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

HALHALLI (4D3A9D1b) 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 Halhalli 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 **S.K. SINGH**

Date: 11.06.2019 Director, ICAR - NBSS&LUP Nagpur

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

The land resource inventory of Halhalli 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 734 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 about 95 per cent is covered by soils, three per cent by rock-out crops and two per cent by water bodies, settlements and others. The salient findings from the land resource inventory are summarized briefly below.

- *The soils belong to 15 soil series and 31 soil phases (management units) and 8 land use classes.*
- *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 28 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area is suitable for agriculture.*
- *About 1 per cent of the soils are shallow (25-50 cm), 22 per cent is moderately shallow (50-75 cm), 31 per cent moderately deep (75- 100 cm) and 40 per cent has deep to very deep soils (100 ->150 cm).*
- *About 5 per cent of the area is having sandy soils, 54 per cent loamy soils and 36 per cent has clayey soils at the surface.*
- *About 46 per cent of the area has non-gravelly (<15%) soils, 45 per cent has gravelly soils (15-35 % gravel) and 4 per cent has very gravelly (35- 60% gravel) soils.*
- *With respect to available water capacity 44 per cent of the area has very low (<50mm/m), 30 per cent of the area has low (51-100 mm/m), 11 per cent medium (101-150 mm/m) and 11 per cent area has high to very high (151 - >200mm/m) .*

- *An area of about 6 per cent has nearly level (0-1%) lands and 89 per cent has very gently sloping (1-3%) lands.*
- *An area of about 45 per cent is slightly eroded (e1) and 50 per cent is moderately eroded (e2) lands.*
- *An area of about 2 per cent is very strongly acid to strongly acid (pH 4.5-5.5), 27 per cent is moderately acid to slightly acid (pH 5.5 -6.5), 25 per cent is neutral (pH 7.3-7.8), 36 per cent is slightly to moderately alkaline (pH 7.3-8.4), 4 per cent is under strongly alkaline to very strongly alkaline (pH 8.4- >9.0) in reaction.*
- *The Electrical Conductivity (EC) of the soils are dominantly <2 dsm^{-1} indicating that soils are non saline.*
- *Organic carbon is low (<0.5%) in about 11 per cent, medium (0.5-0.75%) in 43 per cent and high (>0.75 %) in 41 per cent area of the soils.*
- *Available phosphorus is low (<23 kg/ha) in < 1 per cent, medium (23-57 kg/ha) in 61 per cent and high (>57 kg/ha) in 34 per cent of the soils.*
- *Available potassium is low (<145 kg/ha) in 3 per cent, medium (145-337 kg/ha) in 75 per cent and high (>337 kg/ha) in 17 per cent of the soils.*
- *Available sulphur is low (<10 ppm) in 25 per cent, medium (10-20 ppm) in 37 per cent and high (>20 ppm) in 33 per cent area of the soils*
- *Available boron is low (<0.5 ppm) in about 62 per cent and medium (0.5-1.0 ppm) in 33 per cent area of the soils.*
- *Available iron is deficient in 49 per cent of the area and sufficient (>4.5 ppm) in 46 per cent of the area.*
- *Available zinc is deficient (<0.6 ppm) in 81 per cent of the area and sufficient (>0.6 ppm) in 14 per cent of the area.*
- *Available manganese and copper are sufficient in the entire area.*
- *The land suitability for 28 major agricultural and horticultural crops grown in the microwatershed was assessed and the areas that are highly suitable (class S1) and moderately suitable (class 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	*84(12)*	*81 (11)*	*Pomegranate*	*42(6)*	*201(28)*
Maize	*5(<1)*	*150(20)*	*Guava*	*42(6)*	*159(22)*
Bajra	*67(9)*	*330(45)*	*Jackfruit*	*42(6)*	*159(22)*
Redgram	*42(6)*	*106 (15)*	*Jamun*	*37(5)*	*167 (23)*
Bengal gram	*42 (6)*	*268 (37)*	*Musambi*	*83 (11)*	*160(22)*
Groundnut	*62(8)*	*441(60)*	*Lime*	*83(11)*	*160 (22)*
Sunflower	*83 (11)*	*65(9)*	*Cashew*	*42(6)*	*188(26)*
Cotton	*79(11)*	*86(12)*	*Custard apple*	*110 (15)*	*543(74)*
Chilli	*42(6)*	*81(11)*	*Amla*	*67(9)*	*585(80)*
Tomato	*42(6)*	*81(11)*	*Tamarind*	*37(5)*	*46 (6)*
Drumstick	*42(6)*	*283(39)*	*Marigold*	*42(6)*	*123 (17)*
Mulberry	*42(6)*	*446(61)*	*Chrysanthemum*	*42(6)*	*123 (17)*
Mango	*37(5)*	*5(<1)*	*Jasmine*	*42(6)*	*81(11)*
Sapota	*42(6)*	*159(22)*	*Crossandra*	*42(6)*	*122(17)*

Apart from the individual crop suitability, a proposed crop plan has been prepared for the 8 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 to 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. This 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

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

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

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

Therefore, the land resource inventory required for farm level planning is the one which investigates not only the surface but also consider the other parameters which are critical for productivity *viz.*, soils, climate, water, minerals and rocks, topography, geology, hydrology, vegetation, crops, land use pattern, animal population, socio-

economic conditions, infrastructure, marketing facilities and various schemes and developmental works of the government etc. From the data collected at farm level, the specific problems and potentials of the area can be identified and highlighted, conservation measures required for the area can be planned on a scientific footing, suitability of the area for various uses can be worked out and finally viable and sustainable land use options suitable for each and every land holding can be prescribed.

The Land Resource Inventory is basically done for identifying 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 Halhalli microwatershed in Koppal Taluk, Koppal 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 scale 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 Halhalli micro-watershed is located in the central part of Karnataka in Koppal taluk and district (Fig2.1). It lies between $15^0$23' and $15^0$25' North latitudes and $76^0$11' and $76^0$13' East longitudes and covers an area of about 734 ha. It comprises parts of Tenakankallu, Kamanura, Sangapura, Bheemanura and Lebagiri villages. It is about 56 km from Koppal town and is surrounded by Hatti on the north, Kamanura on the northeast, Tenakanakallu on the west, Hanamanahalli on the south, Sanganura on the east and Bheemnura on the southeastern side of the microwatershed.

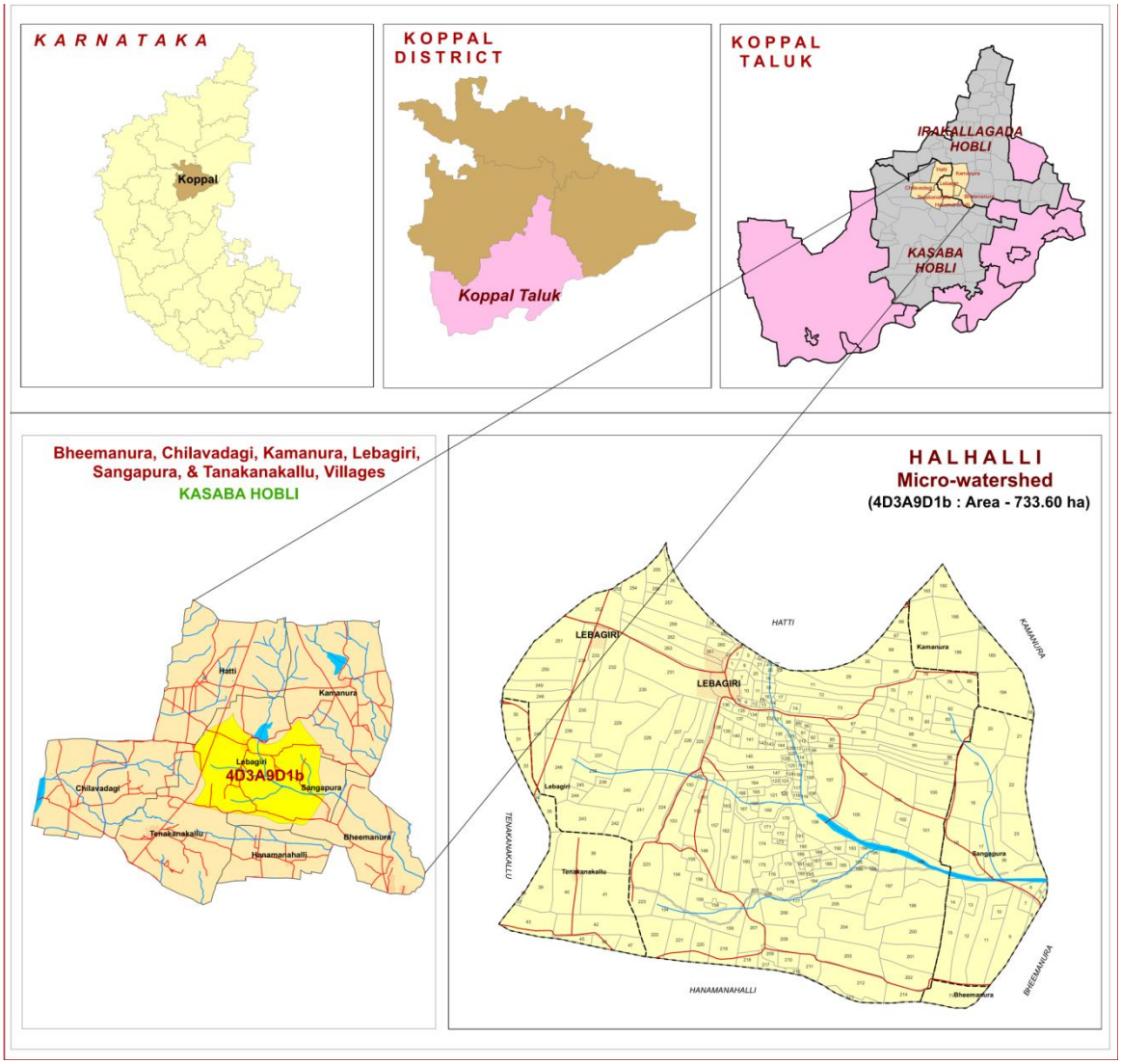


Fig.2.1 Location map of Halhalli Microwatershed

2.2 Geology

Major rock formations observed in the microwatershed are granite gneiss and alluvium (Fig.2.2 a and b). 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 Halhalli village. The thickness of the alluvium generally is limited to less than a meter, except in river valleys where it is very deep extending to tens of meters. Such soils are transported and represent paleo black soils originally formed at higher elevation, but now occupying river valleys.

Fig.2.2a Granite and granite gneiss rocks

Fig.2.2b Alluvium

2.3 Physiography

Physiographically, the area has been identified as Granite gneiss and alluvial landscapes based on geology. The 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 535 to 560 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 village. 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 is received 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 is 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 to 193 mm in the month 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**	

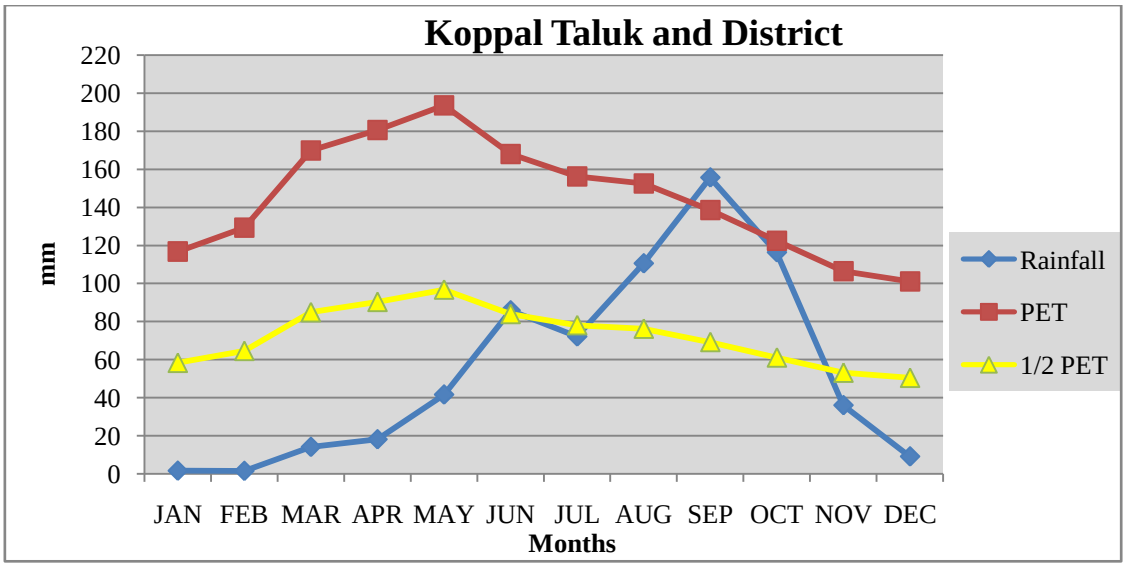


Fig. 2.3 Rainfall distribution in Koppal Taluk and District

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 Halhalli 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 boulder 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, Bengal gram and groundnut (Fig 2.5). 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 Halhalli microwatershed is presented in Fig.2.6.

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 Halhalli Microwatershed

Fig.2.5 (b) Different crops and cropping systems in Halhalli Microwatershed

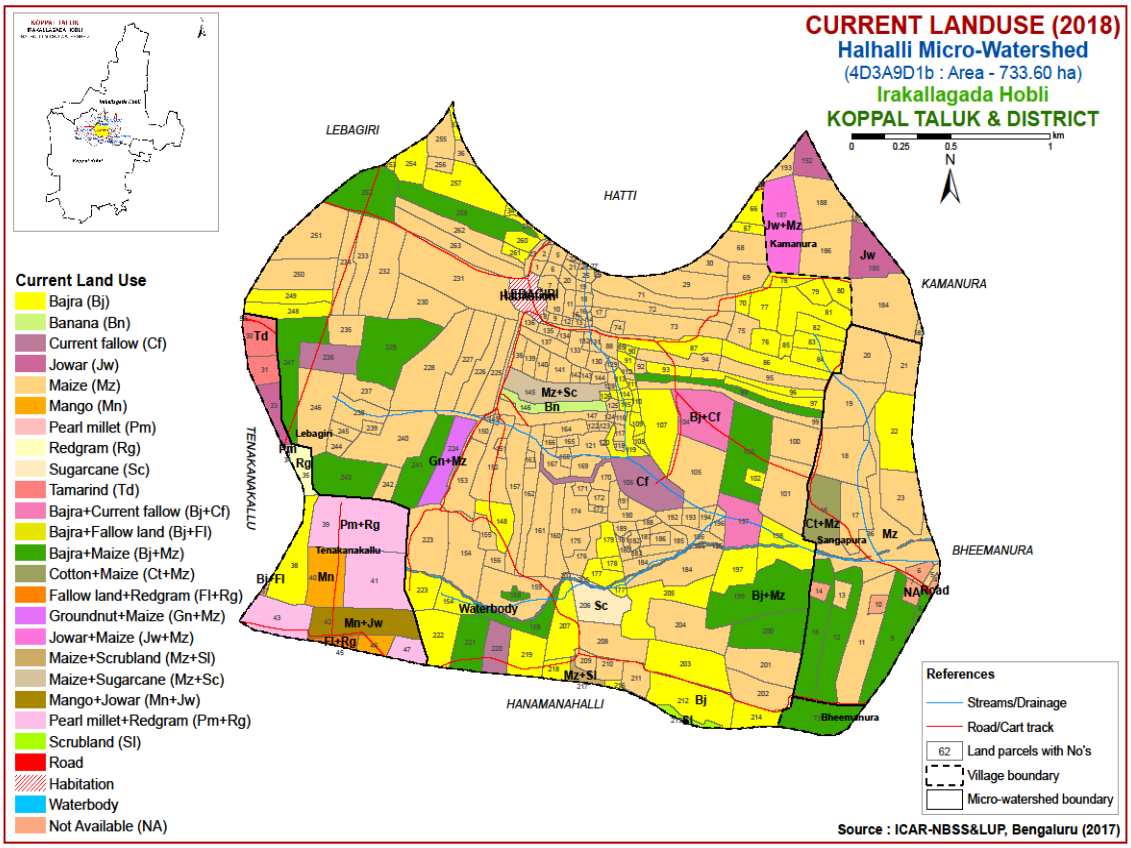


Fig.2.6 Current Land Use – Halhalli Microwatershed

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 to a given level of management. This was achieved in Halhalli 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 734 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 on 1:7920 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 and alluvial landscapes and is divided into landforms such as ridges, mounds and uplands, very gently sloping lands 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)

DSe -Alluvial landscape

DSe1 Summit
- DSe11 Nearly level Summit with dark grey tone
- DSe12 Nearly level Summit with medium grey tone
- DSe13 Nearly level Summit with whitish grey tone
- DSe14 Nearly level Summit with whitish tone (Calcareousness)
- DSe15 Nearly level Summit with pinkish grey tone
- DSe16 Nearly level Summit with medium pink tone
- DSe17 Nearly level Summit with bluish white tone
- DSe 18 Nearly level Summit with greenish grey tone

DSe2 Very gently sloping
- DSe21 Very gently sloping, whitish tone
- DSe22 Very gently sloping, greyish pink tone
- DSe23 Very gently sloping, whitish grey tone
- DSe24 Very gently sloping, medium grey tone
- DSe25 Very gently sloping, medium pink tone
- DSe26 Very gently sloping, dark grey tone
- DSe27 Very gently sloping, bluish grey tone
- DSe28 Very gently sloping, greenish grey tone
- DSe 29 Very gently sloping, Pinkish grey

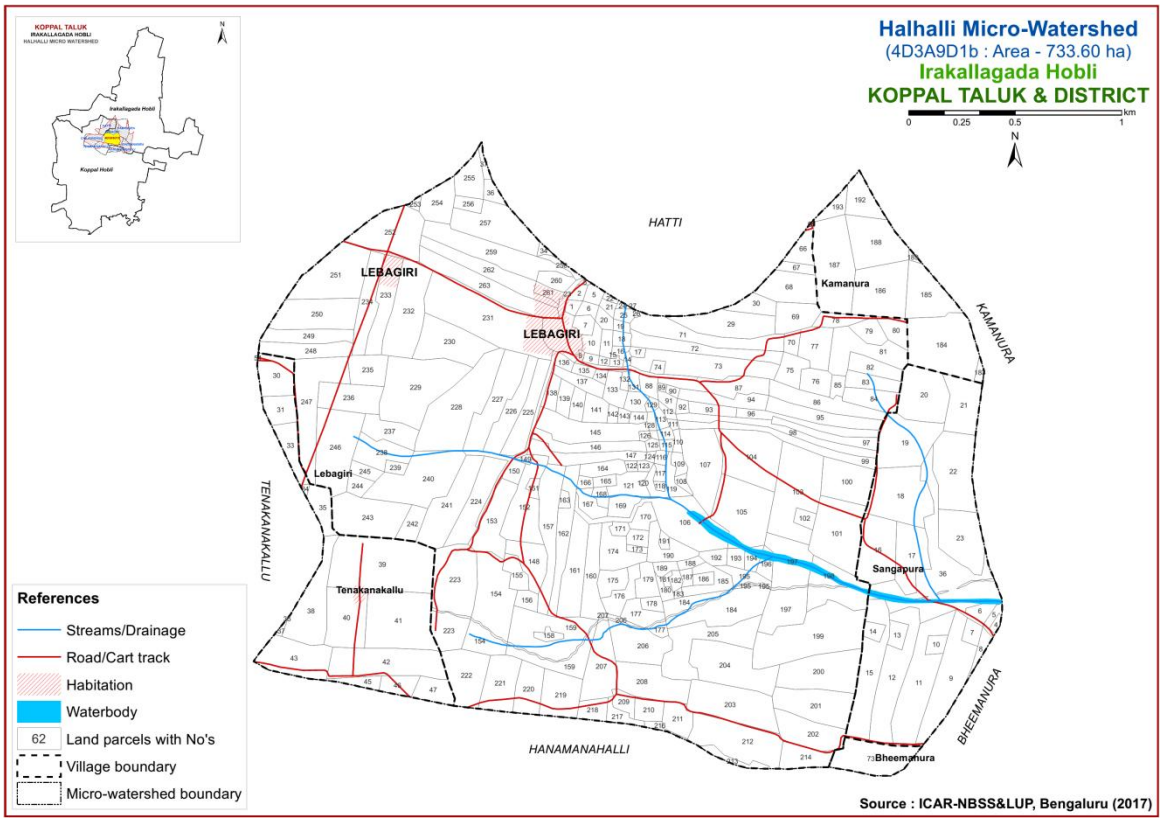


Fig 3.1 Scanned and Digitized Cadastral map of Halhalli Microwatershed

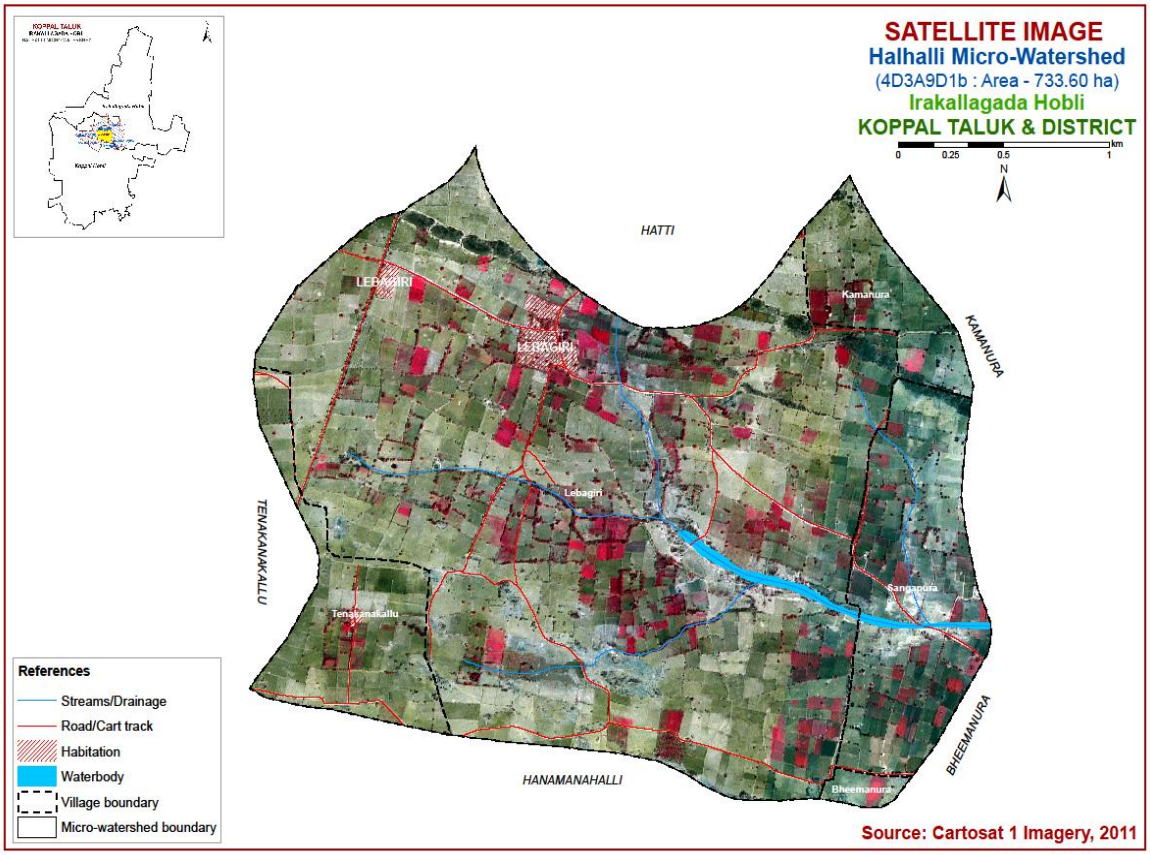


Fig.3.2 Satellite Image of Halhalli Microwatershed

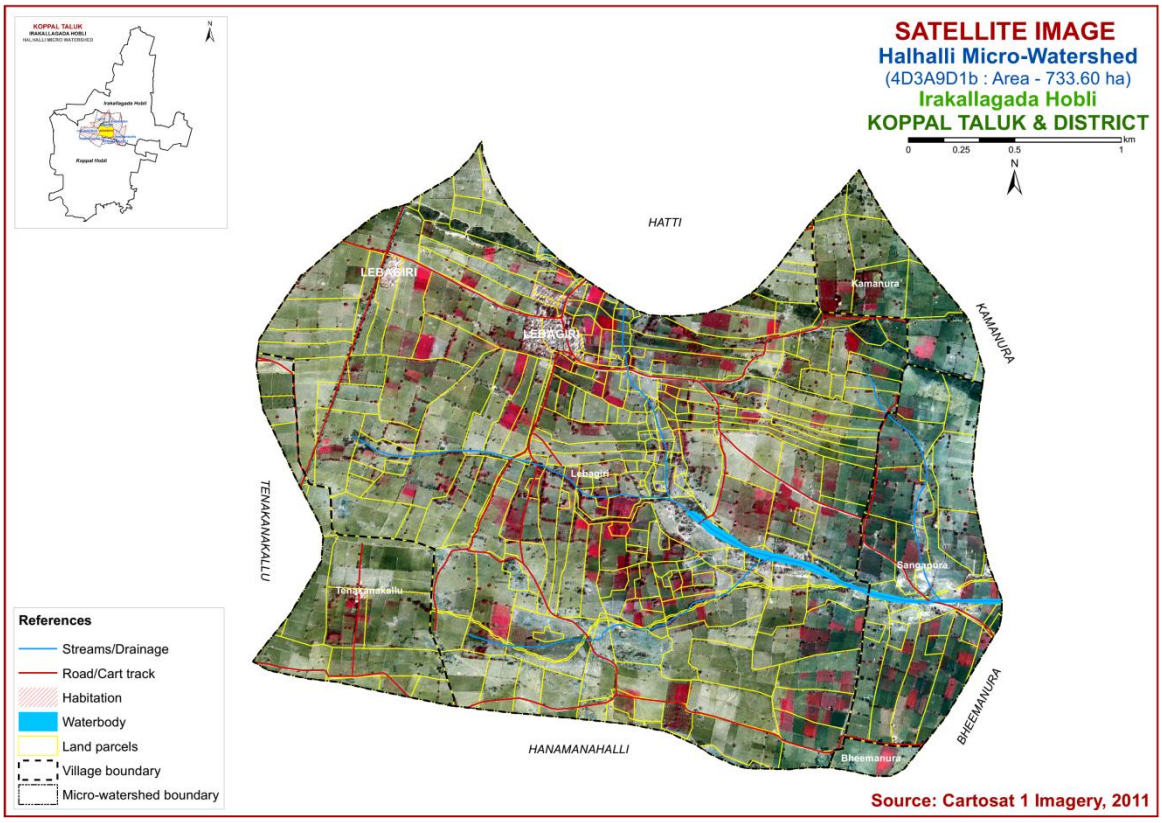


Fig.3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Halhalli Microwatershed

