility status of the soil was the constraint experienced by 3.33 per cent of the households, wild animal menace on farm field (40%), frequent incidence of pest and diseases (13.33%), inadequacy of irrigation water (6.67%), high cost of Fertilizers and plant protection chemicals (6.67%), high rate of interest on credit (60%), low price for the agricultural commodities (6.67%), lack of marketing facilities in the area (60%), lack of transport for safe transport of the agricultural produce to the market (26.67%), less

rainfall (93.33%) and Source of Agri-technology information(Newspaper/TV/Mobile (63.33 %).

Table 58: Farming constraints Experienced in Chikkabagnalu micro watershed

S. N.	Particulars	MF (6)		SF (8)		SMF (9)		MDF (6)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	0	0	0	0	1	11.11	0	0	1	3.33
2	Wild animal menace on farm field	1	16.67	2	25	5	55.56	4	66.67	12	40
3	Frequent incidence of pest and diseases	1	16.67	1	12.50	0	0	2	33.33	4	13.33
4	Inadequacy of irrigation water	1	16.67	0	0	0	0	1	16.67	2	6.67
5	High cost of Fertilizers and plant protection chemicals	0	0	0	0	1	11.11	1	16.67	2	6.67
6	High rate of interest on credit	4	66.67	5	62.50	5	55.56	4	66.67	18	60
7	Low price for the agricultural commodities	0	0	0	0	0	0	2	33.33	2	6.67
8	Lack of marketing facilities in the area	3	50	6	75.00	4	44.44	5	83.33	18	60
9	Lack of transport for safe transport of the Agril produce to the market.	2	33.33	2	25	3	33.33	1	16.67	8	26.67
10	Less rainfall	6	100	8	100	9	100	5	83.33	28	93.33
11	Source of Agri-technology information(Newspaper/TV/Mobile	5	83.33	5	62.50	7	77.78	2	33.33	19	63.33

Chapter 5

SUMMARY

In order to assess the socio-economic condition of the farmers in the watershed a comprehensive questionnaire was prepared. Major components such as demographic conditions, migration details, food consumption and family expenditure pattern, material possession, land holding, land use management, cropping pattern, cost of cultivation of crops, livestock management. The statistical components such as frequency and percentage were used to analyze the data. About 30 households located in the micro watershed were interviewed for the survey.

The data on households sampled for socio economic survey in Chikkabagnalu micro indicated that 30 farmers were sampled in Chikkabagnalu micro watershed among them 6 (20%) were marginal farmers, 8 (26.67%) were small farmers, 9(30%) were semi medium farmers, 6(20%) were medium farmers and 1(3.33%) landless farmer was also interviewed for the survey. The data indicated that there were 150 population households were there in the studied micro watershed. Among them 92 (61.33%) men and 58 (38.67 %) were women. The average family size of landless was 5, marginal farmers were 5, small farmers were 7, semi medium farmers were 4 and medium farmers were 4. On an average the family size was 5.

The data indicated that 26(17.33%) people were in 0-15 years of age, 69 (46%) were in 16-35 years of age, 45 (30 %) were in 36-60 years of age and 10 (6.67%) were above 61 years of age. The results indicated that the Chikkabagnalu had 34 per cent illiterates, 26 per cent of them had primary school education, 9.33 per cent of them had both middle school, 13.33 per cent them had high school education, 7.33 per cent of them had PUC education, 2 per cent them had ITI education, 4.67 per cent of them had degree education and 3.33 per cent them had others.

The results indicated that, 93.33 per cent of households practicing agriculture and 3.33 per cent of the household heads were agricultural labour. The results indicated that agriculture was the major occupation for 50.67 per cent of the household members, 17.33 per cent were agricultural labourers, 2.67 per cent were general labours, 0.67 per cent household industry, 1.33 percent were in government service, 0.67 per cent of them were in private sector, 22 per cent of them were students, 3.33 per cent of them were children and 1.33 per cent were housewives. In case of landless households 20 per cent were agricultural labourers, 60 per cent were general labourers and 20 per cent were household industry. In case of marginal farmers 42.86 per cent were agriculturist, 21.43 percent was in agricultural labour and 25 per cent of them were students. In case of small farmers 54.72 per cent of them were agriculturist, 20.75 percent was in agricultural labour and 18.87 per cent of them were students. In case of semi medium farmers 43.24 per cent of the family members were agriculturist, 21.62 per cent were agricultural labourers and 24.32 per cent of them were students. In case of medium farmers 70.37 per cent of the

family members were agriculturist, 25.93 per cent of them were students and 3.70 per cent were housewives.