3.3 Field Investigation

The field boundaries and survey numbers given on the cadastral sheet were located on the ground by following permanent features like roads, cart tracks, *nallas*, streams, tanks etc., and wherever changes were noticed, they were incorporated on the microwatershed cadastral map. Preliminary traverse of the microwatershed was carried out with the help of cadastral map, imagery and toposheets. While traversing, landforms and physiographic units identified were checked and preliminary soil legend was prepared by studying soils at few selected places. Then, intensive traversing of each physiographic unit like hills, ridges, uplands and 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).

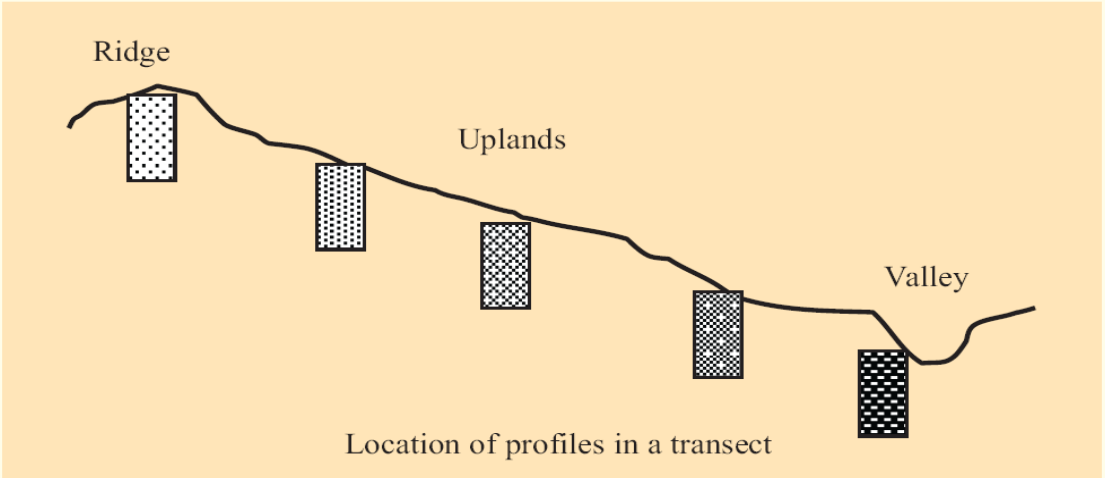


Fig: 3.4. Location of profiles in a transect

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 upto 200 cm or to the depth limited by rock or hard substratum and studied in detail for all their morphological and physical characteristics. The soil and site characteristics were recorded for all profile sites on a standard proforma as per the guidelines given in USDA Soil Survey Manual (Soil Survey Staff, 2012). Apart from the transect study, profiles were also studied at random, almost like in a grid pattern, outside the transect areas 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, 15 soil series were identified in Halhalli microwatershed.

Table 3.1 Differentiating Characteristics used for identifying Soil Series (Characteristics are of Series Control Section)

Soils of Granite Gneiss Landscape							
Sl. No	**Soil Series**	**Depth (cm)**	**Colour (moist)**	**Texture**	**Gravel (%)**	**Horizon sequence**	**Calcareo-usness**
1	Harve (HRV)	25-50	2.5YR3/4,3/6 5YR3/3,4/4,3/4	gscl	>35	Ap-Bt-Cr	-
2	Lakkur (LKR)	50-75	2.5YR2.5/3, 2.5/4,3/4,3/6	gsc	40-60	Ap-Bt-Bc-Cr	-
3	Thammadahalli(TDH)	50-75	2.5YR2.5/4,3/6	sc-c	<15	Ap-Bt-Cr	-
4	Kethanapura (KTP)	50-75	2.5YR3/4,3/6	scl	15-35	Ap-Bt-Cr	-
5	Hooradhahalli (HDH)	75-100	2.5YR2.5/4,3/4, 3/6	gsc-gc	>35	Ap-Bt-Cr	-
6	Gollarahatti (GHT)	75-100	2.5YR3/4,3/6, 4/4,4/6	gscl	15-35	Ap-Bt-Cr	-
7	Bidanagere (BDG)	75-100	5YR3/3,3/4,4/3, 5/4 2.5YR3/4	gc	35-60	Ap-Bt-Cr	-
8	Kumchahalli (KMH)	100-150	2.5YR 3/4,3/6	sc	<15	Ap-Bt-Cr	-
9	Balapur(BPR)	100-150	2.5YR2.5/4,3/4	gsc-gc	>35	Ap-Bt-Cr	
10	Nagalapur (NGP)	100-150	5YR 2.5/2,3/2, 2.5YR3/6,4/6	gsc-gc	>35	Ap-Bt-Cr	-
11	Ranatur(RTR)	>150	2.5YR2.5/3, 2.5/4,3/3,4/6	c	-	Ap-Bt	-
12	Huliyapura (HLP)	75-100	7.5YR3/3,4/6 10YR4/6	sc	-	Ap-Bw-C	-
13	Thondigere (TDG)	>150	7.5R3/3,3/4,4/6 10YR3/3,4/3,4/ 3,4/4,4/6	scl	-	Ap-Bw-C	-
Soils of Alluvial landscape							
14	Narasapura (NSP)	75-100	10YR 3/1,3/2,4/2	c	-	Ap-Bw-Cr	e-es
15	Handrala (HDL)	100-150	10YR2/1,3/1, 4/1	c	-	Ap-Bss-Ck	es

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 mini pits 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 mini pits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map.

The soil map shows the geographic distribution of 31 mapping units representing 15 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 31 phases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one soil phase will have similar management needs and have to be treated accordingly.

3.5 Land Management Units

The 31 soil phases identified and mapped in the microwatershed were regrouped into eight 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 chosen for identification and delineation of LMUs. For Halhalli microwatershed, five soil and site characteristics, namely soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The Land Management Units are expected to behave similarly for a given level of management.

3.5 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 2017 from farmer's fields in Halhalli microwatershed (72 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.

Table 3.2 Soil map unit description of Halhalli Microwatershed

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
Soils of Granite gneiss landscape				
	HRV	Harve soils are shallow (25-50 cm), well drained, have dark red to dark reddish brown, red gravelly sandy clay loam soils occurring on nearly level to gently sloping uplands under cultivation		**11 (1.44)**
23		HRVhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	11 (1.44)
	LKR	Lakkur soils are moderately shallow (50-75 cm), well drained, have dark reddish brown to dark red, red gravelly sandy clay soils occurring on very gently to moderately sloping uplands under cultivation		**148 (20.09)**
43		LKRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	40 (5.44)
52		LKRiB1g2	Sandy clay surface, slope 1-3%, slight erosion, very gravelly (35-60%)	33 (4.48)
451		LKRcB1	Sandy loam surface, slope 1-3%, slight erosion	17 (2.28)
452		LKRhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	58 (7.89)
	TDH	Thammadahalli soils are moderately shallow (50-75cm), well drained, have dark red to dark reddish brown red sandy clay to clay soils occurring on very gently sloping uplands under cultivation		**15 (2.04)**
56		TDHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	15 (2.04)
	KTP	Kethanapura soils are moderately shallow (50-75 cm), well drained, have dark reddish brown gravelly red sandy clay loam soils occurring on very gently sloping uplands under cultivation		**2 (0.23)**
71		KTPcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	2 (0.23)
	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		**95 (12.97)**
105		HDHbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	23 (3.13)
122		HDHhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	23 (3.17)
125		HDHiB1	Sandy clay surface, slope 1-3%, slight erosion	26 (3.56)
132		HDHmB2g1	Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	23 (3.11)
	GHT	Gollarahatti soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red gravelly sandy clay		**25 (3.46)**

		loam soils occurring on nearly level very gently sloping uplands under cultivation		
142		GHThB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	25 (3.46)
	BDG	Bidanagere soils are moderately deep (75-100 cm), well drained, have dark reddish brown gravelly clay soils occurring on nearly level to gently sloping uplands under cultivation		**68 (9.22)**
180		BDGcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	40 (5.4)
455		BDGcB2	Sandy loam surface, slope 1-3%, moderate erosion	28 (3.82)
	KMH	Kumchahalli soils are deep (100-150cm), well drained, have dark reddish brown to dark red sandy clay red soils occurring on nearly level to very gently sloping uplands under cultivation		**5 (0.74)**
196		KMHcA1	Sandy loam surface, slope 0-1%, slight erosion	5 (0.74)
	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		**81 (10.66)**
221		BPRcA1g1	Sandy loam surface, slope 0-1%, slight erosion, gravelly (15-35%)	4 (0.53)
225		BPRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	1 (0.08)
230		BPRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	22 (2.95)
238		BPRiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	33 (4.51)
240		BPRmB2	Clay surface, slope 1-3%, moderate erosion	21 (2.89)
	NGP	Nagalapur 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		**96 (13.2)**
249		NGPbB1	Loamy sand surface, slope 1-3%, slight erosion	15 (2.1)
251		NGPcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	35 (4.82)
257		NGPhB1	Sandy clay loam surface, slope 1-3%, slight erosion	27 (3.69)
260		NGPhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	1 (0.14)
265		NGPiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	18 (2.45)
	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		**37 (4.99)**
288		RTRiB2	Sandy clay surface, slope 1-3%, moderate erosion	37 (4.99)
	HLP	Huliyapura soils are moderately deep (75-100 cm), well drained, have dark yellowish brown to dark brown, black sandy clay soils occurring on very gently sloping lowlands under cultivation		**39 (5.37)**

437		HLPhB1	Sandy clay loam surface, slope 1-3%, slight erosion	39 (5.37)
	TDG	Thondigere soils are very deep (>150 cm), well drained, have dark brown to dark yellowish brown, black sandy clay loam stratified soils occurring on nearly level to very gently sloping lowlands under cultivation		**32 (4.39)**
441		TDGmA1	Clay surface, slope 0-1%, slight erosion	32 (4.39)
Soils of Alluvial landscape				
	NSP	Narasapura soils are moderately deep (75-100 cm), moderately well drained, have dark grayish brown to very dark grayish brown and very dark gray, black calcareous cracking clay soils occurring on nearly level to very gently sloping alluvial plains under cultivation		**1 (0.15)**
355		NSPhB1	Sandy clay loam surface, slope 1-3%, slight erosion	1 (0.15)
	HDL	Handrala soils are deep (100-150 cm), moderately well drained, have dark gray to very dark gray, black calcareous cracking clay soils occurring on very gently sloping alluvial plains under cultivation		**41 (5.64)**
380		HDLmB1	Clay surface, slope 1-3%, slight erosion	41 (5.64)
999	Rock outcrops	Rock lands, both massive and boulder with little or no soil		**25 (3.36)**
1000	Others	Habitation & Water body		**13 (1.77)**

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

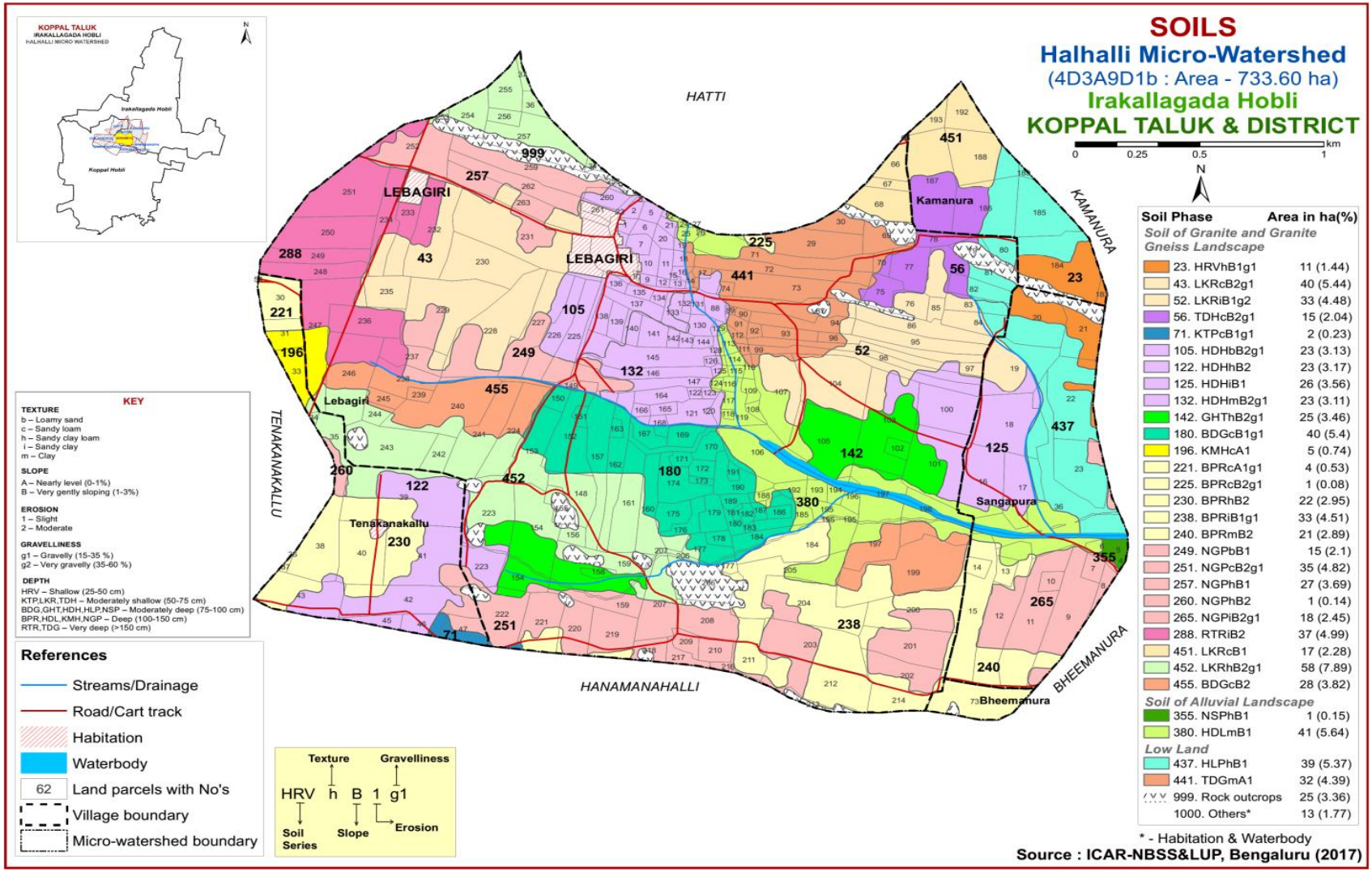


Fig 3.5 Soil Phase or Management Units- Halhalli Microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Halhalli microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscapes based on geology. In all, 15 soil series were 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 15 soil series identified followed by 31 soil phases (management units) mapped (Fig. 3.5) are furnished below. The physical and chemical characteristics of soil series identified and their classification in Halhalli microwatershed are given in Table 4.1. 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, 13 soil series were identified and mapped. Of these series, Lakkur (LKR) series occupies maximum area of about 148 ha (20%) followed by Nagalapur (NGP) series 96 ha (13%). The brief description of the soil series along with the soil phases identified and mapped is given below.

4.1.1 Harve (HRV) Series: Harve soils are shallow (25-50 cm), well drained, have reddish brown to dark red gravelly sandy clay loam soils. They have developed weathered from granite gneiss and occur on very gently to moderately sloping uplands. The Harve series has been tentatively classified as a member of the loamy- skeletal, mixed, isohyperthermic family of Typic Haplustalfs.

The thickness of the solum ranges from 28 to 48 cm. The thickness of A-horizon ranges from 12 to 17 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from loamy sand to sandy loam with 20 to 60 per cent gravel. The thickness of B-horizon ranges from 16 to 32 cm. Its colour is in 2.5 YR and 5 YR hue with value 3 to 4 and chroma 4 to 6. Its texture is sandy clay loam with gravel content of more than 35 per cent. The available water capacity is very low (<50mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Harve (HRV) Series

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

The thickness of the solum ranges from 51 to 74 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 to 4 and chroma 4 to 6. The texture varies from loamy sand to sandy clay loam with 15 to 50 per cent gravel. The thickness of B horizon ranges from 39 to 58 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay with 40 to 60 per cent gravel. The available water capacity is low (50-100 mm/m). Four soil phases were identified and mapped.

Landscape and soil profile characteristics of Lakkur (LKR) Series.

4.1.3 Thammadahalli (TDH) Series: Thammadahalli soils are moderately shallow (50-75cm), well drained, have brown to very dark brown and dark reddish brown sandy clay to clay soils. They have developed from weathered granite gneiss and occur on nearly level to gently sloping uplands. The Thammadahalli series has been classified as a member of the fine, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum ranges from 54 to 75 cm. The thickness of A horizon ranges from 11 to 19 cm. Its colour is in 7.5 YR, 5YR and 2.5 YR hue with value 2.5 to 4 and chroma 2 to 6. The texture varies from sandy clay loam to clay with 10 to 20 per cent gravel. The thickness of B horizon ranges from 43 to 60 cm. Its colour is in 2.5 YR hue with value 3 and chroma 4 to 6. Its texture is sandy clay to clay. The available water capacity is medium (100-150 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Thammadahalli (TDH) Series

4.1.4 Kethanapura (KTP) Series: Kethanapura soils are moderately shallow (50-75cm), well drained, have dark reddish brown gravelly sandy clay loam soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands. The Kethanapura series has been tentatively classified as a member of the fine-loamy, mixed, isohyperthermic family of Typic Rhodustalfs.

The thickness of the solum ranges from 53 to 72 cm. The thickness of A-horizon ranges from 11 to 16 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 3 to 6. The texture varies from loamy sand to sandy clay loam with 15 to 40 per cent gravel. The thickness of B-horizon varies from 41 to 56 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is dominantly sandy clay loam with 15 to 35 per cent gravel. The available water capacity is medium (101-150 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Kethanapura (KTP) Series

4.1.5 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).Four soil phases were identified and mapped.

Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

4.1.6 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 (100-150 mm/m). One soil phase was identified and mapped. One soil phase was identified and mapped.

Landscape and soil profile characteristics of Gollarahatti (GHT) Series

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

The thickness of the solum ranges from 78 to 99 cm. The thickness of A-horizon ranges from 12 to 19 cm. Its colour is in 2.5 YR and 5 YR hue with value 2 to 3 and chroma 3 to 4. The texture varies from sandy clay loam to sandy clay with 10 to 20 per cent gravel. The thickness of B-horizon ranges from 68 to 85 cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 5 and chroma 3 to 4. Its texture is gravelly clay with gravel content of 35-60 per cent. The available water capacity is very low (<50 mm/m).Two soil phases were identified and mapped.

Landscape Soil Profile Characteristics of Bidanagere (BDG) Series

4.1.8 Kumchahalli (KMH) Series: Kumchahalli soils are deep (100-150cm), well drained, have dark reddish brown to dark red sandy clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently sloping uplands. The Kumchahalli series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Rhodustalfs.

The thickness of the solum ranges from 102 to 150 cm. The thickness of A horizon ranges from 11 to 23 cm. Its colour is in 5 YR and 2.5 YR hue with value 2.5 to 3 and chroma 3 to 6. The texture is dominantly sandy clay. The thickness of B horizon ranges from 95 to 132 cm. Its colour is in 2.5 YR hue with value 3 and chroma 4 to 6. Its texture is dominantly sandy clay loam to sandy clay. The available water capacity is high (150-200 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Kumchahalli (KMH) 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. They 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 low (51-100 mm/m).Five soil phases were identified and mapped.

Landscape Soil Profile Characteristics of Balapur (BPR) Series

4.1.10 Nagalapur (NGP) Series: Nagalapur 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 to gently sloping uplands.

The thickness of the solum ranges from 105 to 145 cm. The thickness of A-horizon ranges from 14 to 20 cm. Its colour is in 7.5 YR hue with value and chroma 3 to 4. The texture ranges from sandy loam to sandy clay with 10 to 50 per cent gravel. The thickness of B horizon ranges from 90 to 128 cm. Its colour is in 2.5 YR, 5 YR and 7.5 YR hue with value 3 to 5 and chroma 3 to 6. Texture is sandy clay to clay with 35 to 80 per cent gravel. The available water capacity is low (51-100 mm/m). One soil phase was identified and mapped. Five soil phases were identified and mapped.

Landscape and soil profile characteristics of Nagalapur (NGP)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).One soil phase was identified and mapped.

Landscape and soil profile characteristics of Ranatur (RTR) Series

4.1.12 Huliyapura (HLP) Series: Huliyapura soils are moderately deep (75-100 cm), well drained, have dark brown to strong brown and dark yellowish brown sandy clay soils. They have developed from weathered granite gneiss and occur on very gently sloping low lands under cultivation.

The thickness of the solum ranges from 75 to 98 cm. The thickness of A-horizon ranges from 18 to 22 cm. Its colour is in 5 YR and 10 YR hue with value 3 to 4 and chroma 4. The texture is sandy clay loam. The thickness of B-horizon ranges from 56 to 75 cm. Its colour is in 5 YR, 7.5 YR and10 YR hue with value 3 to 4 and chroma 2 to 6. Its texture is sandy clay. The available water capacity is low (50-100 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Huliyapura (HLP) Series

4.1.13 Thondigere (TDG) Series: Thondigere soils are very deep (>150 cm), well drained, have dark brown to dark yellowish brown, sandy clay loam and sandy clay stratified soils. They have developed from alluvio- colluvium and occur on nearly level to very gently sloping lowlands under cultivation. The Thondigere series has been classified as a member of the fine- loamy, mixed, isohyperthermic family of Fluventic Haplustepts.

The thickness of the solum is more than 150 cm. The thickness of A-horizon ranges from 12 to 19 cm. Its colour is in 10 YR, 5 YR and 7.5 YR hue with value 3 to 4 and chroma 4. The texture is sandy clay loam. The thickness of B horizon is more than 150 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 to 4 and chroma 3 to 6. Its texture is sandy loam, sandy clay loam and sandy clay. The available water capacity is medium (101-150 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Thondigere (TDG)Series.

4.2 Soils of Alluvial Landscape

In this landscape, two soil series were identified and mapped. The brief description of soil series along with the soil phases identified and mapped is given below.

4.2.1 Narasapura (NSP) series: Narasapura soils are moderately deep (75-100 cm), moderately well drained, have dark grayish brown to very dark grayish brown and very dark gray, black calcareous cracking clay soils They have developed from alluvium and occur on very gently sloping uplands. The Narasapura series has been classified as a member of the very fine, smectitic, isohyperthermic (calc) family of Typic Haplustepts.

The thickness of the solum is 76 to 98 cm. The thickness of A horizon ranges from 15 to 19 cm. Its colour is in 10 YR hue with value 3 and chroma 1 to 2.The texture is clay with no gravel. The thickness of B horizon ranges from 57 to 83 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 3. Its texture is clay. The available water capacity is medium (101-150 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Narasapura (NSP) series

4.2.2 Handrala (HDL) Series: Handrala soils are deep (100-150 cm), moderately well drained, have black, very dark brown to dark gray cracking clay soils. They are developed from alluvium and occur on very gently to gently sloping uplands. The Handrala series has been classified as a member of the very fine, smectitic, isohyperthermic (calc) family of Typic Haplusterts

The thickness of the solum ranges from 102 to 149 cm. The thickness of A horizon ranges from 14 to 26 cm. Its colour is in 10 YR hue with value 3 and chroma 1. The texture is clay. The thickness of B horizon ranges from 103 to 127 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 2. Texture is dominantly clay. The available water capacity is very high (>200 mm/m). One soil phase was identified and mapped.

Landscape and Soil Profile Characteristics of Handrala (HDL) Series

Table: 4.1 Physical and Chemical Characteristics of Soil Series identified in Halhalli microwatershed

Soil Series: Lakkur (LKR), **Pedon:** RM-8.
Location: $15^0$04'26.3"N, $75^0$37'84.1"E, (4D4A3I1f), Belhatti village, Shirahatti taluk, Gadag distrtict
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
0-21	Ap	74.00	8.34	17.66	9.62	11.57	15.76	23.13	13.92	20	sl	-	-
21-35	Bt1	54.37	10.48	35.14	16.33	8.64	9.69	11.59	8.11	40	sc	-	-
35-56	Bt2	48.37	13.46	38.17	10.96	7.69	9.17	11.28	9.27	60	sc	-	-

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}							%	%
0-21	8.18	-	-	0.30	0.56	0.94	-	-	0.31	0.55	0.86	12.19	0.69	100.00	4.51
21-35	8.17	-	-	0.30	0.52	1.29	-	-	0.19	0.84	1.03	22.18	0.63	100.00	3.79
35-56	7.95	-	-	0.46	0.48	1.99	-	-	0.24	0.58	0.82	22.94	0.60	100.00	2.53

Contd…

Soil Series: Thammadahalli (TDH), Pedon-TR_1/1
Location: $15^0$03'41.7"N, $75^0$36'65.2"E, (4D4A3G2d), Nilogal village, 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
0-25	Ap	85.71	7.34	6.94	14.79	13.28	16.10	24.75	16.80	20	ls	-	-
25-65	Bt	47.76	7.96	44.28	15.30	9.78	6.24	7.91	8.53	10	sc	-	-

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}							%	%
0-25	9.19	-	-	0.18	0.35	1.29	-	-	0.08	0.52	0.60	3.57	0.51	-	14.57
25-65	8.00	-	-	0.17	0.35	0.58	-	-	0.15	1.31	1.46	13.87	0.31	-	9.44

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.	CaACO$_3$	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: Bidanagere (BDG), **Pedon**: RM-3
Location: $13^0$22'11"N, $76^0$38'03"E, (4D3D8G1a), Tharabenahalli village, Chikkanayakanahalli taluk, Tumakuru district.
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-Skeletal, mixed, isohyperthermic Rhodic1 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
0-20	Ap	81.19	11.25	7.56	12.54	15.07	17.90	21.94	13.75	50	ls	-	-
20-35	Bt1	57.45	11.45	31.10	12.76	11.02	10.92	12.45	10.31	50	scl	-	-
35-92	Bt2	44.63	7.85	47.52	12.40	9.61	8.37	7.75	6.51	60	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}							%	%
0-20	6.24	-	-	0.06	0.60	0.00	1.61	0.26	0.10	0.01	1.98	3.76	0.50	52.56	0.35
20-35	5.99	-	-	0.02	0.40	0.00	4.25	0.46	0.08	0.28	5.07	8.02	0.26	63.18	3.46
35-92	6.70	-	-	0.03	0.20	0.00	5.45	0.31	0.10	0.22	6.09	9.90	0.21	61.48	2.24

Contd…

Series Name: Kumchahalli (KMH), Pedon: RM- 9
Location: $15^0$20'05"N, $76^0$13'21"E, Basapura village, Koppal taluk and district
Analysis at: NBSS&LUP, Regional Centre, Bangalore **Classification:** Fine, 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
0-13	Ap	51.76	9.05	39.19	7.99	8.84	13.42	14.38	7.14	-	sc	20.08	13.69
13-27	Bt1	53.50	8.12	38.38	7.00	11.05	15.21	14.33	5.91	-	sc	17.05	12.32
27-43	Bt2	63.60	5.01	31.40	3.85	11.56	24.52	18.52	5.14	-	scl	11.76	9.09
43-64	Bt3	48.74	5.91	45.35	8.87	9.31	12.49	12.27	5.81	10	sc	16.68	13.35
64-84	Bt4	45.13	8.90	45.97	9.86	7.12	10.95	10.62	6.57	20	sc	17.45	13.42
84-114	Bt5	65.04	6.94	28.02	10.49	16.21	17.80	13.88	6.67	40	scl	13.20	9.75

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}							%	%
0-13	7.2	-	-	0.193	0.81	3.00	9.69	3.93	1.41	0.08	15.10	15.07	0.38	100	0.54
13-27	7.13	-	-	0.161	0.7	3.00	8.69	3.57	1.29	0.16	13.70	13.75	0.36	100	1.14
27-43	7.31	-	-	0.096	0.89	2.64	5.19	2.36	1.07	0.24	8.86	9.46	0.30	94	2.51
43-64	7.65	-	-	0.089	1.16	2.52	8.25	2.88	0.72	0.35	12.20	12.65	0.28	96	2.79
64-84	7.98	-	-	0.1	0.38	3.12	10.49	2.88	0.26	0.41	14.04	14.63	0.32	96	2.78
84-114	8.23	-	-	0.121	0.58	2.88	8.02	1.87	0.09	0.43	10.41	10.67	0.38	98	4.02

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…

Soil Series: Ranatur (RTR), Pedon: RM-87

Location: $13^0$21'49.0"N, $76^0$38'06"E, (4B3D4L2a), J C Pura village, Chikkanayakanahalli taluk, Tumakuru 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
0-17	Ap	84.16	9.46	6.38	2.22	18.57	26.14	24.32	12.92	-	ls	-	-
17-47	Bt1	51.14	8.30	40.56	1.66	13.49	14.52	13.59	7.88	-	sc	-	-
47-89	Bt2	51.99	11.01	37.00	1.94	13.99	15.32	13.18	7.56	-	sc	-	-
89-123	Bt3	51.58	9.07	39.35	3.47	14.50	14.61	11.64	7.35	-	sc	-	-
123-152	Bt4	47.89	8.88	43.23	2.27	12.36	14.21	11.12	7.93	-	sc	-	-
152-198	Bt5	43.37	13.17	43.45	2.48	9.83	13.25	10.87	6.94	-	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}							%	%
0-17	5.08	-	-	0.03	0.52	0.00	3.68	0.72	0.06	0.19	4.65	9.21	1.44	50.50	2.06
17-47	6.28	-	-	0.03	0.48	0.00	3.93	0.72	0.08	0.07	4.80	7.92	0.20	60.59	0.94
47-89	6.42	-	-	0.03	0.40	0.00	4.40	0.74	0.08	0.06	5.28	7.52	0.20	70.15	0.79
89-123	6.50	-	-	0.02	0.32	0.00	4.44	0.76	0.09	0.07	5.36	7.82	0.20	68.58	0.93
123-152	6.52	-	-	0.02	0.28	0.00	4.40	0.71	0.09	0.07	5.26	8.22	0.19	64.00	0.81
152-198	7.09	-	-	0.02	0.24	0.00	6.10	0.98	0.10	0.20	7.38	9.60	0.22	76.89	2.09

Contd…

Soil Series: Thondigere (TDG), Pedon: RM-24
Location: $13^0$28'21"N, $76^0$52'50"E, (4B3D3N1b), Sanabanahalli village, Gubbi taluk, Tumakuru district
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine- loamy, mixed, isohyperthermic Fluventic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-17	Ap	73.83	10.36	15.81	11.20	16.19	15.99	18.84	11.61	-	sl	-	-
17-30	A2	77.02	9.01	13.97	10.12	18.83	18.72	19.43	9.92	-	sl	-	-
30-39	A3	76.42	8.45	15.13	7.49	13.36	15.59	26.01	13.97	-	sl	-	-
39-50	Bw1	63.75	9.90	26.35	5.80	9.27	10.49	18.53	19.65	-	scl	-	-
50-71	Bw2	53.49	15.81	30.70	1.44	4.72	10.57	22.28	14.48	-	scl	-	-
71-95	Bw3	36.35	22.32	41.33	1.46	5.83	16.25	6.25	6.56	-	c	-	-
95-114	Bc1	57.96	13.88	28.16	4.39	12.35	14.18	16.94	10.10	-	scl	-	-
114 - >150	Bc2	50.16	16.94	32.91	3.64	12.90	11.34	13.11	9.16	-	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}							%	%
0-17	7.02	-	-	0.05	0.62	0.00	4.33	1.14	0.28	0.08	5.83	5.77	0.36	100.00	1.44
17-30	7.80	-	-	0.07	0.37	0.00	4.64	0.44	0.06	0.01	5.15	5.15	0.37	100.02	0.24
30-39	7.55	-	-	0.04	0.29	0.00	4.27	0.33	0.05	0.03	4.69	4.64	0.31	100.00	0.75
39-50	7.69	-	-	0.05	0.25	0.00	7.03	0.49	0.07	0.07	7.66	8.45	0.32	90.66	0.82
50-71	8.09	-	-	0.04	0.12	0.00	9.09	1.43	0.13	0.38	11.02	12.26	0.40	89.94	3.10
71-95	7.97	-	-	0.08	0.29	0.00	11.84	1.27	0.11	0.46	13.68	14.42	0.35	94.85	3.21
95-114	8.32	-	-	0.05	0.29	0.00	9.28	1.23	0.15	0.31	10.97	11.74	0.42	93.44	2.65
114 - >150	8.34	-	-	0.07	0.25	0.00	13.90	1.71	0.13	0.83	16.57	17.61	0.54	94.07	4.70

Contd…

Series Name: Narasapura (NSP), Pedon: A2/RM-2

Location: $15^0$19'86.9"N, $75^0$57'86.1"E, Kavalura village, Koppal taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bangalore **Classification:** Very fine, smectitic, isohyperthermic (calc) Typic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-29	Ap	31.32	16.52	52.16	5.51	5.40	5.51	9.83	5.08	10	c	38.86	27.64
29-52	Bw1	13.30	22.08	64.62	2.52	2.41	2.41	3.67	2.29	05	c	49.88	40.05
52-77	BW2	13.22	17.39	69.40	3.56	2.41	1.95	2.76	2.53	05	c	51.33	41.55

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-29	9.16	-	-	0.615	0.23	9.36	-	-	0.72	10.98	-	51.09	0.98	-	21.49
29-52	8.69	-	-	2.01	0.5	8.64	-	-	0.55	24.42	-	60.63	0.94	-	40.27
52-77	8.52	-	-	2.68	0.46	7.68	-	-	0.50	25.65	-	60.74	0.88	-	42.24

Contd…

Series Name: Handrala (HDL), Pedon: A2/RM-1

Location: $15^0$19'69.8"N, $75^0$58'00"E, Kavalura village, Koppal taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bangalore **Classification:** Very fine, smectitic, isohyperthermic (calc) Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-25	Ap	21.68	16.62	61.70	4.42	3.98	3.43	5.64	4.20	10	c	41.36	31.27
25-50	Bss1	14.93	15.76	69.32	2.64	2.53	2.99	3.33	3.44	05	c	48.92	39.19
50-82	Bss2	23.11	16.60	60.29	4.51	3.61	6.31	4.74	3.95	05	c	42.46	33.85
82-117	Bss3	10.50	18.38	71.12	1.98	1.98	1.63	2.57	2.33	05	c	52.95	42.82

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}							%	%
0-25	9.06	-	-	0.371	0.16	4.80	-	-	0.80	7.93	-	62.33	1.01	-	12.72
25-50	9.09	-	-	0.719	0.2	7.20	-	-	0.42	14.94	-	67.10	0.97	-	22.26
50-82	9.28	-	-	0.47	0.19	9.36	-	-	0.47	11.59	-	60.21	1.00	-	19.26
82-117	8.76	-	-	1.55	0.36	8.64	-	-	0.11	2.28	-	25.33	0.36	-	9.02

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, 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 recognized 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/alkalinity or gravelliness and "c" indicates limitation due to climate.

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

The 31soil map units identified in the Halhalli microwatershed are grouped under two land capability classes and seven land capability subclasses (Fig. 5.1).

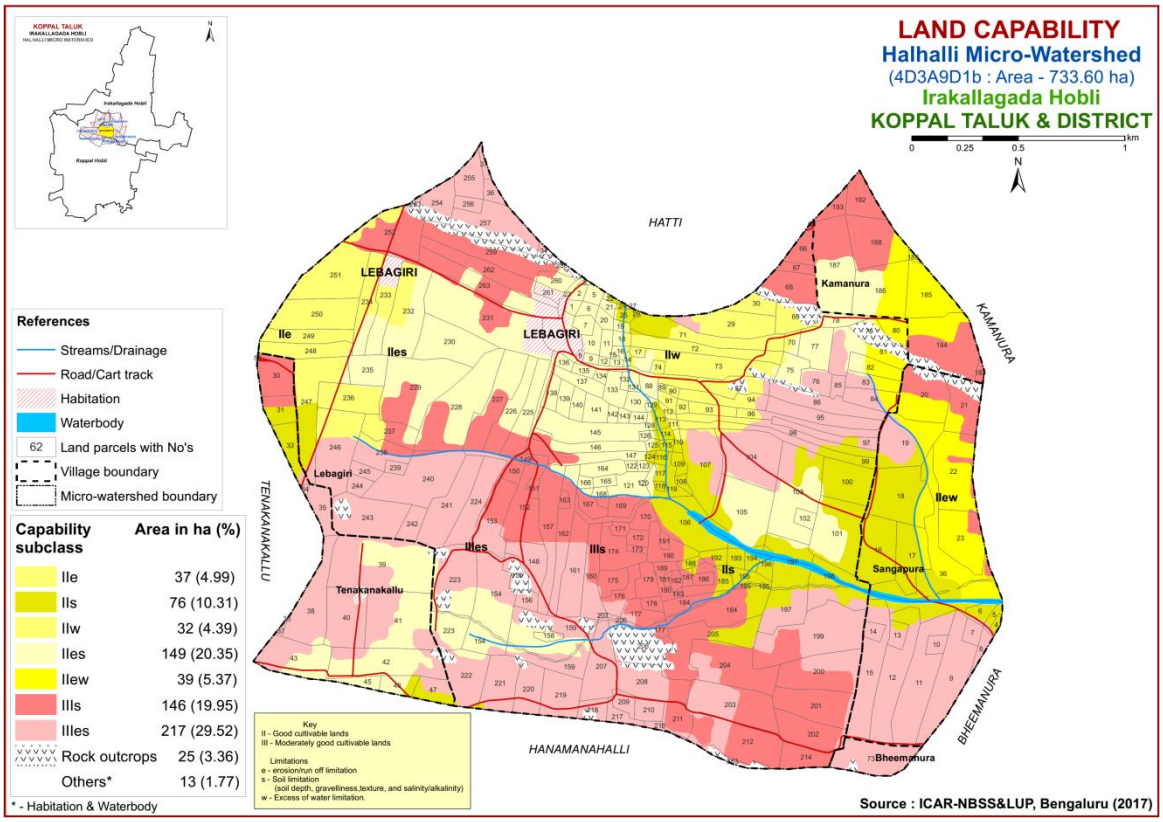


Fig. 5.1 Land Capability map of Halhalli Microwatershed

Entire area in the microwatershed is suitable for agriculture. Good cultivable lands (Class II) cover an area of about333 ha (45 %) and distributed in the western, central, northern and eastern part of the microwatershed with moderate problems of soil, erosion and drainage. Moderately good cultivable lands occupy maximum area of about 363 ha (49 %) and distributed in the major part of the microwatershed with severe limitations of soil and erosion.

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). The area extent and their geographical distribution in the microwatershed is given in Fig. 5.2

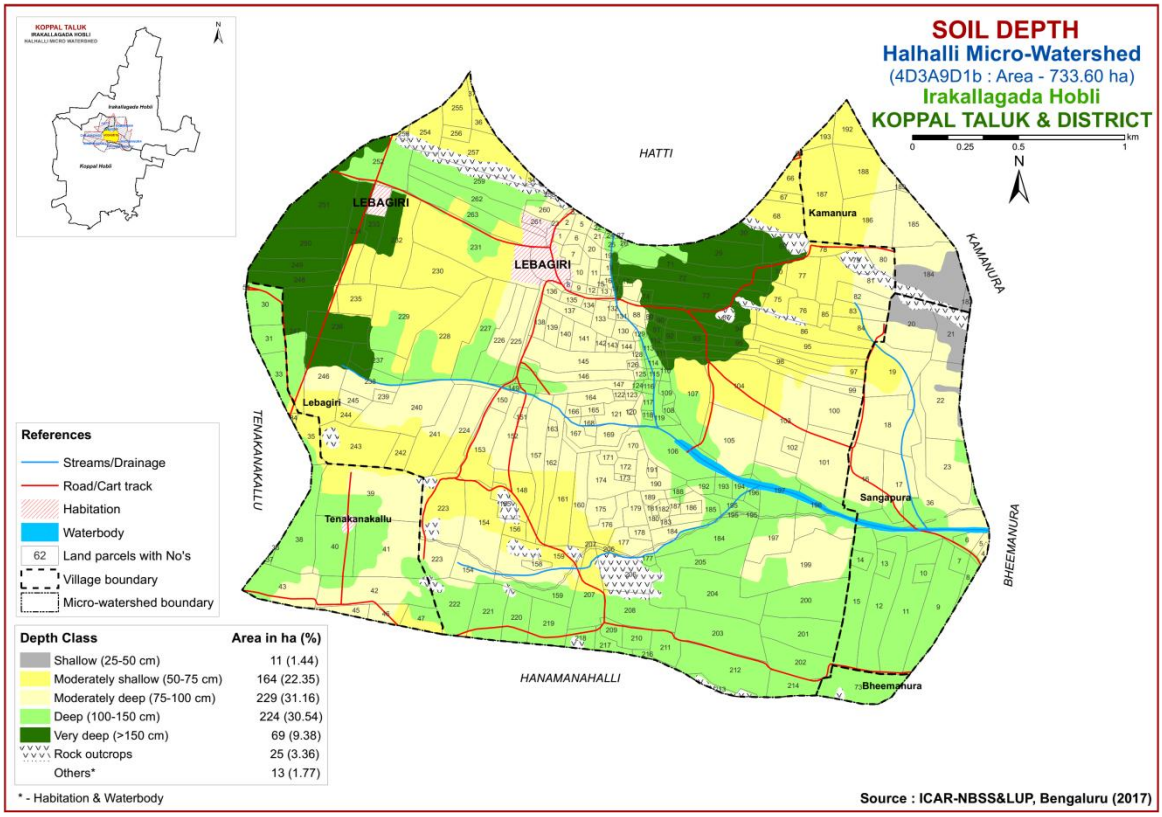


Fig. 5.2 Soil Depth map of Halhalli Microwatershed

Shallow soils (25-50 cm) occupy an area of about 11 ha (1%)and distributed in the eastern part of the microwatershed. Moderately shallow soils (50-75 cm) occupy about 164 ha (22%) and occur in the northern, central and western part of the microwatershed.

An area of about 229 ha (31%) is moderately deep (75-100 cm) and distributed in the southwestern, northern, central and eastern part of the microwatershed. Deep to Very deep (100->150 cm) soils occupy maximum area of about 293 ha (40%) and occur in the major part of the microwatershed.

The most productive lands cover about 293 ha (40%) where all climatically adapted long duration crops be grown. The problem lands cover about 11 ha (1%) where only short duration crops can be grown. The probability of crop failure is very high.

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 behavior, microbial activity and crop suitability. The textural classes used for LRI were used to classify and a surface soil texture map was generated. The area extent and their geographical distribution in the microwatershed is shown in Fig 5.3.