The results showed that 0.67 per cent of them participated in user groups and 99.33 per cent of them have not participated in any local institutions. Landless, marginal, semi medium and medium farmers were found to have no participation in any local institutions. Small farmers were found to participate in one or the other local institutions. The results indicated that 43.33 per cent of the households possess Katcha house, 20 per cent of the households possess Pucca house, 33.33 per cent of the households possess Semi Pacca house and 3.33 per cent of them possess Thatched house. 100 percent of the landless farmers possess Katcha house.

The results showed that, 86.67 per cent of the households possess TV, 3.33 per cent of the households possess DVD/VCD Player, 63.33 per cent of the households possess Mixer grinder, 10 per cent of the households possess bicycle, 36.67 per cent of the households possess motor cycle, 3.33 per cent of the households possess Auto and 96.67 per cent of the households possess mobile phones. The results showed that the average value of television was Rs.5673; DVD/VCD Player was Rs. 2000, mixer grinder was Rs.1647, bicycle was Rs.3000, motor cycle was Rs.44545, Auto was Rs. 300000 and mobile phone was Rs.2022.

The results indicated that about 23.33 per cent of the households possess bullock cart, 43.33 per cent of them possess plough, 13.33 per cent of the households possess tractor, 40 per cent of the households possess sprayer, 3.33 per cent of the households possess sprinkler, 56.67 per cent of the households possess weeder and 3.33 per cent of the households possess harvester. The results showed that the average value of bullock cart was Rs. 14921; the average value of plough was Rs. 1573, the average value of tractor was Rs. 351250, the average value of sprayer was Rs. 3958, the average value of sprinkler was Rs. 200, the average value of weeder was Rs. 213 and the average value of harvester was Rs. 100.

The results indicated that, average own labour men available in the micro watershed was 1.83, average own labour (women) available was 1.13, average hired labour (men) available was 7.87 and average hired labour (women) available was 11.97. In case of marginal farmers, average own labour men available was 1.67, average own labour (women) was also 1.17, average hired labour (men) was 8.83 and average hired labour (women) available was 16.83. In case of small farmers, average own labour men available was 2.88, average own labour (women) was 1.25, average hired labour (men) was 10.38 and average hired labour (women) available was 10.75. In case of semi medium farmers, average own labour men available was 1.11, average own labour (women) was 1, average hired labour (men) was 7.78 and average hired labour (women) available was 13.56. In medium farmers average own labour men available was 2, average own labour (women) was 1.33, average hired labour (men) was 5 and average hired labour (women) available

was 8.33. The results indicated that, 73.33 per cent of the household opined that hired labour was adequate and 26.67 per cent of the household opined that hired labour was inadequate.

The results indicated that, households of the Chikkabagnalu micro watershed possess 11.59 ha (27.32 %) of dry land and 30.82 ha (72.68%) of irrigated land. Marginal farmers possess 2.08 ha (67.41%) of dry land and 1.01 ha (32.59%) of irrigated land. Small farmers possess 4.65 ha (55.41 %) of dry land and 3.74 ha (44.59 %) of irrigated land. Semi medium farmers possess 2.83 ha (19.85 %) of dry land and 11.44 ha (80.15 %) of irrigated land. Medium farmers possess 2.02 ha (12.15 %) of dry land and 14.63 (87.85%) of irrigated land.

The results indicated that, the average value of dry land was Rs. 345,092.56 and average value of irrigated was Rs. 387,934.60. In case of marginal famers, the average land value was Rs. 623,495.16 for dry land and Rs. 1,289,558.23 for irrigated land. In case of small famers, the average land value was Rs. 322,735.19 for dry land Rs. 657,597.40 for irrigated land. In case of semi medium famers, the average land value was Rs. 247,000 for dry land and Rs. 401,910.16 for irrigated land. In case of medium famers, the average land value was Rs. 247,000 for dry land and was Rs. 245,975.65 for irrigated land. The results indicated that, there were 30 functioning and 8 defunctioning bore wells in the micro watershed. The results indicated that, bore well was the major irrigation source for 96.66 per cent of the farmers and 3.33 per cent of the households were using tank as a source of irrigation. The results indicated that on an average the depth of the bore well was 68.15 meters and tank was 2.54 meters.