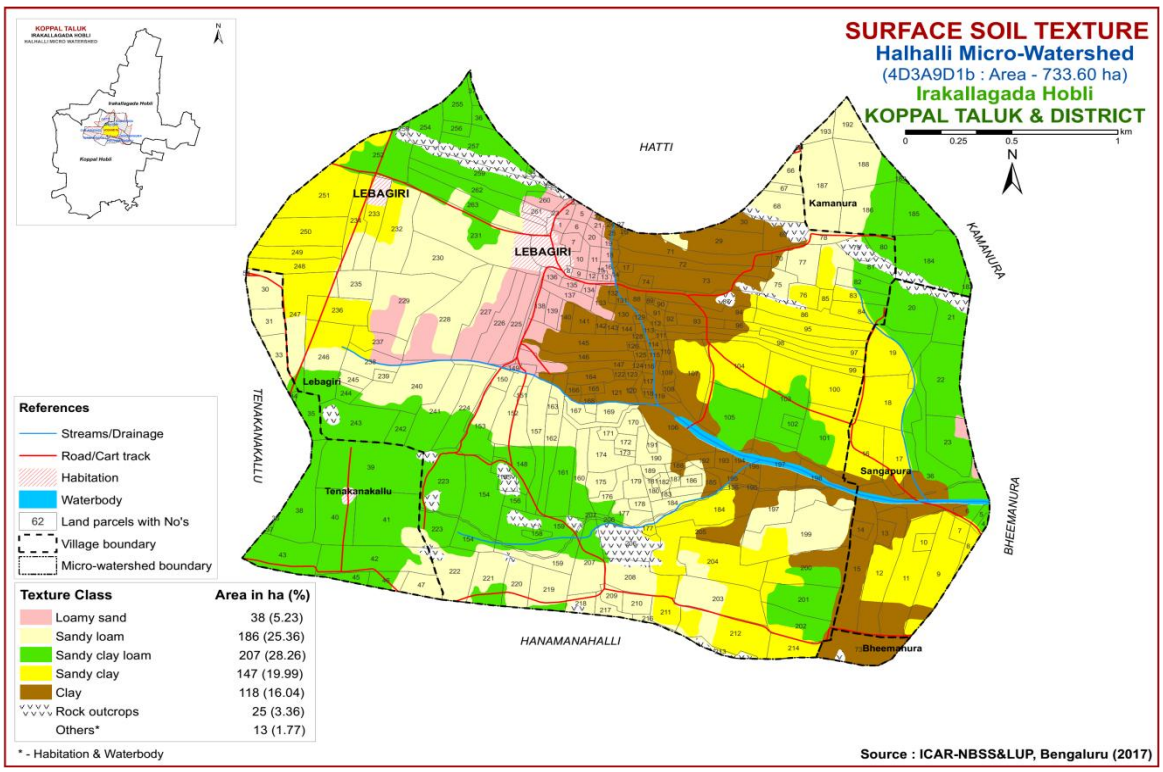


Fig. 5.3 Surface Soil Texture map of Halhalli Microwatershed

A small area of about 38 ha (5%) is sandy at the surface and distributed in the northern part of the microwatershed. Maximum area of about 393 ha (54%) is loamy at the surface and distributed in the major part of the microwatershed. An area of about 265

ha (36%) is clayey at the surface and distributed in the western, northern, central and southeastern part of the microwatershed.

The most productive lands with respect to surface soil texture are clayey soils (36%) that 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 area loamy (54%) soils which also have high potential for soil- water retention and nutrient availability but have no drainage or other physical problems. The problem soils are sandy covering 5 per cent area that have moisture and nutrient constraints.

5.4 Soil Gravelliness

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

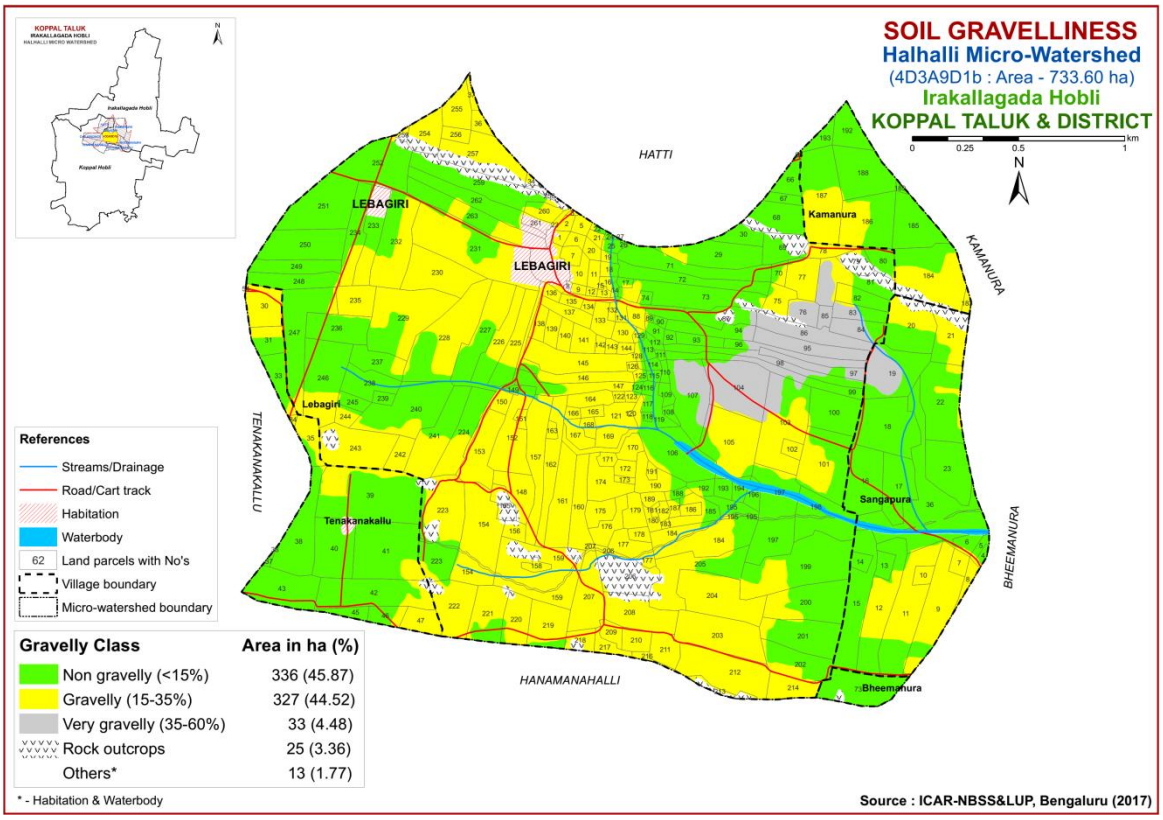


Fig. 5.4 Soil Gravelliness map of Halhalli Microwatershed

The soils that are non-gravelly (<15% gravel) cover an area of about 336 ha (46 %) and distributed in the western, northeastern, eastern, central and southeastern part of the microwatershed. An area of about 327 ha (45%) is covered by gravelly (15-35% gravel) soils and are distributed in the southern, northern and central part of the microwatershed. A small area of about 33 ha (4 %) is covered by very gravelly (35-60%) soils and distributed in the northeastern part of the microwatershed (Fig. 5.4).

The most productive lands with respect to gravelliness are found to be 47 per cent. They are non-gravelly with less than 15 per cent gravel and have potential for growing both annual and perennial crops. The problem soils that are very gravelly (35-60%) cover about 4 per cent where only short duration can be grown.

5.5 Available Water Capacity

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

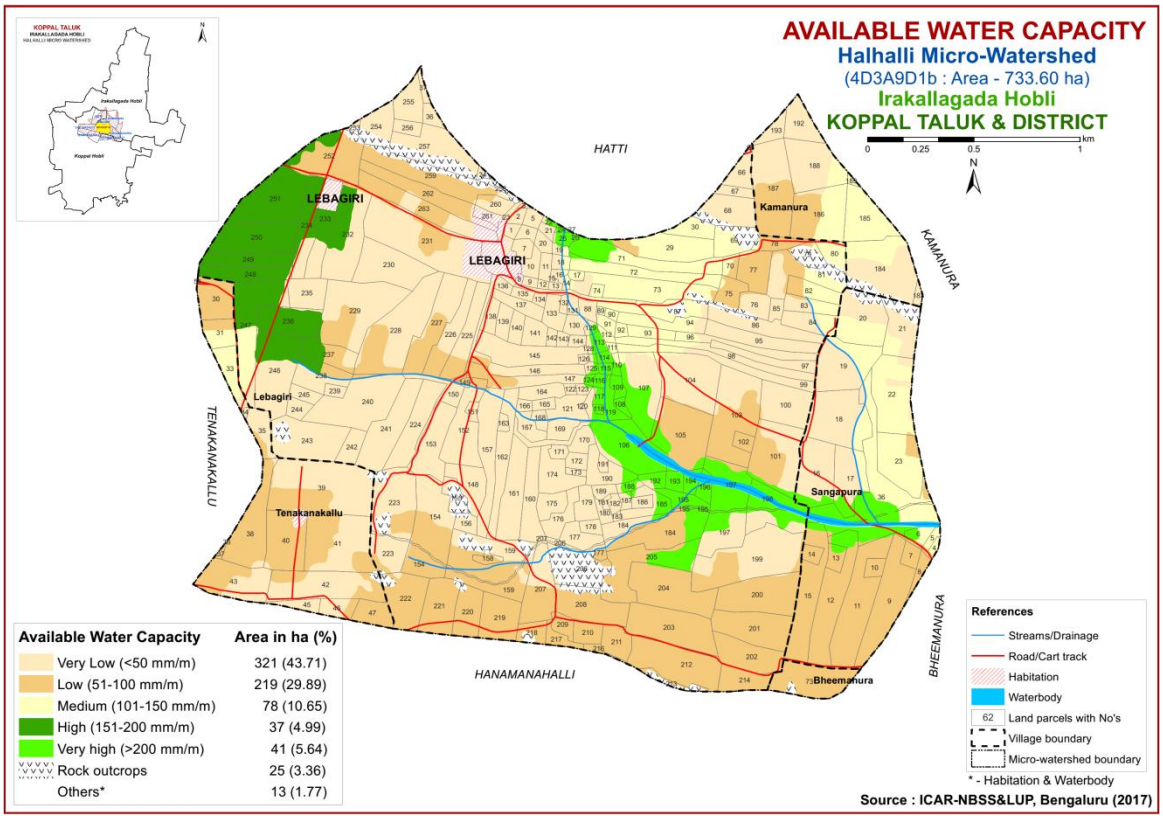


Fig. 5.5 Soil Available Water Capacity map of Halhalli Microwatershed

Maximum area of about 321 ha (44%) in the microwatershed has soils that are very low (<50 mm/m) in available water capacity and are distributed in the major part of the microwatershed. An area of about 219 ha (30%) has soils that are low (51 to 100 mm/m) in available water capacity and are distributed in the southern, central, northwestern and central part of the microwatershed. An area of about 78 ha (11%) has soils that are medium (101-150 mm/m) in available water capacity and are distributed in the western, northern and eastern part of the microwatershed. An area of about 78 ha (11%) is high to very high (>200 mm/min) in available water capacity and distributed in the western, northern, central and northeastern part of the microwatershed.

An area of about 321 ha (44%) 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 78 ha (11 %) has soils that have high potential (>200 mm/m) with regard to available water capacity where all climatically adapted long duration crops can be grown successfully.

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 two 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 42 ha (6%) falls under nearly level (0-1% slope) lands and distributed in the western and northern part of the microwatershed. Very gently sloping (1-3%) lands cover a maximum area of about 654 ha (89%) and distributed in the major part of the microwatershed. In all these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

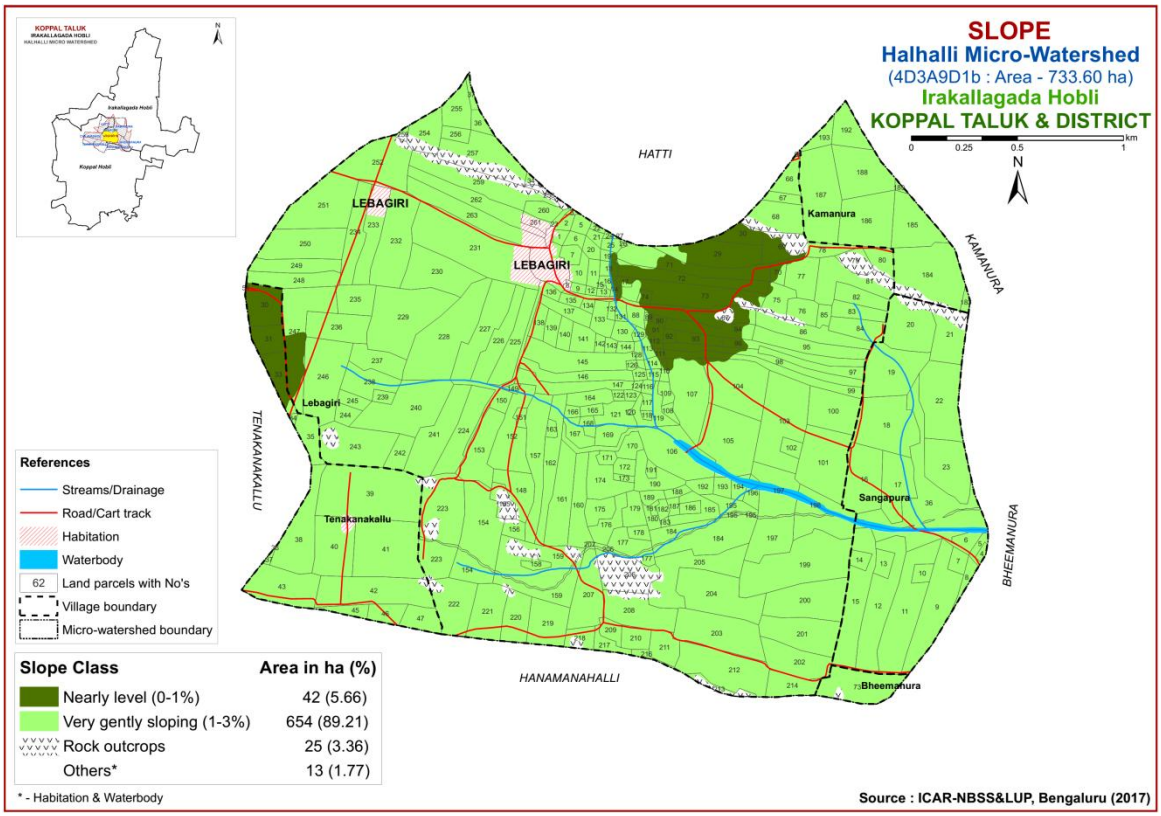


Fig. 5.6 Soil Slope map of Halhalli Microwatershed

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.

Slightly eroded lands cover an area of about 327 ha (45%) and distributed in the northeastern, eastern and central part of the microwatershed. An area of about 369 ha (50%) is moderately eroded (e2 class) and distributed in the major part of the microwatershed.

Moderately eroded lands are problematic and need appropriate soil and water conservation and other land development measures.

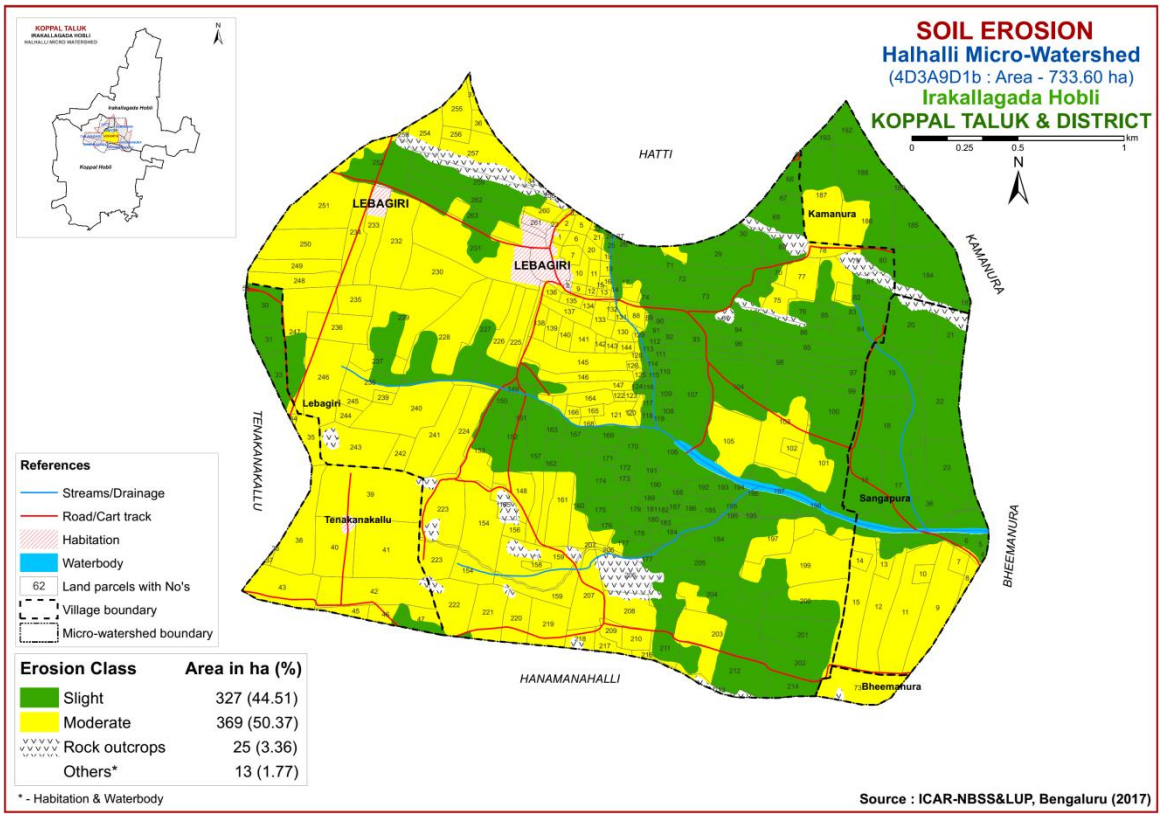


Fig. 5.7 Soil Erosion map of Halhalli Microwatershed

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 characterized 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 2017 were analyzed 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 by 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 Halhalli microwatershed for soil reaction (pH) showed that an area of about 16 ha (2%) is very strongly to strongly acid (pH 4.5-5.5) and distributed in the northern and southern part of the microwatershed. An area of about 200 ha (27%) is moderately acid to slightly acid (pH 5.5 -6.5) and distributed in the northern, southern and eastern part of the microwatershed. Neutral (pH 7.3-7.8), soils cover an area of about 183 ha (25%) and distributed in the central, eastern, western, southern and northern part of the microwatershed. Maximum area of about 265 ha (36%) is slightly alkaline to moderately alkaline (pH 7.3-8.4) and distributed in the major part of the microwatershed. An area of about 33 ha (4 %) is under strongly alkaline to very strongly alkaline (pH 8.4- >9.0) in reaction and distributed in the northern and central part of the microwatershed (Fig.6.1).

6.2 Electrical Conductivity (EC)

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

6.3 Organic Carbon

An area of about 79 ha (11 %) is low (<0.5%) in organic carbon and distributed in the major part of the microwatershed. An area of about 316 ha (43%) is medium (0.5-0.75%) in organic carbon content and distributed in the central, northern, western and southern part of the microwatershed. An area of about 301 ha (41%) is high in organic

carbon (>0.75%) and distributed in the central, northern, eastern and southwestern part of the microwatershed (Fig.6.3).

6.4 Available Phosphorus

A small area of about 1 ha (<1%) is low in available phosphorus and distributed in the northern part of the microwatershed. Maximum area of about 448 ha (61%) is medium (23-57 kg/ha) in available phosphorus and distributed in the major part of the microwatershed. Available phosphorus is high (>57 kg/ha) in an area of about 246 ha (34 %) and distributed in the northern, central, southeastern and northeastern part of the microwatershed. The areas with high phosphorus content may reduce 25 per cent from the RDF to avoid the excess application of fertilizer and apply additional 25 % phosphorus in areas where it is low or medium (Fig 6.4).

6.5 Available Potassium

An area of about 20 ha (3%) is low (<145 kg/ha) in available potassium and distributed in the northern and central part of the microwatershed. Maximum area of about 553 ha (75%) is medium (145-337 kg/ha) in available potassium content and distributed in the major part of the microwatershed. An area of about 123 ha (17 %) is high in available potassium content and distributed in the northern, western and southeastern part of the microwatershed. The areas with high potassium content needs to reduce 25 per cent from the recommended dose to avoid the excess application of fertilizer and apply additional 25% potassium in areas where it is low or medium (Fig 6.5).

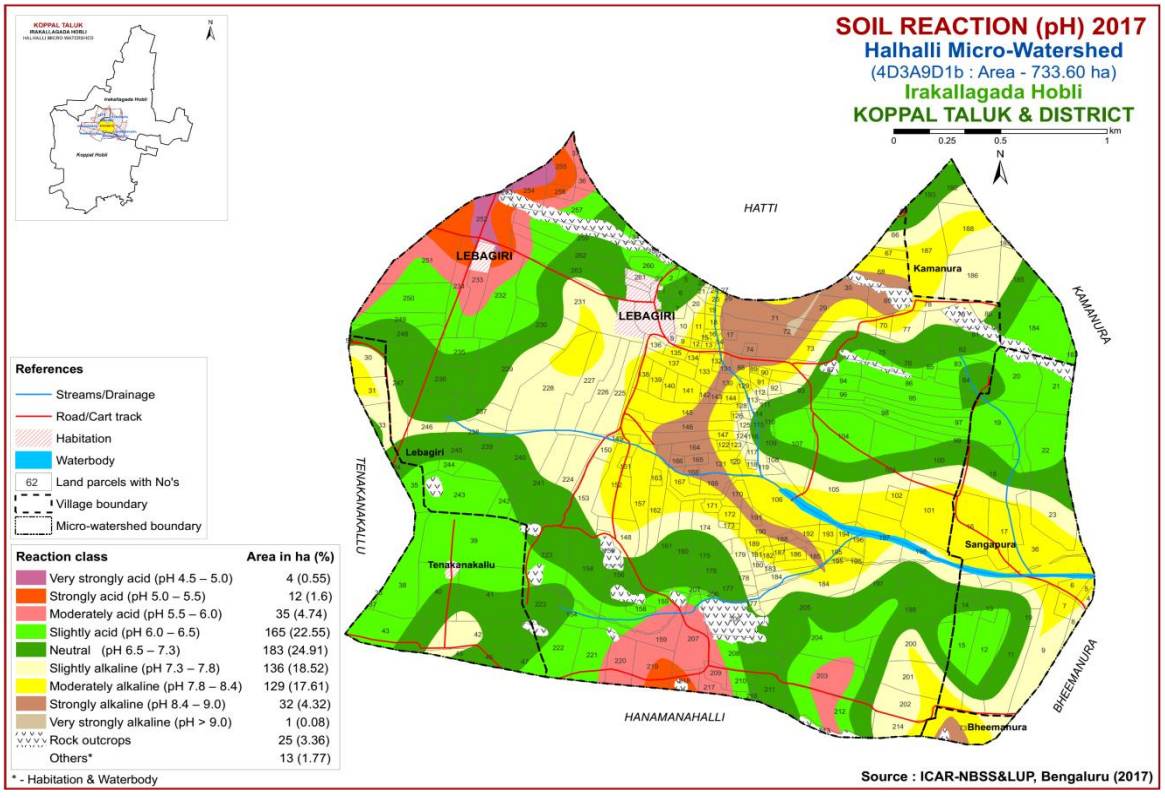


Fig.6.1 Soil Reaction (pH) map of Halhalli Microwatershed

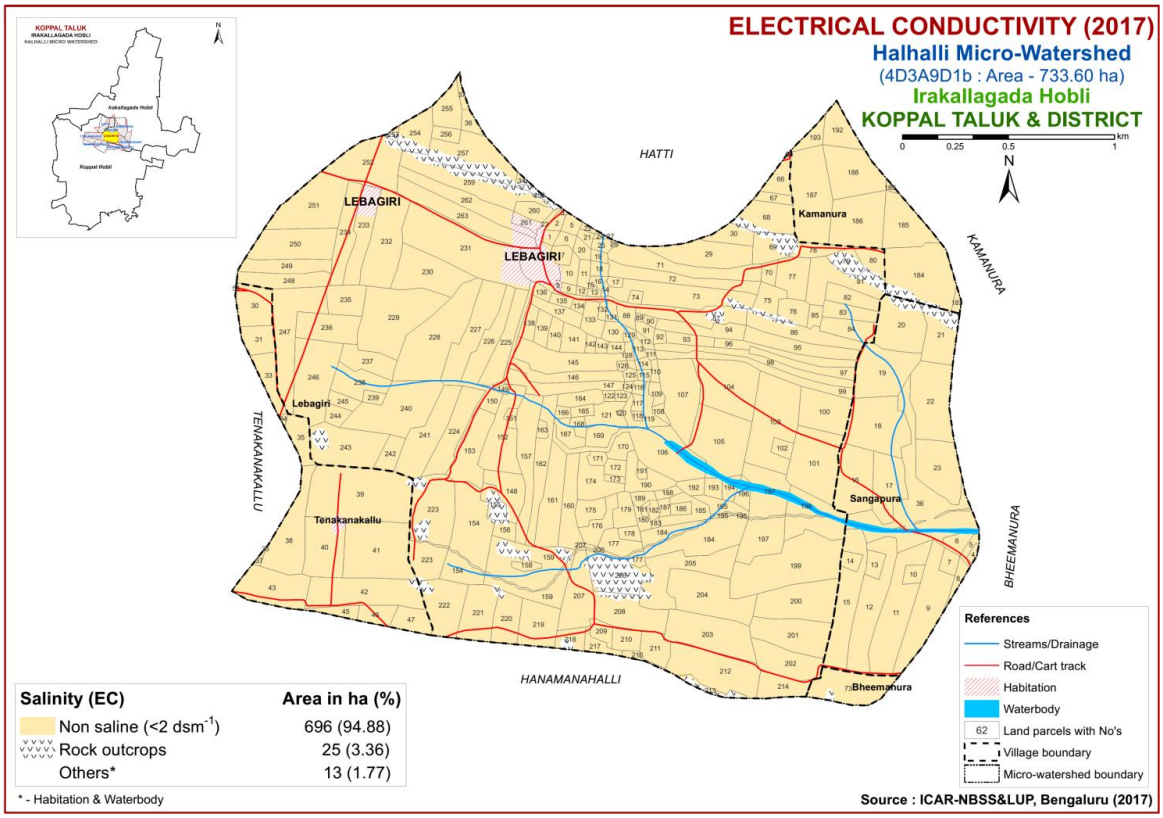


Fig.6.2 Electrical Conductivity (EC) map of Halhalli Microwatershed

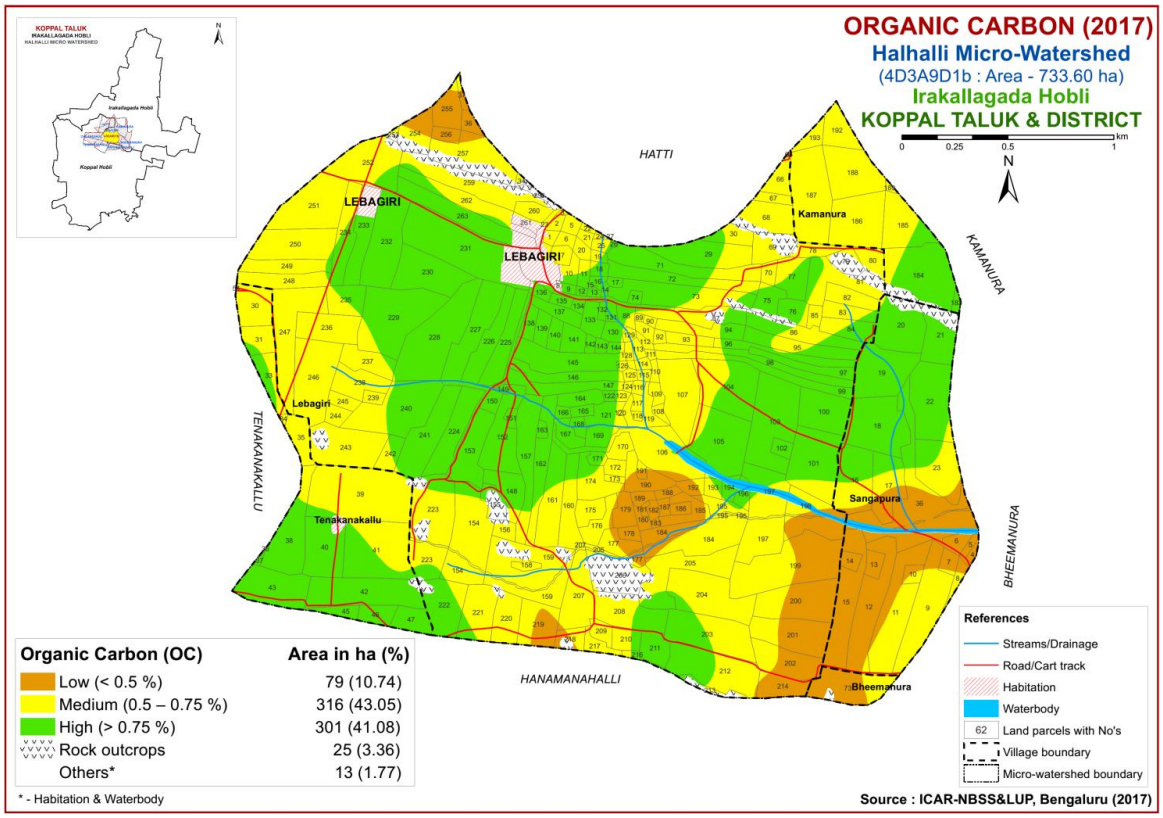


Fig.6.3 Soil Organic Carbon map of Halhalli Microwatershed

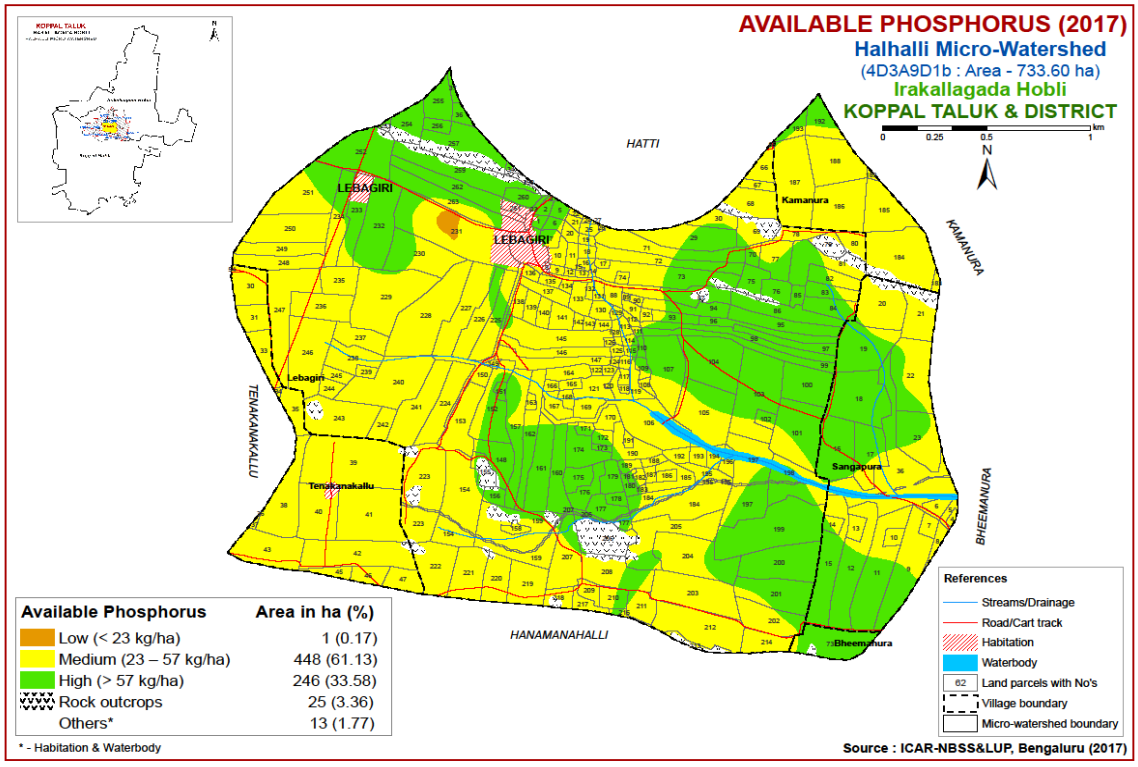


Fig.6.4 Soil Available Phosphorus map of Halhalli Microwatershed

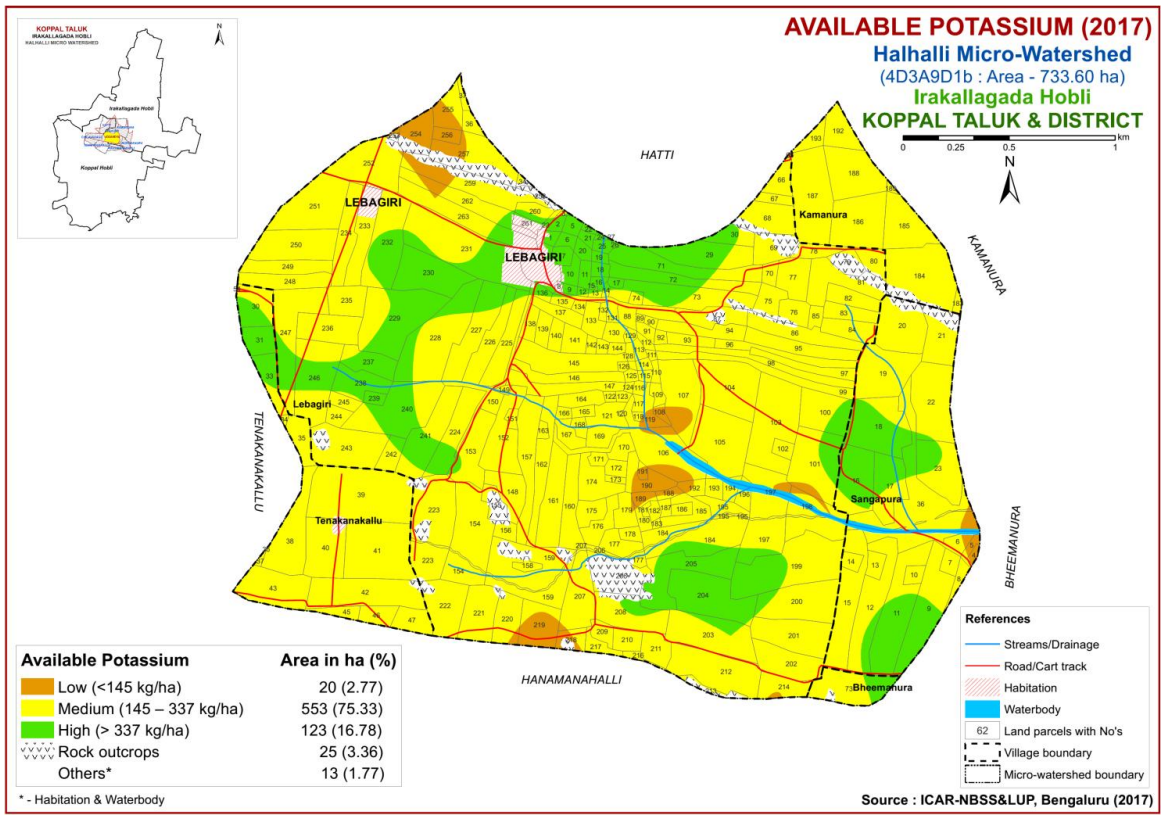


Fig.6.5 Soil Available Potassium map of Halhalli Microwatershed

6.6 Available Sulphur

Soil analysis of available sulphur content in Halhalli microwatershed showed that an area of about 184 ha (25%) is low (<10 ppm) in available sulphur content and distributed in the southern and central part of the microwatershed. An area of about 268 ha (37 %) is medium (10-20 ppm) and distributed in the major part of the microwatershed. An area of about 244 ha (33%) is high (>20ppm) in available sulphur and distributed in the northwestern, northern and eastern part of the microwatershed (Fig.6.6). The areas that are low and medium in available sulphur need to be applied with magnesium sulphate or gypsum or factamphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.

6.7 Available Boron

Soil analysis of available boron content in Halhalli microwatershed showed that maximum area of about 451 ha (62 %) is low (<0.5ppm) in available boron content and distributed in the major part of the microwatershed. An area of about 245 ha (33%) is medium (0.5-1.0ppm) in available boron content and distributed in the eastern, central and northern part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content in the soils of the Halhalli microwatershed is deficient (<4.5 ppm) in an area of about 358 ha (49%) and distributed in the major part. An area of about 338 ha (46 %) showed sufficiency (>4.5 ppm) with respect to iron content and distributed in the western, southern and eastern part of the microwatershed (Fig 6.8).

6.9 Available Manganese

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

6.10 Available Copper

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

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in a maximum area of about 594 ha (81%) and distributed in the major part of the microwatershed. An area of about 102 ha (14 %) is sufficient (>0.6) in available zinc content and distributed in the northern, northeastern, central and southern part of the microwatershed (Fig 6.11).