The results indicated that, in case of marginal farmers there was 1.01 ha of irrigated land, in case of small farmers there was 54.25 ha of irrigated land, semi medium farmers were having 11.12 ha of irrigated land and medium farmers were having 6.88 ha of irrigated land. The results indicated that, farmers have grown banana (0.40ha), groundnut (4.05ha), maize (19.14ha), paddy (1.62ha), bajra (0.81ha), red gram (1.31ha) in kharif season and also grown red gram (0.44 ha) in Rabi season. Marginal farmers have grown banana, groundnut and maize. Small farmers have grown groundnut, maize and red gram. Semi medium farmers have grown groundnut, maize, paddy and red gram and medium farmers grown groundnut, paddy and maize.

The results indicated that, the cropping intensity in Chikkabagnalu micro watershed was found to be 75.56 per cent. In case of marginal farmers it was 100 per cent, in small farmers it was 83.55, in semi medium farmers it was 88.05 and in medium farmers it was 60.77 per cent. The results indicated that, 93.33 per cent of the households have both bank account and savings respectively. Among marginal farmers 100 percent of them possess both bank account and savings. 87.50 per cent of small farmers possess both bank account and savings correspondingly. Semi medium farmers possess 100 per cent of both

bank account and savings respectively and medium category of farmers also possess 100 per cent of bank account and also savings correspondingly.

The results indicated that, 50 per cent of marginal, 12.50 per cent of small, 22.22 per cent of the semi medium and 66.67 per cent of medium farmers have borrowed credit from different sources. The results indicated that, 40 per cent have availed loan in commercial bank, 20 per cent have availed loan from Cooperative Bank and Grameena Bank, and 10 per cent have availed loan from Friends/Relatives and money lender respectively. The results indicated that the average amount availed from marginal, small, semi medium and medium farmer were Rs.74250, Rs. 24750, Rs. 28400 and Rs. 71250 respectively. Overall average credit amount availed by households in the micro watershed is 54,235.29.

The results indicated that, 90 per cent of the households have borrowed loan for agriculture production and 10 per cent of the households have borrowed loan for land purchase. The results indicated that, agriculture production and household consumption were the purpose for which marginal and small farmers borrowed loan from private credit. About 25 percent of loan was taken for agriculture production and 75 per cent of the farmers taken loan for household consumption. Results indicated that 40 per cent of the households have repaid their institutional credit partially, 50 percent of the households have unpaid their loan and 10 percent of the households have fully paid their loan. Results indicated that 100 per cent of the households have repaid their private credit partially.

The results indicated that 30 per cent of the households were opined that they were helped to perform timely agricultural operations, 10 households were opined that easy accessibility of credit and 60 per cent of the farmers did not give any opinion on credit.

The results indicated that, the total cost of cultivation for bajra was Rs. 56355.49. The gross income realized by the farmers was Rs. 40014.00. The net income from bajra cultivation was Rs. -16341.49, thus the benefit cost ratio was found to be 1:0.71. The results indicated that, the total cost of cultivation for maize was Rs. 44337.39. The gross income realized by the farmers was Rs. 40198.74. The net income from maize cultivation was Rs. -4138.65. Thus the benefit cost ratio was found to be 1:0.91.

The results indicated that, the total cost of cultivation for paddy was Rs. 58309.08. The gross income realized by the farmers was Rs. 55266.25. The net income from paddy cultivation was Rs. -3042.83. Thus the benefit cost ratio was found to be 1:0.95. The results indicated that, the total cost of cultivation for groundnut was Rs. 60025.95. The gross income realized by the farmers was Rs. 91159.47. The net income from groundnut cultivation was Rs. 31133.51. Thus the benefit cost ratio was found to be 1:1.52.

The results indicated that, the total cost of cultivation for Banana was Rs. 288143.50. The gross income realized by the farmers was Rs. 247000. The net income from Banana cultivation was Rs. -41143.50. Thus the benefit cost ratio was found to be

1:0.86. The results indicated that, the total cost of cultivation for red gram was Rs. 34365.65. The gross income realized by the farmers was Rs. 58404.41. The net income from red gram cultivation was Rs. 24038.76. Thus the benefit cost ratio was found to be 1:1.7.

The results indicated that, 33.33 per cent of the households opined that dry fodder was adequate and inadequate respectively. Similarly 60 per cent of the households opined that green fodder was adequate and 6.67 per cent of the households opined that green fodder was inadequate. The results indicated that, in case of landless farmers, the average income from wage was Rs. 120000, in marginal farmers the average income from service/salary was Rs.61666.67, wage was Rs.15500, agriculture was Rs.32100 and dairy farm was Rs. 8400. In case of small farmers average income from service/salary was Rs. 25000, Wage Rs.12500, agriculture was Rs. 62375 and goat farming was Rs.3750. In semi medium farmers the average income from wage was Rs. 13444.44, agriculture was Rs. 84888.89 and dairy farming was Rs.5222.22. In medium farmers the average income from wage was Rs. 17166.67, agriculture was Rs. 137583.33 and dairy farming was Rs. 11333.33. Over all, the average income from the salary was Rs.19000, wage was Rs.17900, agriculture was Rs.76036.67, dairy farm was Rs.5513.33 and goat farming was Rs.1000.