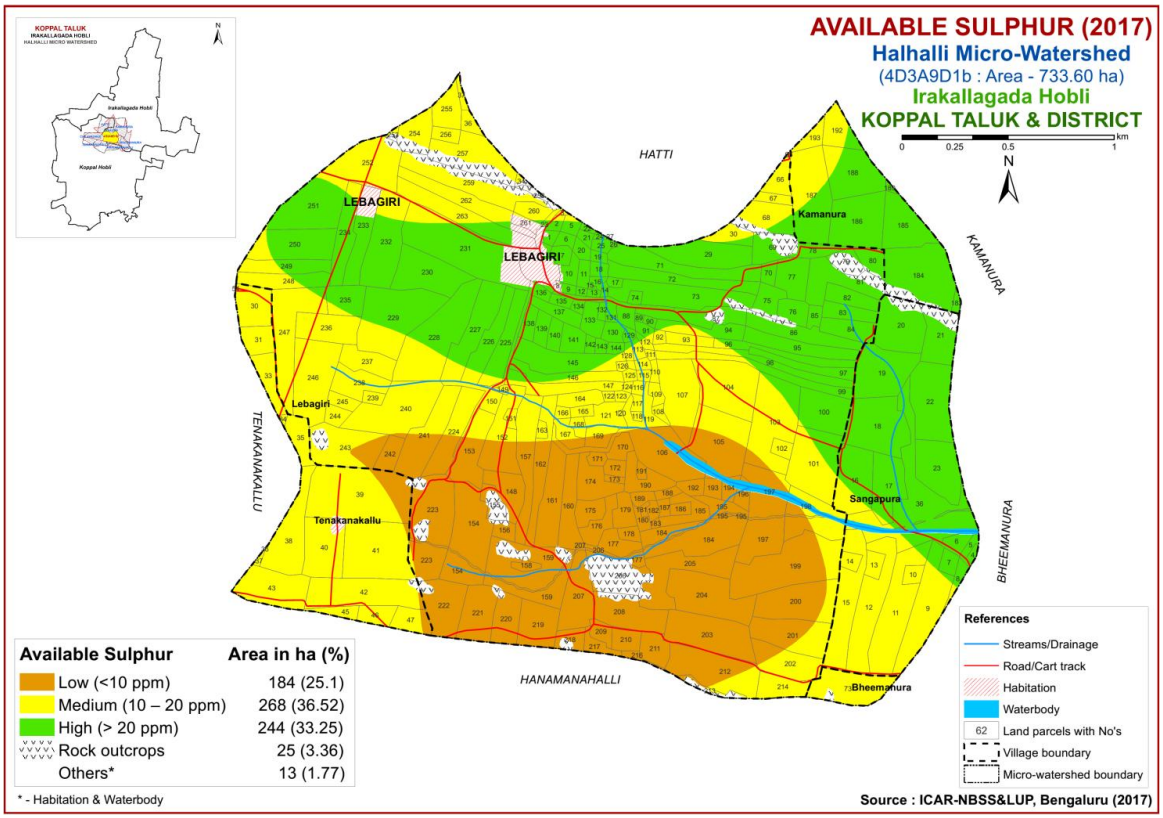


Fig.6.6 Soil Available Sulphur map of Halhalli Microwatershed

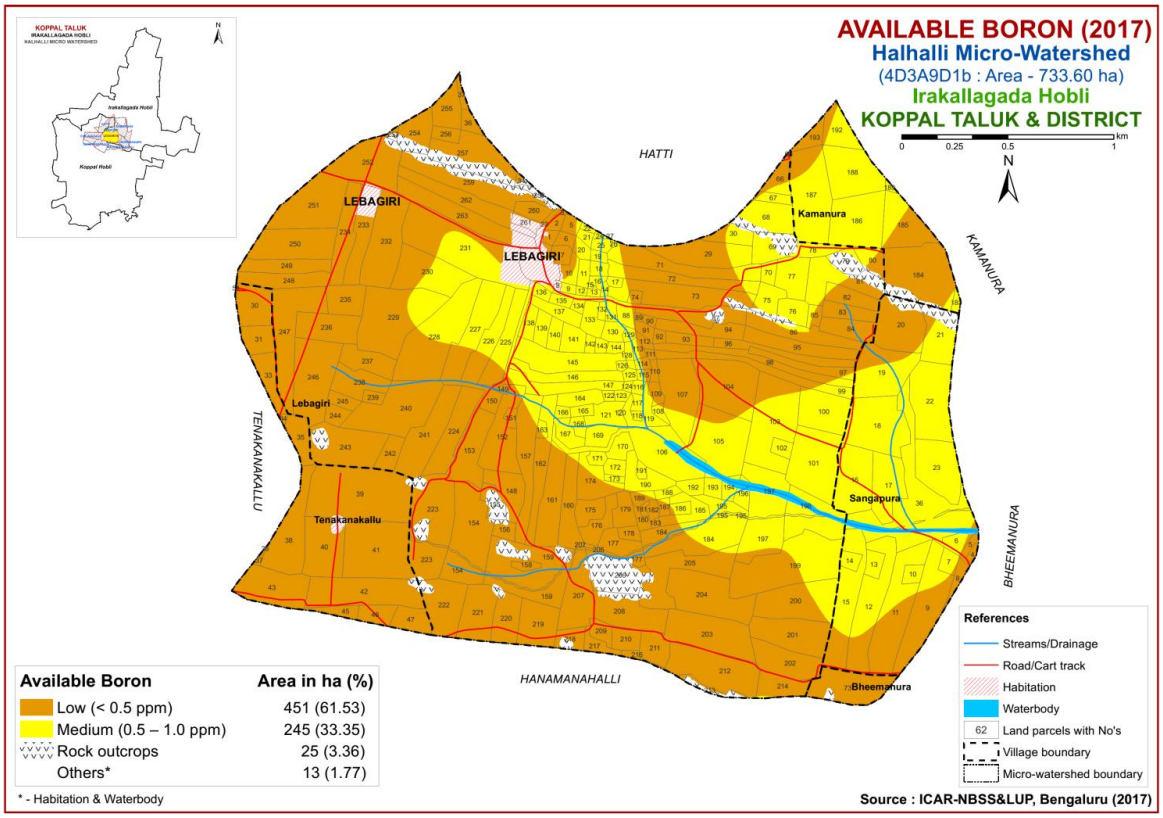


Fig.6.7 Soil Available Boron map of Halhalli Microwatershed

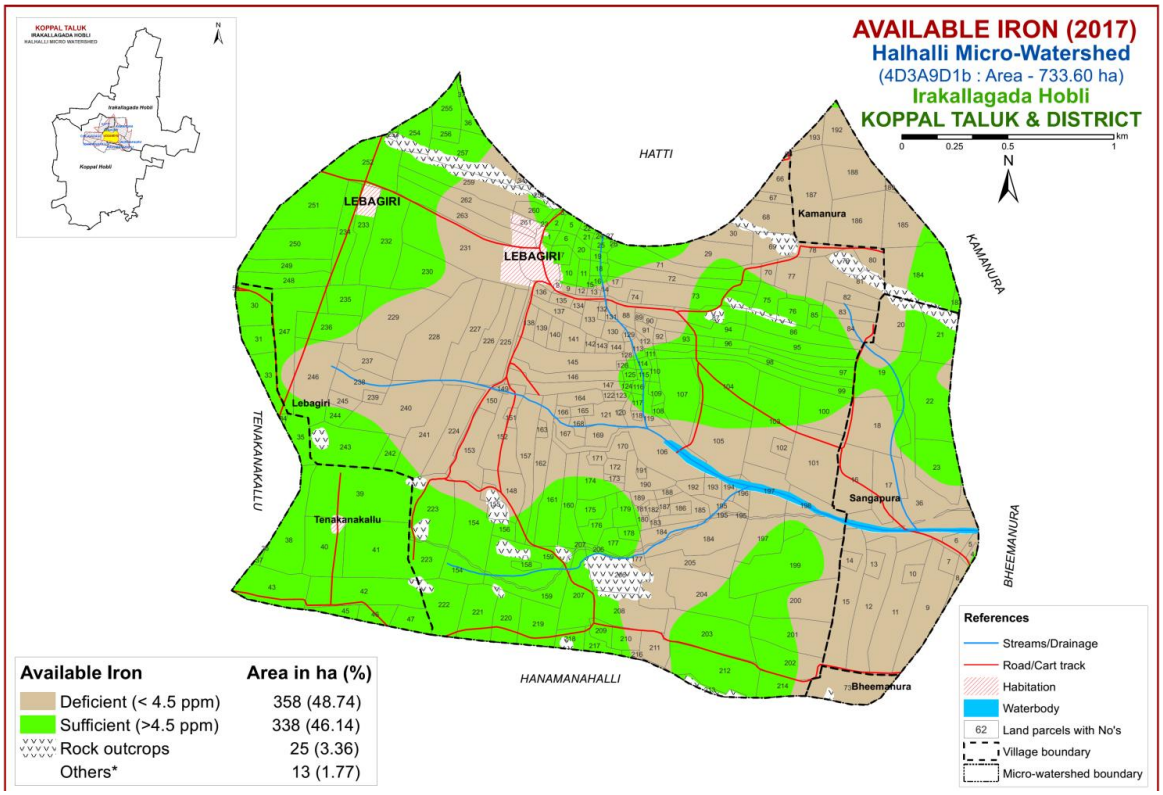


Fig.6.8 Soil Available Iron map of Halhalli Microwatershed

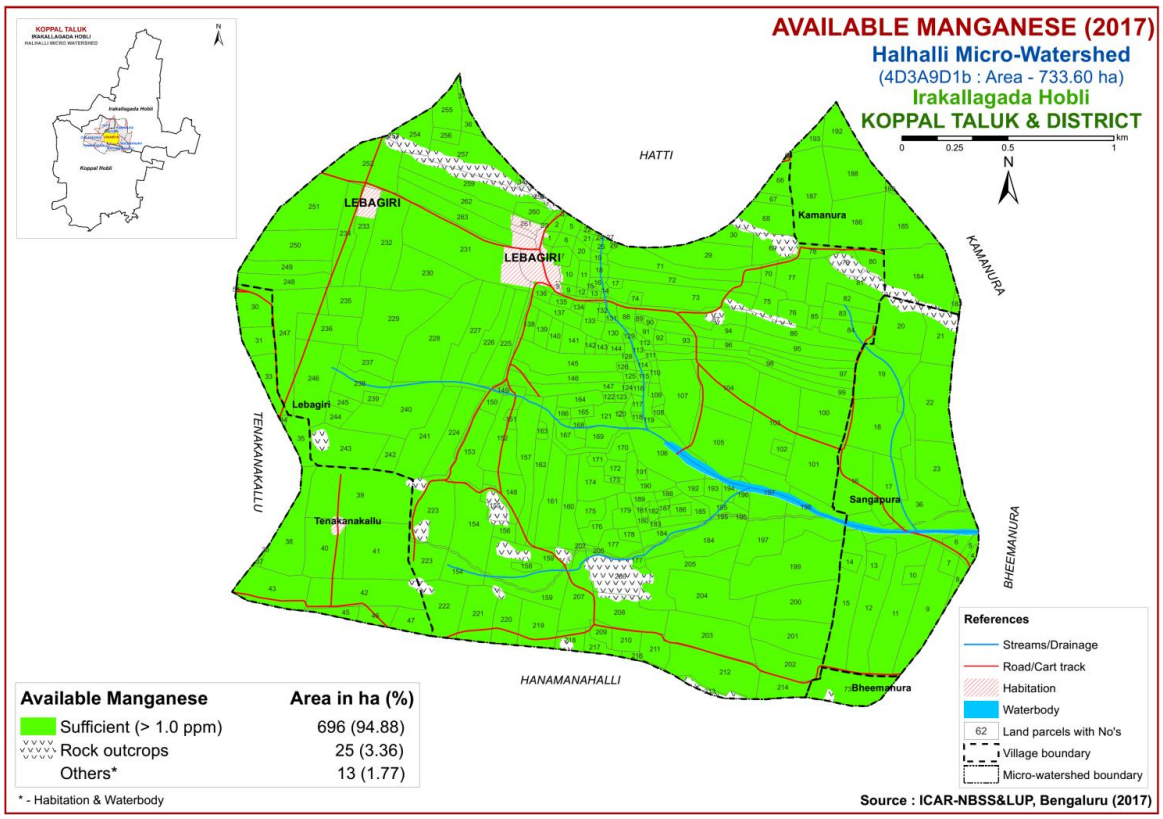


Fig.6.9 Soil Available Manganese map of Halhalli Microwatershed

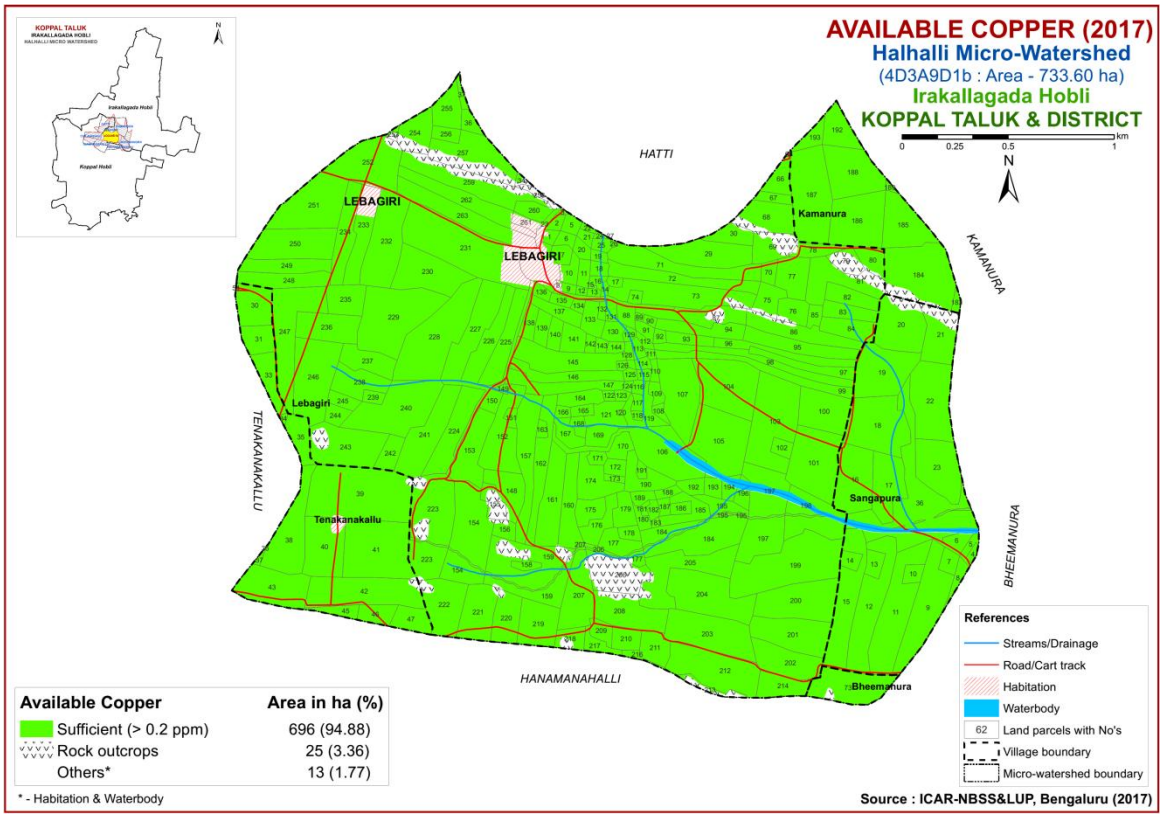


Fig.6.10 Soil Available Copper map of Halhalli Microwatershed

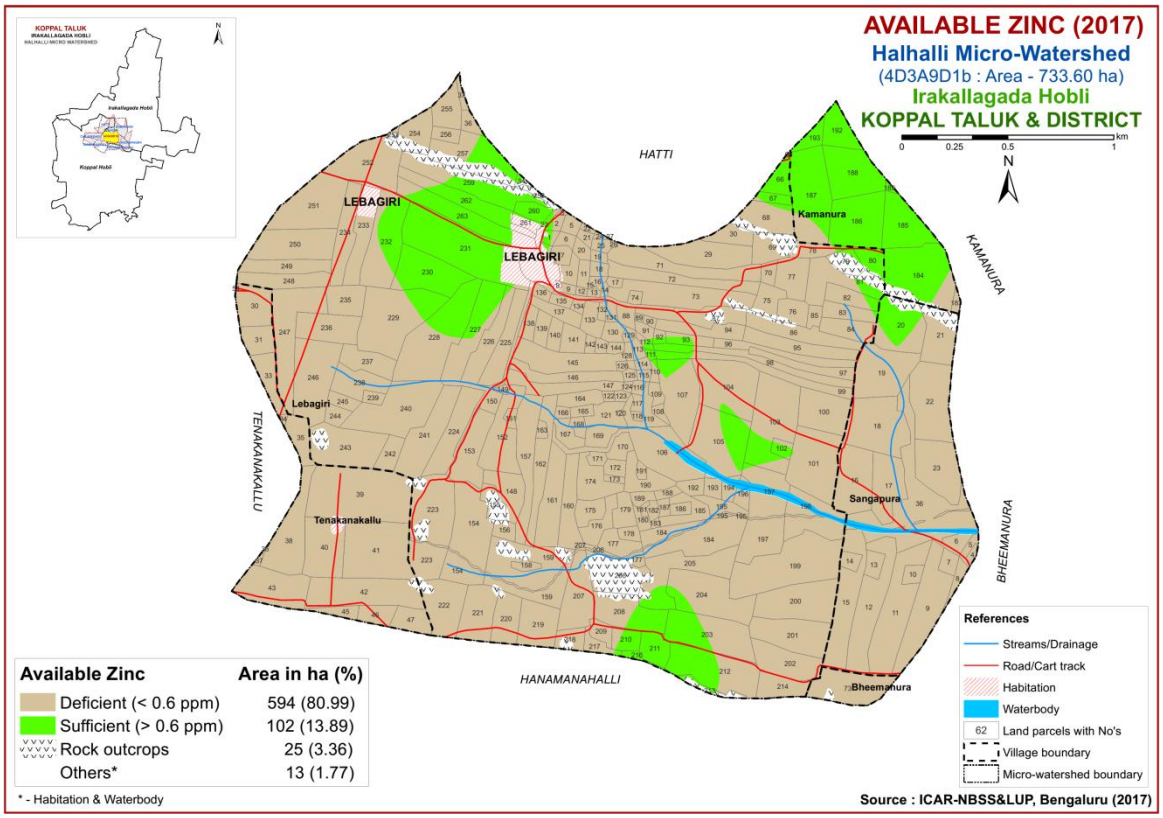


Fig.6.11 Soil Available Zinc map of Halhalli Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Halhalli 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 crop requirements were matched with the soil and land characteristics (Table 7.1) to arrive at the crop suitability. In FAO land suitability classification, two orders are recognized. Order S-Suitable and Order N-Not suitable. The orders have classes, subclasses and units. Order-S has three classes, Class S1- Highly Suitable, Class S2- Moderately Suitable and Class S3- Marginally Suitable. Order N has two Classes, N1- Currently not Suitable and N2- Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2, S3 and N1 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 28 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 crops 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 a land suitability map for growing sorghum was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.1.

Highly suitable (Class S1) lands occupy an area of about 84ha (12 %) for growing sorghum and occur in the western part of the microwatershed. An area of about 81 ha (11%) is moderately suitable (Class S2) for growing sorghum and distributed in the northeastern, eastern and central part of the microwatershed with minor limitations of gravelliness, drainage and rooting depth.

Table 7.1 Soil-Site Characteristics of Halhalli 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 (dSm^{-1})	ESP	CEC [Cmol (p^{+})kg^{-1}]	BS (%)
					Surf-ace	Sub-surface	Sur-face	Sub-surface								
HRVhB1g1	662	<90	WD	25-50	scl	gscl	15-35	>35	<50	1-3	slight	-	-	-	-	-
LKRcB2g1	662	<90	WD	50-75	sl	gsc	15-35	40-60	51-100	1-3	moderate	8.18	0.30	4.51	12.19	100
LKRiB1g2	662	<90	WD	50-75	sc	gsc	35-60	40-60	51-100	1-3	slight	8.18	0.30	4.51	12.19	100
LKRcB1	662	<90	WD	50-75	sl	gsc	-	40-60	51-100	1-3	slight	8.18	0.30	4.51	12.19	100
LKRhB2g1	662	<90	WD	50-75	scl	gsc	15-35	40-60	51-100	1-3	moderate	8.18	0.30	4.51	12.19	100
TDHcB2g1	662	<90	WD	50-75	sl	sc-c	15-35	<15	101-150	1-3	moderate	9.19	0.18	14.57	3.57	100
KTPcB1g1	662	<90	WD	50-75	sl	scl	15-35	15-35	101-150	1-3	slight	-	-	-	-	-
HDHbB2g1	662	<90	WD	75-100	ls	gsc-gc	15-35	>35	51-100	1-3	moderate	6.54	0.07	7.11	5.84	84.07
HDHhB2	662	<90	WD	75-100	scl	gsc-gc	-	>35	51-100	1-3	moderate	6.54	0.07	7.11	5.84	84.07
HDHiB1	662	<90	WD	75-100	sc	gsc-gc	-	>35	51-100	1-3	slight	6.54	0.07	7.11	5.84	84.07
HDHmB2g1	662	<90	WD	75-100	c	gsc-gc	15-35	>35	51-100	1-3	moderate	6.54	0.07	7.11	5.84	84.07
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	73.00
BDGcB1g1	662	<90	WD	75-100	sl	gc	15-35	35-60	<50	1-3	slight	6.24	0.06	0.35	3.76	52.56
BDGcB2	662	<90	WD	75-100	sl	gc	-	35-60	<50	1-3	moderate	6.24	0.06	0.35	3.76	52.56
KMHcA1	662	<90	WD	100-150	sl	scl-sc	-	<15	150-200	0-1	slight	7.2	0.19	0.54	15.07	100
BPRcA1g1	662	<90	WD	100-150	sl	gsc-gc	15-35	>35	51-100	0-1	slight	6.64	0.03	0.51	5.45	63.48
BPRcB2g1	662	<90	WD	100-150	sl	gsc-gc	15-35	>35	51-100	1-3	moderate	6.64	0.03	0.51	5.45	63.48
BPRhB2	662	<90	WD	100-150	scl	gsc-gc	-	>35	51-100	1-3	moderate	6.64	0.03	0.51	5.45	63.48
BPRiB1g1	662	<90	WD	100-150	sc	gsc-gc	15-35	>35	51-100	1-3	slight	6.64	0.03	0.51	5.45	63.48
BPRmB2	662	<90	WD	100-150	c	gsc-gc	-	>35	51-100	1-3	moderate	6.64	0.03	0.51	5.45	63.48
NGPbB1	662	<90	WD	100-150	ls	gsc-gc	-	>35	51-100	1-3	slight	-	-	-	-	-
NGPcB2g1	662	<90	WD	100-150	sl	gsc-gc	15-35	>35	51-100	1-3	moderate	-	-	-	-	-
NGPhB1	662	<90	WD	100-150	scl	gsc-gc	-	>35	51-100	1-3	slight	-	-	-	-	-
NGPhB2	662	<90	WD	100-150	scl	gsc-gc	-	>35	51-100	1-3	moderate	-	-	-	-	-
NGPiB2g1	662	<90	WD	100-150	sc	gsc-gc	15-35	>35	51-100	1-3	moderate	-	-	-	-	-
RTRiB2	662	<90	WD	>150	sc	c	-	-	151-200	1-3	moderate	5.08	0.03	2.06	9.21	50.50
NSPhB1	662	<90	MWD	75-100	scl	c	-	-	101-150	1-3	slight	9.16	0.61	21.49	51.09	-
HDLmB1	662	<90	WD	100-150	c	c	-	-	>200	1-3	slight	9.06	0.37	12.72	62.33	-
HLPhB1	662	<90	WD	75-100	scl	sc	-	-	50-100	1-3	slight	-	-	-	-	-
TDGmA1	662	<90	WD	>150	c	scl-sl	-	-	101-150	0-1	slight	7.02	0.05	1.44	5.77	100

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

Maximum area of about 530 ha (72 %) is marginally suitable for growing sorghum and distributed in the major part of the microwatershed. They have moderate limitations of gravelliness, rooting depth and texture.

Table 7.2 Crop suitability criteria for Sorghum

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

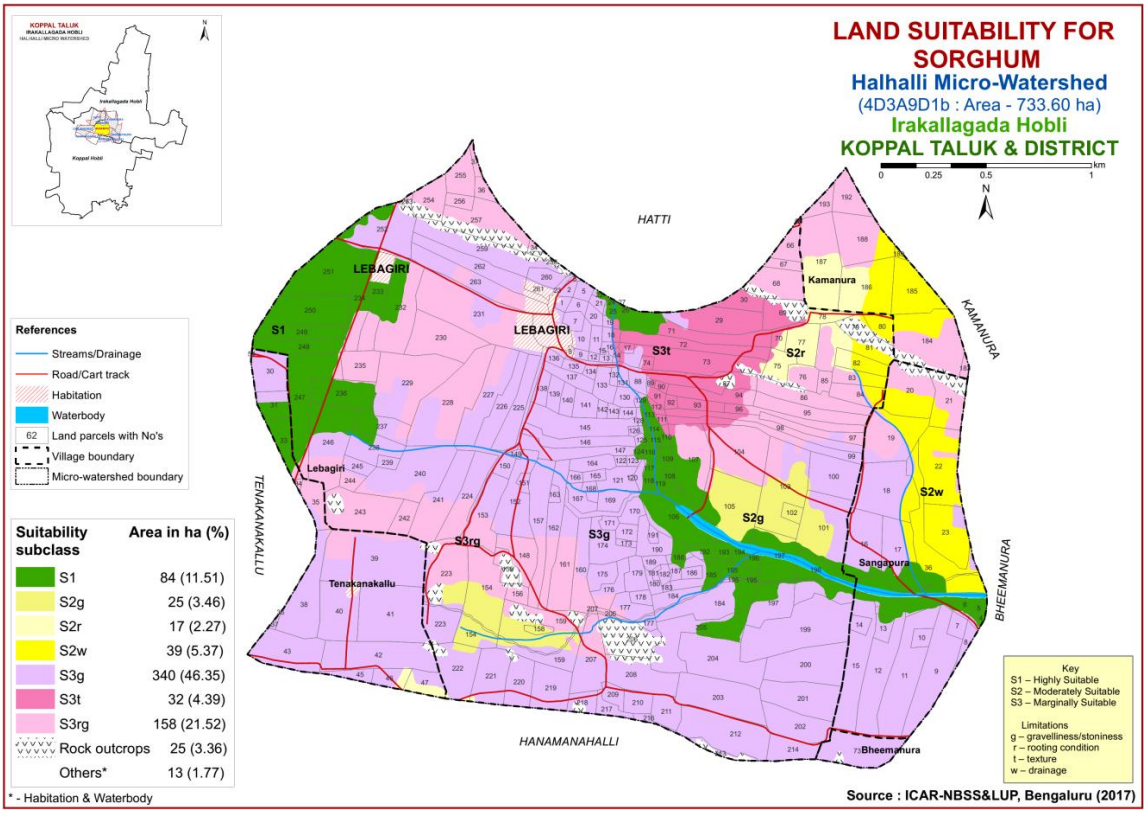


Fig. 7.1 Land Suitability map of Sorghum

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 are given in Figure 7.2.

Table 7.3 Crop suitability criteria for Maize

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

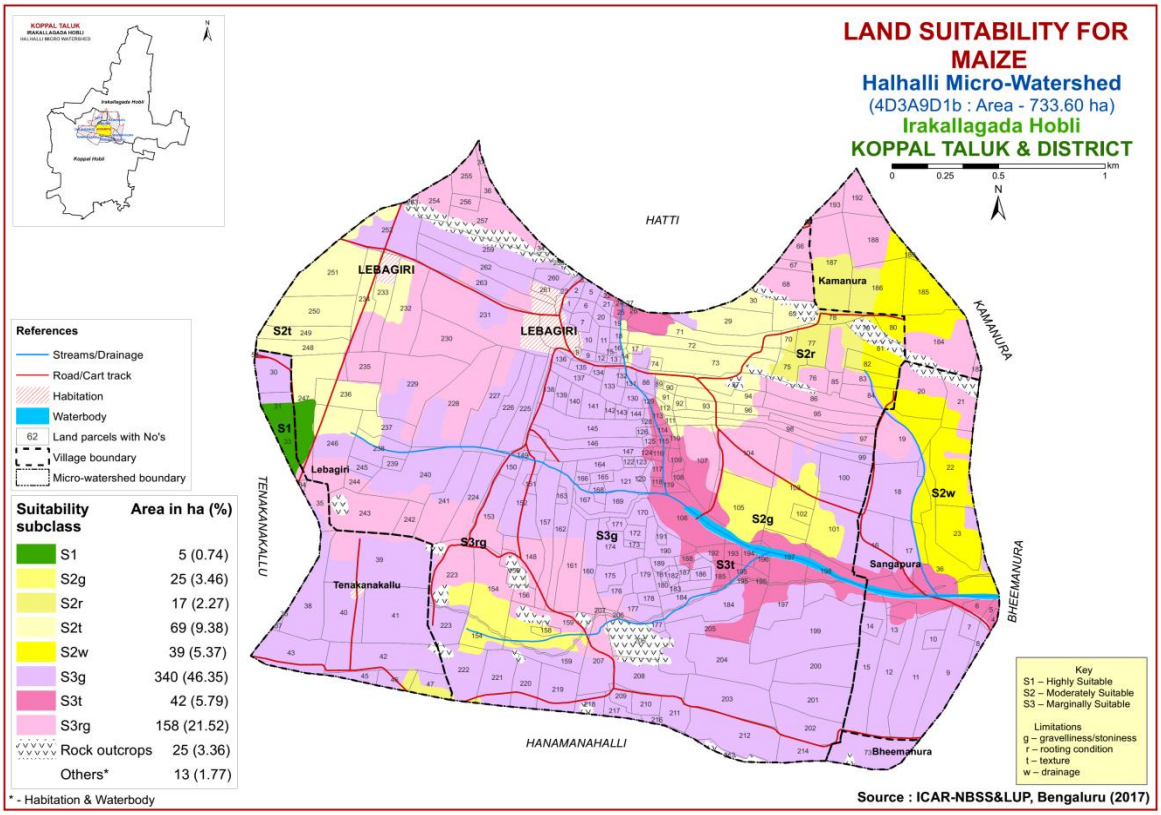


Fig. 7.2 Land Suitability map of Maize

Highly suitable (Class S1) lands occupy an area of about 5 ha (<1 %) for growing maize and occur in western part of the microwatershed. An area of about 150 ha (20%) is moderately suitable (Class S2) for growing maize and distributed in the northeastern, eastern, western, southern and central part of the microwatershed with minor limitations of gravelliness, drainage, texture and rooting depth. Maximum area of about 540 ha (74 %) is marginally suitable for growing maize and distributed in the major part of the

microwatershed. They have moderate limitations of gravelliness, rooting depth and texture.

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 a 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.

Highly suitable (Class S1) lands occupy an area of about 67 ha (9 %) for growing bajra and occur in the western and central part of the microwatershed. Maximum area of about 330 ha (45%) is moderately suitable (Class S2) for growing bajra and distributed in the major part of the microwatershed with minor limitations of gravelliness, drainage, texture and rooting depth. Maximum area of about 298 ha (41 %) is marginally suitable for growing maize and distributed in the southern, central, northern and eastern part of the microwatershed. They have moderate limitations of gravelliness, rooting depth and texture.

Table 7.4 Crop suitability criteria for Bajra

Crop requirement		**Rating**			
Soil –site characteristics	**Unit**	**Highly suitable (S1)**	**Moderately suitable(S2)**	**Marginally suitable (S3)**	**Not suitable (N)**
Slope	%	2-3	3-8	8-15	>15
LGP	Days	120-150	120-90	<90	
Soil drainage	Class	Well to mod.Well drained	imperfect	Poorly/ excessively	V.poorly
Soil reaction	pH	5.5-8.0	5.0-5.5 7.8-8.4	8.4-9.0	>9.0
Surface soil texture	Class	c(red), sicl, sc,sl, cl	l, c (black) scl, sil, sic	sl, ls	S, fragmental skeletal
Soil depth	cm	100-75	50-75	25-50	<25
Gravel content	% vol.	15-35	35-60	60-80	-
Salinity (EC)	dSm^{-1}	2-4	4-8	8-10	>10
Sodicity (ESP)	%	5-8	8-10	10-15	>15

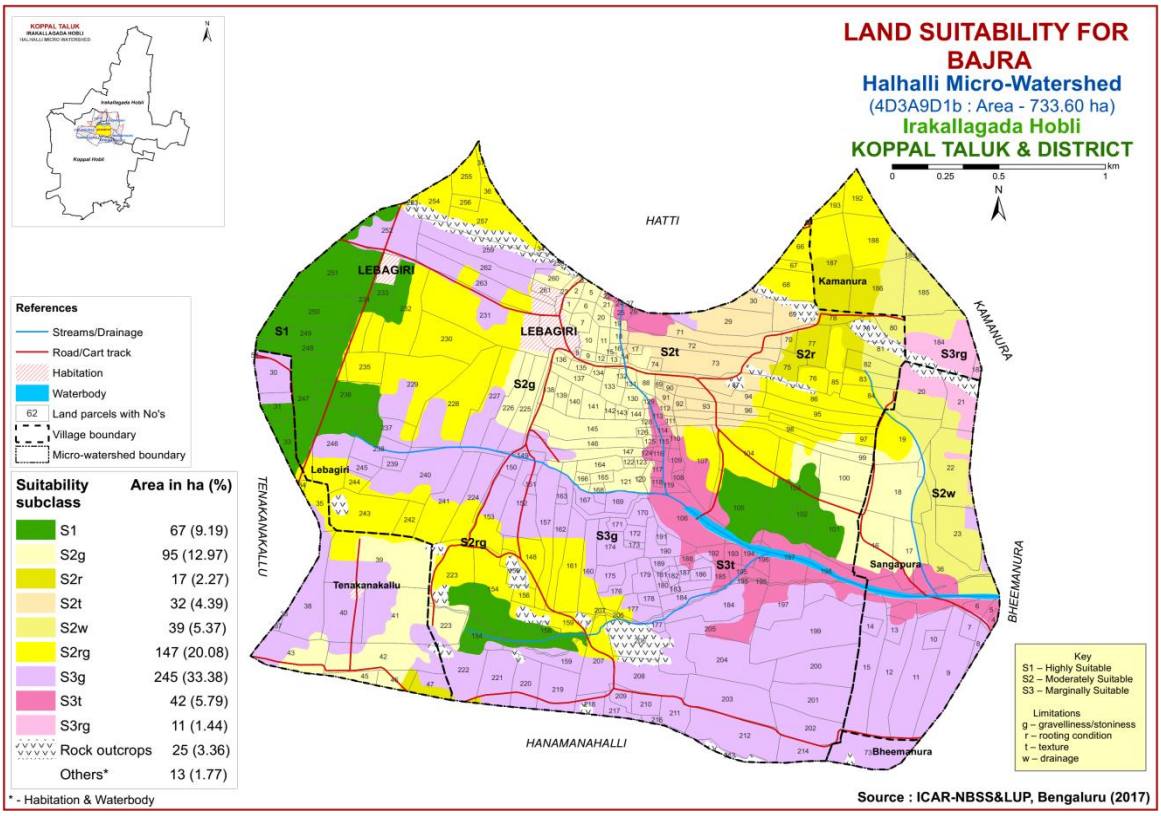


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Redgram (*Cajanus cajana*)

Redgram is one of the most important pulse crop grown in an area of 7.28 lakh ha in almost all the districts of the State. The crop requirements for growing redgram (Table 7.5) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing redgram was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.4.

Highly suitable (Class S1) lands for growing redgram cover an area of about 42ha (6%) and distributed in the western part of the microwatershed.. An area of about 106 ha (15 %) is moderately suitable (Class S2) for growing redgram and occur in the eastern, central and southern part of the microwatershed. They have minor limitations of texture, rooting depth, gravelliness and drainage. Marginally suitable lands (Class S3) occupy a maximum area of about 536 ha (73 %) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and texture. Area not suitable (class N1) for growing redgram cover about 11 ha (1%) and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.5 Crop suitability criteria for Red gram

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

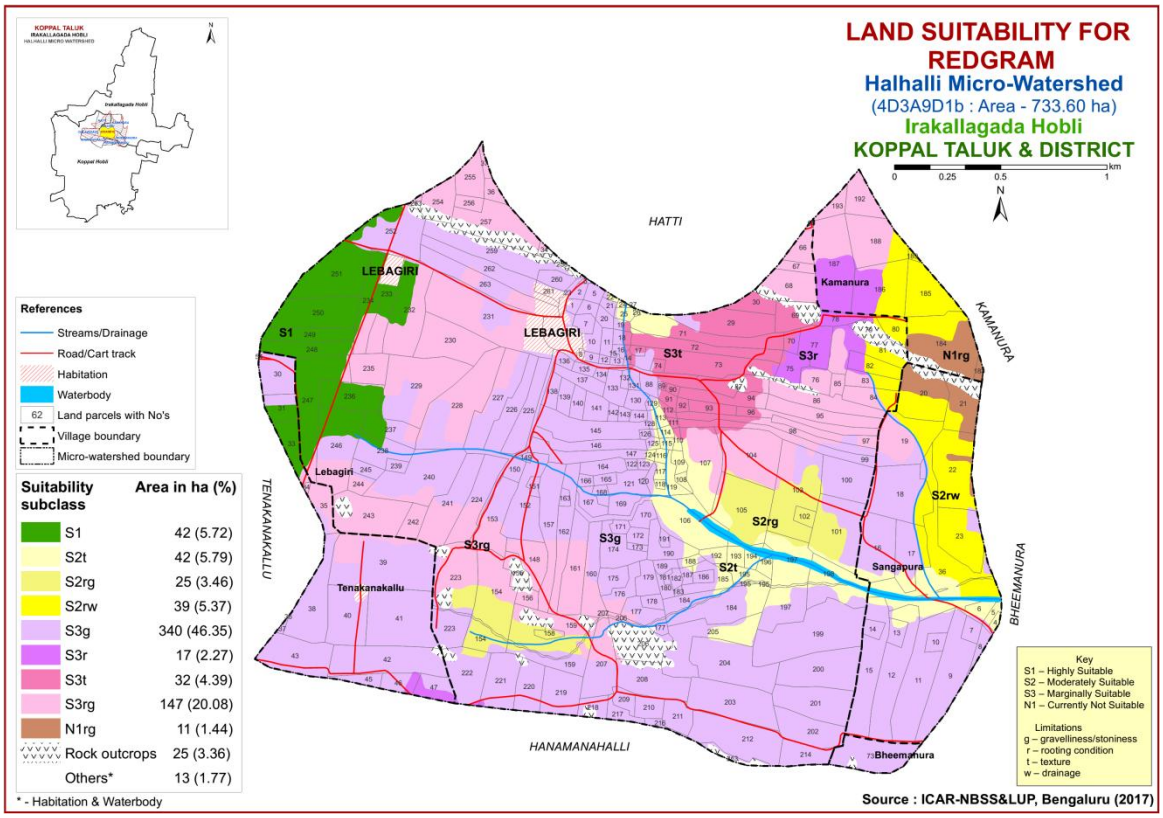


Fig. 7.4 Land Suitability map of Redgram

7.5 Land Suitability for Bengal gram (*Cicer arietinum*)

Bengal gram is one of the major pulse crop grown in an area of 9.39 lakh ha in northern Karnataka in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad and Bellary districts. The crop requirements for growing Bengal gram (Table 7.6) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing Bengal gram was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.5.

Table 7.6 Crop suitability criteria for Bengal gram

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

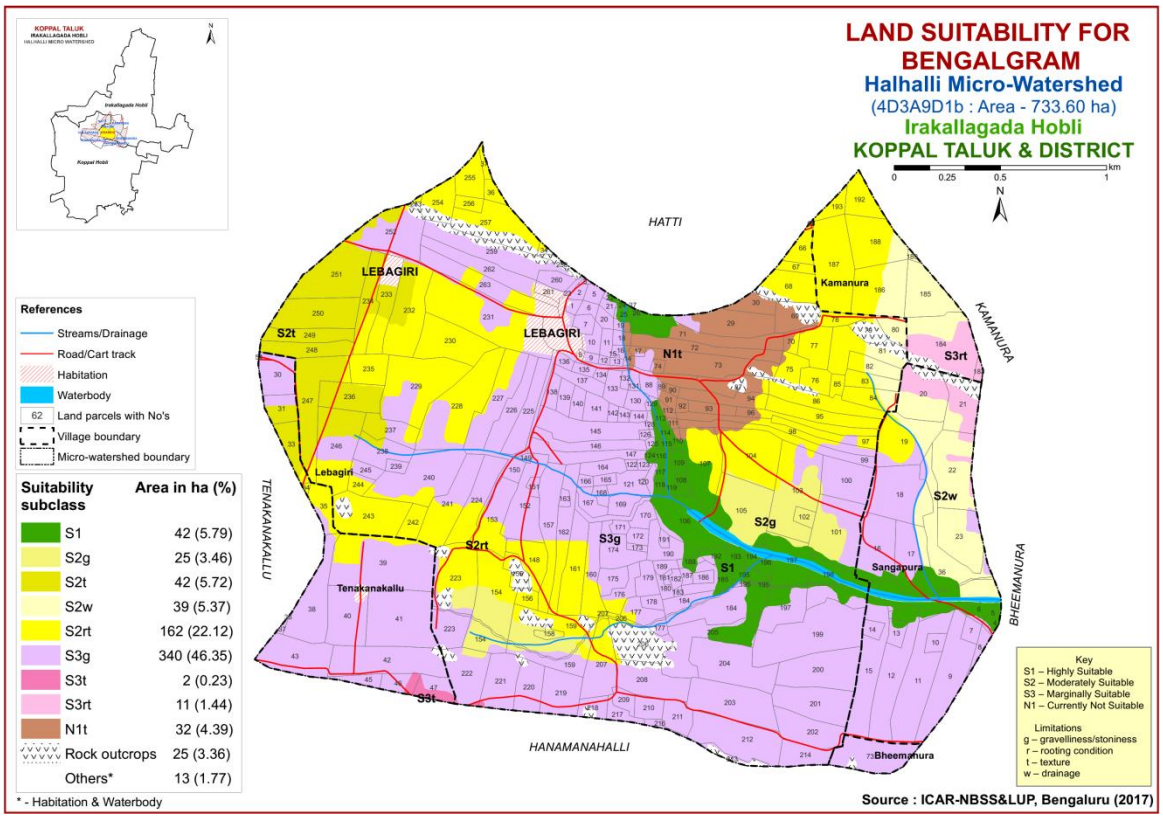


Fig. 7.5 Land Suitability map of Bengal gram

An area of about 42 ha (6 %) in the microwatershed has soils that are highly suitable (Class S1) for growing Bengal gram and are distributed in the northern, central and eastern part of the microwatershed. An area of about 268 ha (37 %) is moderately suitable (Class S2) for growing Bengal gram and are distributed in the southwestern, western, northern and eastern part of the microwatershed. They have minor limitations of rooting depth, drainage, gravelliness and texture. Marginally suitable (Class S3) lands cover maximum area of about 353 ha (48 %) and are distributed in the major part of the

microwatershed. They have moderate limitations of rooting depth, gravelliness and texture. Area currently not suitable (class N1) for growing Bengal gram cover about 32 ha (4%) and distributed in the northern part of the microwatershed with severe limitation of texture.

7.6 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 7.7) 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 7.6.

An area of about 62 ha (8%) is highly suitable (Class S1) for growing groundnut and are distributed in the western and central part of the microwatershed. Maximum area of about 441 ha (60%) is moderately suitable (Class S2) for growing groundnut and distributed in the major part of the microwatershed. They have minor limitations of gravelliness, texture, drainage and rooting depth. An area of about 193 ha (26%) is marginally suitable (Class S3) for growing groundnut and occur the northeastern, northwestern and central part of the microwatershed with moderate limitations of gravelliness, texture and rooting depth.

Table 7.7 Crop suitability criteria for Groundnut

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

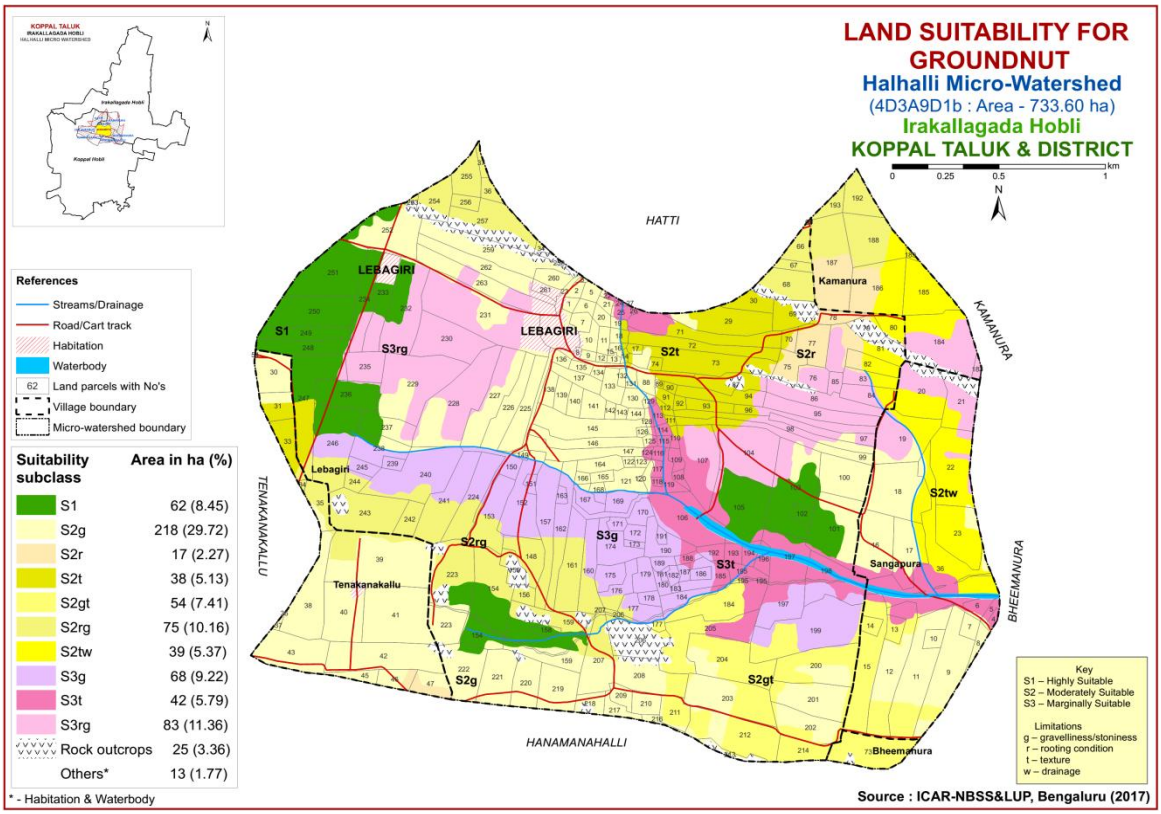


Fig. 7.6 Land Suitability map of Groundnut

7.7 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 7.8) 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 7.7.

Table 7.8 Crop suitability criteria for Sunflower

Crop requirement		Rating			
Soil–site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Slope	%	<3	3-5	5-10	>10
LGP	Days	>90	80-90	70-80	<70
Soil drainage	class	Well drained	mod. Well drained	imperfectly drained	Poorly drained
Soil reaction	pH	6.5-8.0	8.1-8.5:5.5-6.4	8.6-9.0;4.5-5.4	>9.0:<4.5
Surface soil texture	Class	l, cl, sil, sc	Scl, sic, c,	c (>60%), sl	ls, s
Soil depth	cm	>100	75-100	50-75	<50
Gravel content	%vol.	<15	15-35	35-60	>60
Salinity (EC)	dSm^{-1}	<1.0	1.0-2.0	>2.0	
Sodicity (ESP)	%	<10	10-15	>15	

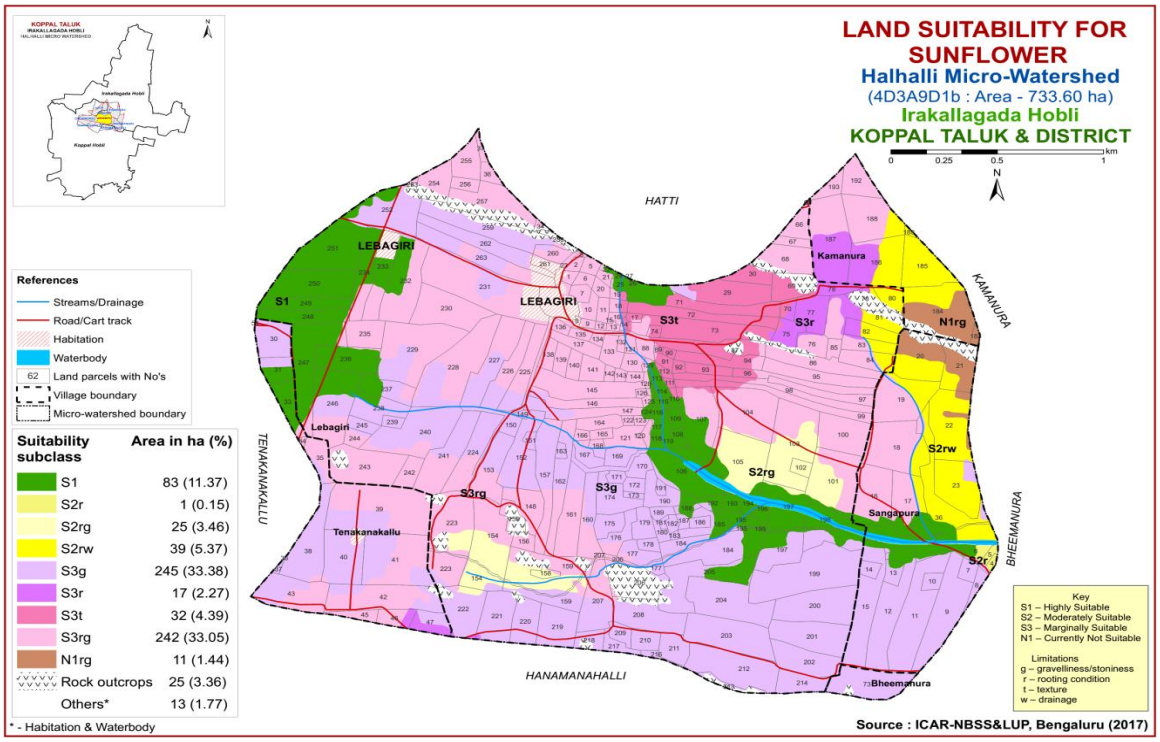


Fig. 7.7 Land Suitability map of Sunflower

An area of about 83 ha (11%) is highly suitable (Class S1) for growing sunflower and are distributed in the western, central and eastern part of the microwatershed. An area of about 65 ha (9%) is moderately suitable (Class S2) and distributed in the southern and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. Marginally suitable (Class S3) lands occupy maximum area of about 536 ha (73%) and are distributed in the major part of the microwatershed with moderate limitations of rooting depth, texture and gravelliness. An area of about 11 ha (1%) is currently not suitable (Class N1) and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness

7.8 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, Gulbarga, Bijapur, Bidar, Bellary, Chitradurga and Chamarajnagar districts. The crop requirements for growing cotton (Table 7.9) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cotton was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.8.

An area of about 79 ha (11 %) in the microwatershed has soils that are highly suitable (Class S1) for growing cotton and are distributed in the western, central and eastern part of the microwatershed. An area of about 86 ha (12 %) is moderately suitable (Class S2) for growing cotton and are distributed in the southern, central, eastern and western part of the microwatershed. They have minor limitations of rooting depth,

texture, drainage and gravelliness. Marginally suitable (class S3) lands cover a maximum area of about 499 ha (68%) and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness, rooting depth and texture. An area of about 32 ha (4 %) is currently not suitable (Class N1) and distributed in the northern part of the microwatershed with severe limitation of texture.

Table 7.9 Crop suitability criteria for Cotton

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

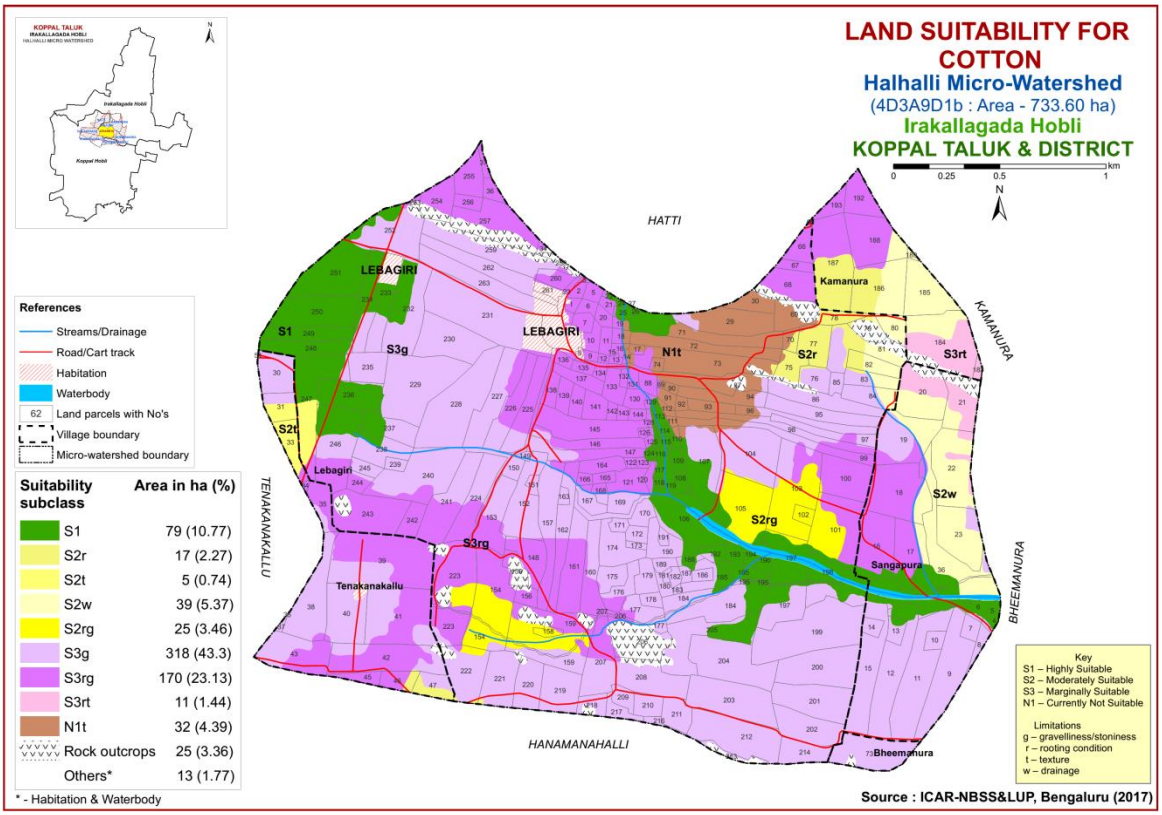


Fig. 7.8 Land Suitability map of Cotton

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.

Table 7.10 Crop suitability criteria for Chilli

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

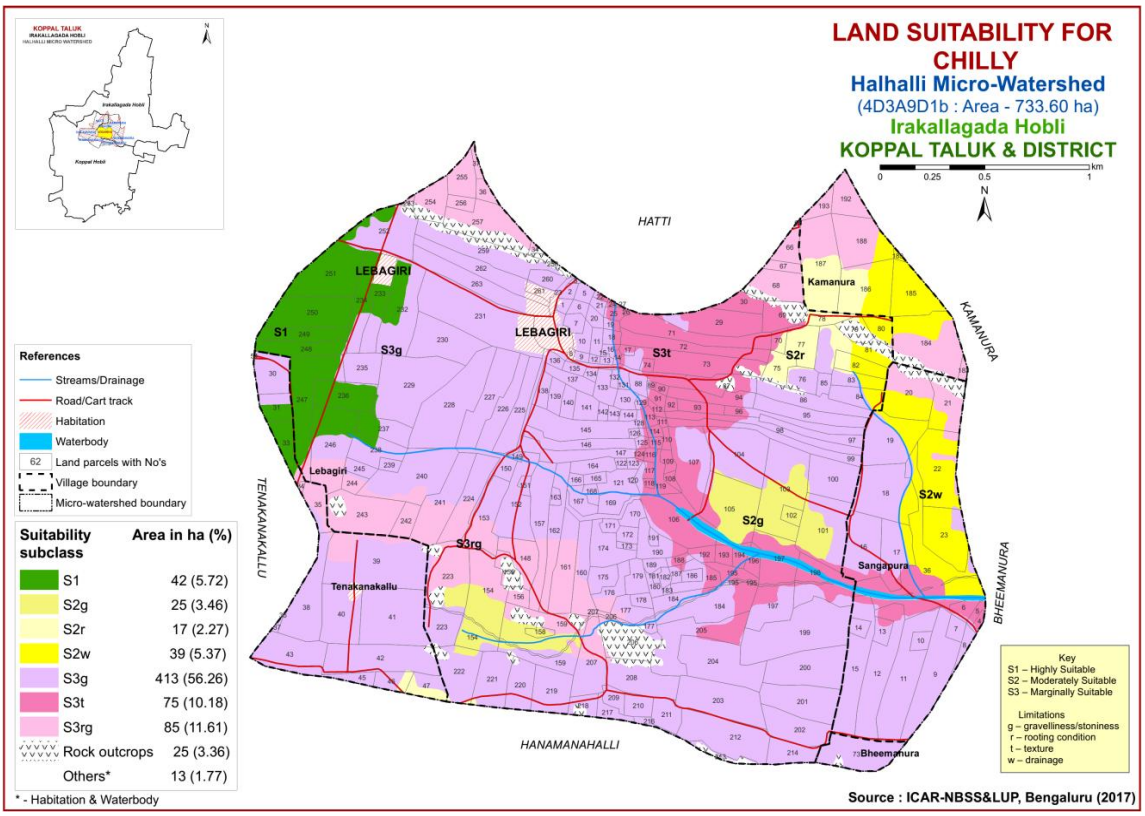


Fig. 7.9 Land Suitability map of Chilli

An area of about 42 ha (6 %) in the microwatershed has soils that are highly suitable (Class S1) for growing chilli and are distributed in the western part of the microwatershed. An area of about 81 ha (11 %) is moderately suitable (Class S2) for growing chilli and are distributed in the eastern, central and southern part of the microwatershed. They have minor limitations of rooting depth, drainage and gravelliness. Marginally suitable (class S3) lands cover a maximum area of about 573 ha (78%) and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness, rooting depth and texture.