The results indicated that, in case of landless, the average expenditure from wage Rs. 50,000. In case of marginal farmers the average expenditure from service/salary was Rs.140000, wage was Rs.14750, agriculture was Rs.19666.67 and dairy farm was Rs. 30000. In case of small farmers the average expenditure from service/salary was Rs.37500, wage was Rs.11000, agriculture was Rs.38125 and goat farming was Rs.5000. In semi medium farmers the average expenditure from wage was Rs.7125, agriculture was Rs.50000 and dairy farm was Rs.8333.33. Similarly in medium farmers the average expenditure from wage was Rs. 12000, agriculture was Rs.80000 and dairy farm was Rs.7875. The results indicated that, sampled households have grown 57 coconut trees, 12 mango trees and 3 Sapota trees in their field.

The results indicated that, 3.33 per cent of the households are interested in growing horticultural crops which include 16.67 per cent medium farmers. The results indicated that, households have planted 77 neem trees, 2 tamarind tress, 6 acacia trees and 5 banyan trees in their field. The results indicated that, Bajra, coriander, cotton, cowpea, groundnut, sorghum, paddy, red gram and sunflower crops were sold to the extent of 100 per cent. Only maize was sold to the extent of 56.32 per cent.

The results indicated that, 30 percent of the households have sold their produce to agent/traders, 50 percent of the households have sold their produce to local/village merchant, 30 percent of the households sold their produce in regulated markets and 3.33 percent of the households sold their produce to cooperative marketing society. The results indicated that 3.33 per cent of the households have used head load as a mode of transport,

6.67 per cent of them have used cart, 90 per cent have used tractor and 10 per cent of them have used truck.

The results indicated that, 66.67 per cent of the households have experienced the soil and water erosion problems i.e. 66.67 percent of marginal farmers, 75 per cent of small farmers, 55.56 per cent semi medium farmers and 83.33 percent medium farmers. The results indicated that, 60 per cent of the households have shown interest in soil testing i.e. 66.67 per cent of marginal, 62.50 per cent of small, 44.44 per cent of semi medium and 83.33 per cent of medium farmers have shown interest towards soil testing. The results indicated that, 83.33 percent used fire wood as a source of fuel and 23.33 percent of the households used LPG as a source of fuel.

The results indicated that, piped supply was the source of drinking water for 6.67 per cent, 76.67 per cent of them were using bore well and 16.67 per cents of the households were using lake/tank for drinking water. The results indicated that, electricity was the major source of light for 93.33 per cent of the households and 3.33 per cent of the households were using kerosene lamp. The results indicated that, 20 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, 16.67 per cent of marginal, 12.50 per cent of small, 22.22 per cent of semi medium and 16.67 per cent of medium had sanitary toilet facility.

The results indicated that, 90 per cent of the sampled households possessed BPL card and 6.67 per cent of the sampled households have not possessed BPL card. The results indicated that, 46.67 per cent of the households participated in NREGA programme which included 100 per cent of the landless, 16.67 percent of the marginal, 100 per cent of the small, 33.33 per cent of the semi medium and 16.67 percent of the medium farmers.

The results indicated that, cereals, pulses, oilseeds, vegetables, milk, egg and meat were adequate for 96.67 per cent, 46.67 per cent, 53.33 per cent, 43.33 per cent, 73.33 per cent, 36.67 per cent, and 23.33 per cent respectively. The results indicated that, cereals, pulses, oilseeds, vegetables and milk were inadequate for 3.33 per cent, 53.33 per cent, 26.67 per cent, 40 per cent and 13.33 of the households. Fruits, egg and meat were inadequate for 23.33 per cent of the households.

The results indicated that, Lower fertility status of the soil was the constraint experienced by 3.33 per cent of the households, wild animal menace on farm field (40%), frequent incidence of pest and diseases (13.33%), inadequacy of irrigation water (6.67%), high cost of Fertilizers and plant protection chemicals (6.67%), high rate of interest on credit (60%), low price for the agricultural commodities (6.67%), lack of marketing facilities in the area (60%), lack of transport for safe transport of the agricultural produce to the market (26.67%), less rainfall (93.33%) and Source of Agri-technology information (Newspaper /TV/Mobile (63.33 %).