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 42 ha (6 %) in the microwatershed has soils that are highly suitable (Class S1) for growing tomato and are distributed in the western part of the microwatershed. An area of about 81 ha (11 %) is moderately suitable (Class S2) for growing tomato and are distributed in the eastern, central and southern part of the microwatershed. They have minor limitations of rooting depth, drainage and gravelliness. Marginally suitable (class S3) lands cover maximum area of about 573 ha (78%) and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness, rooting depth and texture.

Table 7.11 Crop suitability criteria for Tomato

Crop requirement			**Rating**			
Soil-site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season	^{0}c	25-28	29-32 20-24	15-19 33-36	<15 >36
Soil moisture	Growing period	Days	>150	120-150	90-120	
Soil aeration	Soil drainage	Class	Well drained	Moderately well drained	Imperfectly drained	Poorly drained
Nutrient availability	Texture	Class	l, sl, cl, scl	Sic,sicl,sc,c(m/k)	C (ss)	ls, s
	pH	1:2.5	6.0-7.0	5.0-5.9:7.1-8.5	<5;>8.5	
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Strongly calcareous	
Rooting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15	15-35	>35	
Soil toxicity	Salinity	dS/m	Non saline	slight	strongly	
	Sodicity (ESP)	%	<10	10-15	>15	-
Erosion	Slope	%	1-3	3-5	5-10	>10

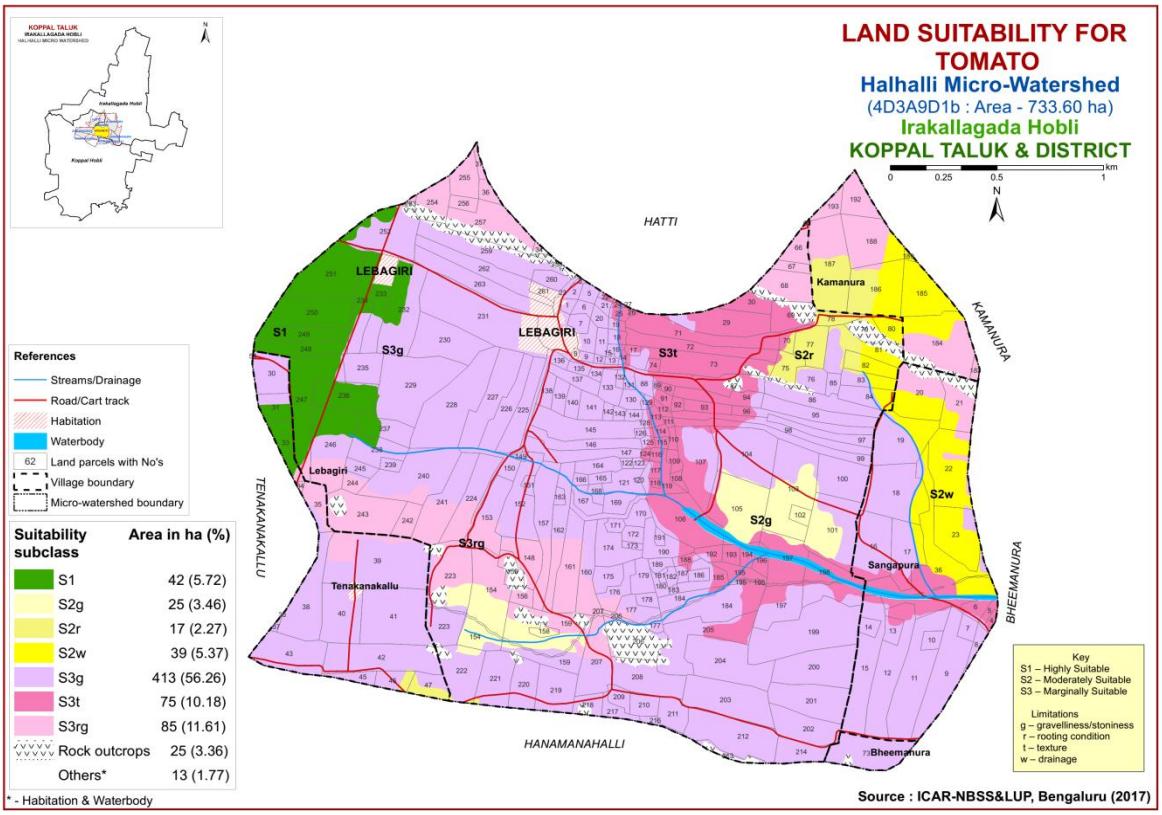


Fig. 7.10 Land Suitability map of Tomato

7.11 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 7.12) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing drumstick was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.11.

Table 7.12 Crop suitability criteria for Drumstick

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

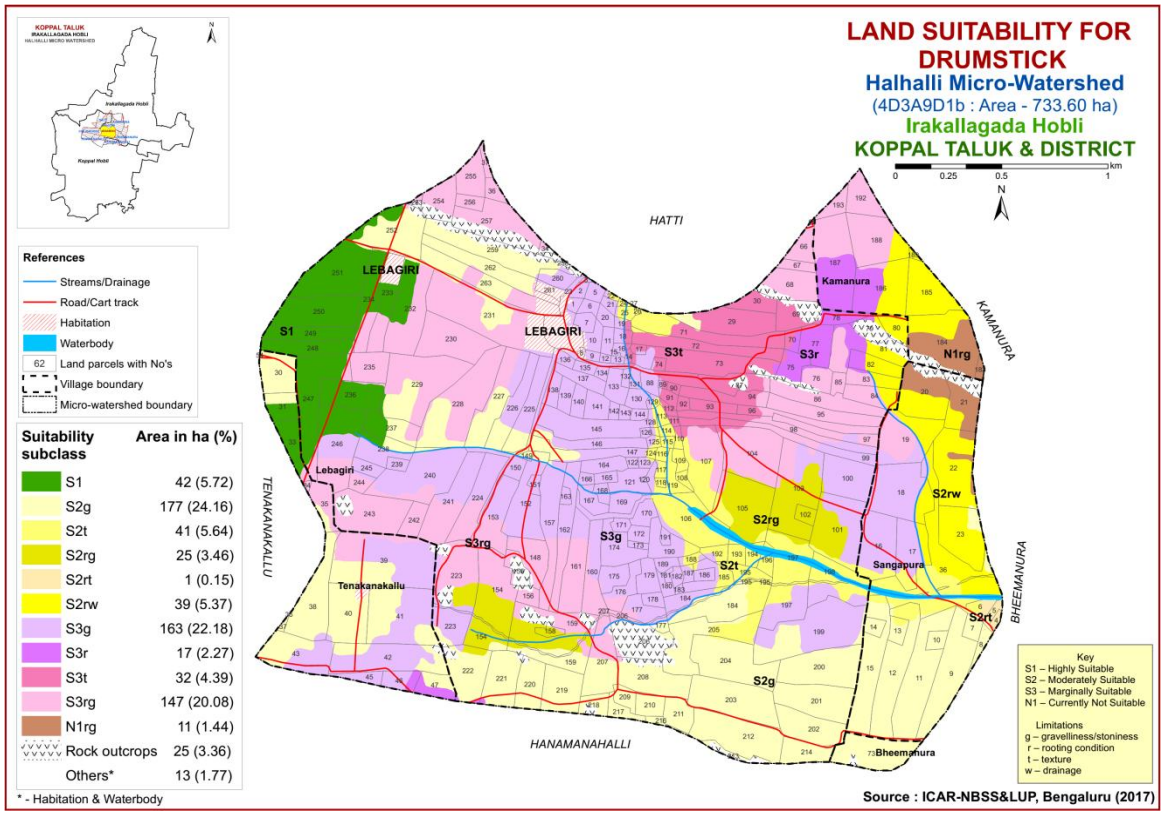


Fig. 7.11 Land Suitability map of Drumstick

An area of about 42 ha (6 %) in the microwatershed has soils that are highly suitable (Class S1) for growing drumstick and are distributed in the western part of the microwatershed. An area of about 283 ha (39 %) in the microwatershed has soils that are moderately suitable (Class S2) for growing drumstick and are distributed in the southern, eastern and central part of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture and drainage. Marginally suitable (Class S3) lands cover a maximum area of about 359 ha (49 %) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, texture and gravelliness. An area of about 11 ha (1 %) is currently not suitable (Class N1) and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

7.12 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 7.13) 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 7.12.

An area of about 42 ha (6 %) in the microwatershed has soils that are highly suitable (Class S1) for growing mulberry and are distributed in the western part of the

microwatershed. Maximum area of about 446 ha (61%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the major part of the microwatershed. They have minor limitations of texture, gravelliness, rooting depth and drainage. Marginally suitable lands (Class S3) cover an area of about 196 ha (27 %) and occur in the northeastern, northwestern and southern part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing mulberry and distributed in the northeastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.13 Crop suitability criteria for Mulberry

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

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

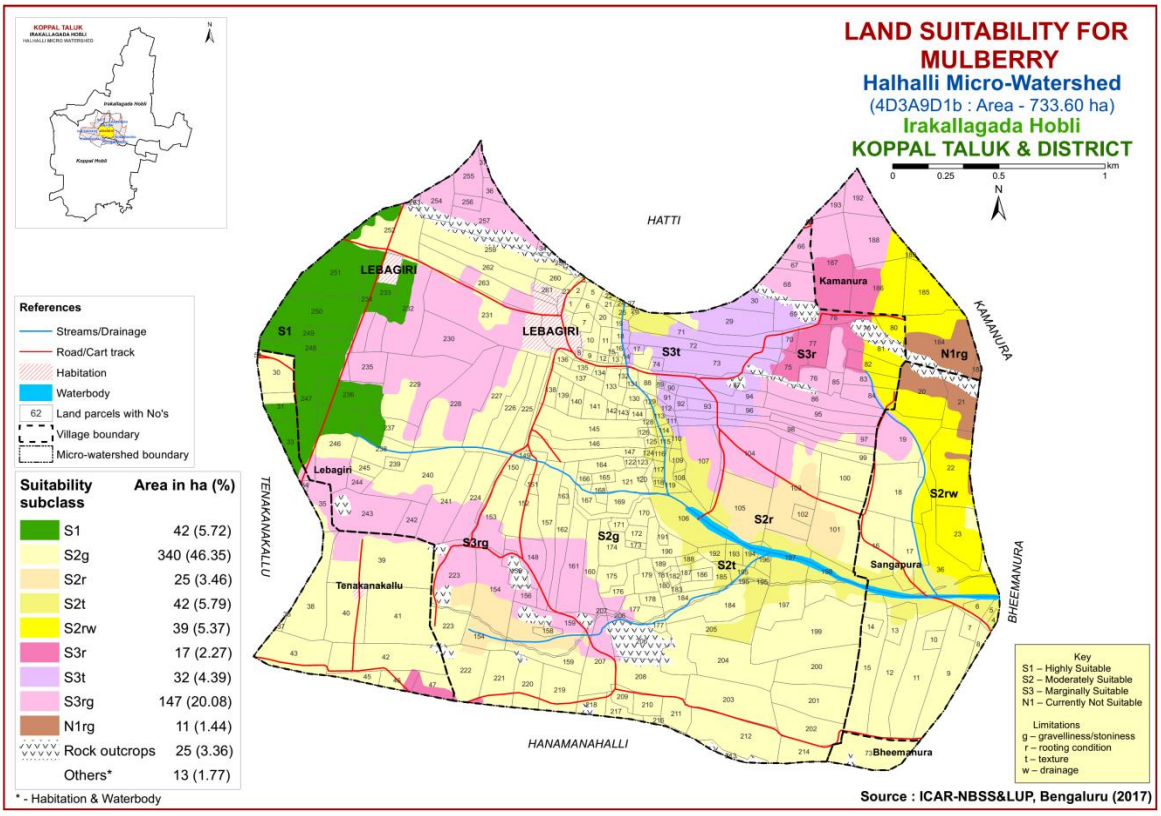


Fig. 7.12 Land Suitability map of Mulberry

7.13 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 7.14) 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 7.13.

An area of about 37 ha (5%) in the microwatershed has soils that are highly suitable (Class S1) for growing mango and are distributed in the western part of the microwatershed. An area of about 5 ha (<1%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the western part of the microwatershed. They have minor limitation of rooting depth. Marginally suitable (Class S3) lands cover maximum area of about 479 ha (65%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture, rooting depth and drainage. An area of about 175 ha (24%) is currently not suitable (Class N1) for growing mango and distributed in the northeastern, northwestern and southern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.14 Crop suitability criteria for Mango

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

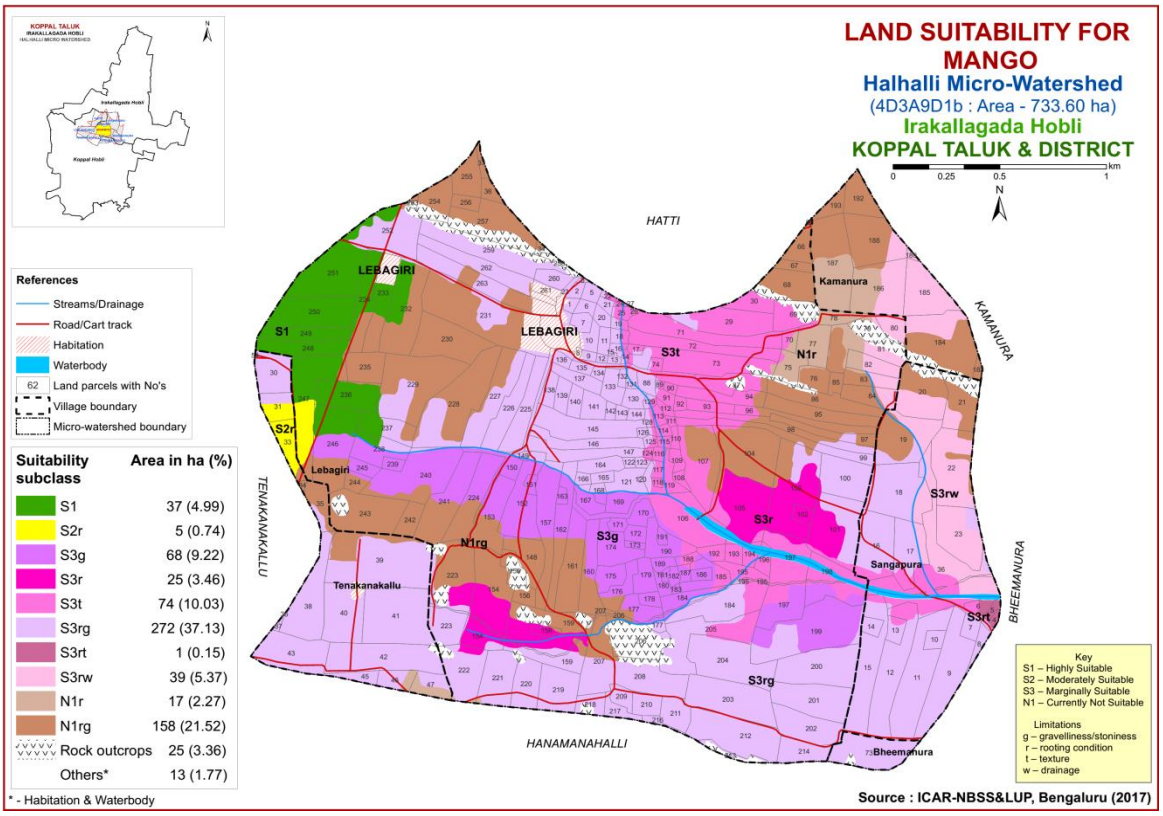


Fig. 7.13 Land Suitability map of Mango

7.14 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 7.15) 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 7.14.

An area of about 42 ha (6%) in the microwatershed has soils that are highly suitable (Class S1) for growing sapota and are distributed in the western part of the microwatershed. An area of about 159 ha (22%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the southern, northern and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. Marginally suitable lands (Class S3) cover a maximum area of about 484 ha (66%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing sapota and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.15 Crop suitability criteria for Sapota

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

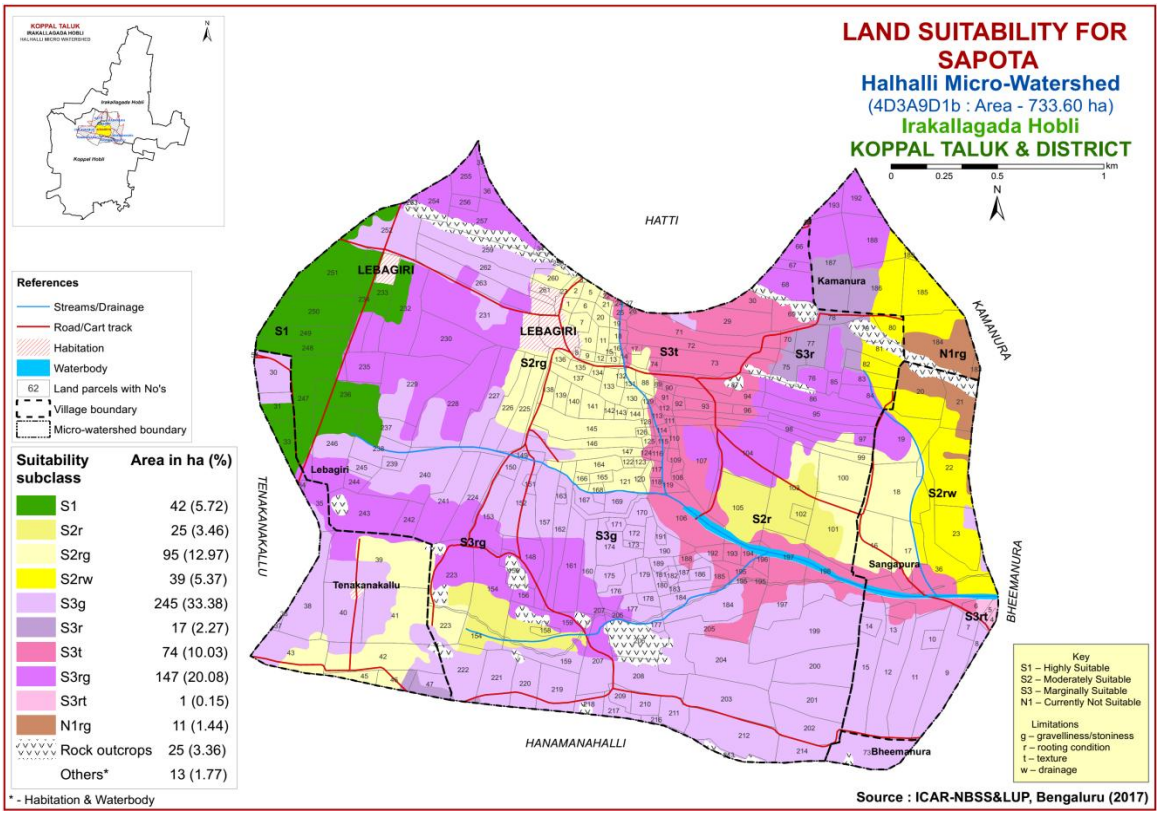


Fig. 7.14 Land Suitability map of Sapota

7.15 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 7.16) 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 7.15.

Table 7.16 Crop suitability criteria for Pomegranate

Crop requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season	^{0}C	30-34	35-38 25-29	39-40 15-24	
Soil moisture	Growing period	Days	>150	120-150	90-120	<90
Soil aeration	Soil drainage	Class	Well drained	imperfectly drained		
Nutrient availability	Texture	Class	sl, scl, l, cl	c, sic, sicl	cl, s, ls	s,fragmental
Rooting conditions	pH	1:2.5	5.5-7.5	7.6-8.5	8.6-9.0	
	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	%vol.	nil	15-35	35-60	>60
Soil toxicity	Salinity	dS/m	Nil	<9	>9	<50
	Sodicity	%	nil			
Erosion	Slope	%	<3	3-5	5-10	

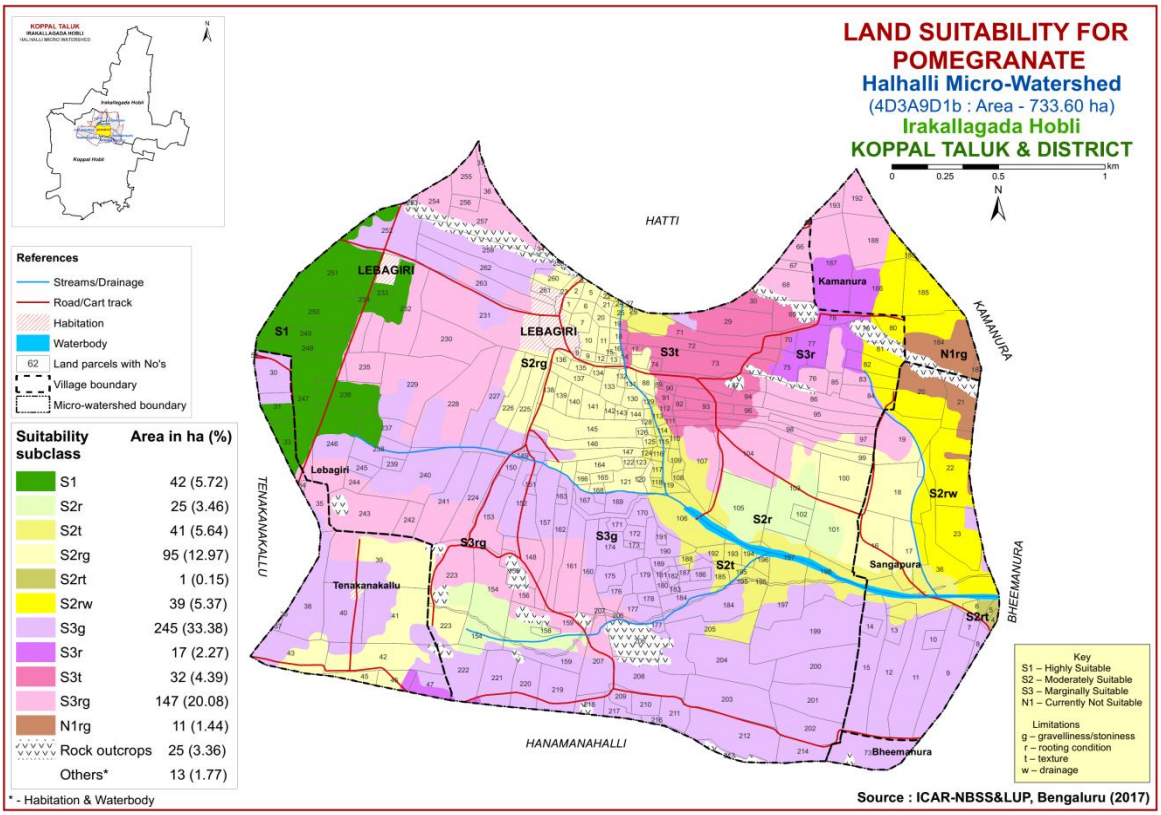


Fig. 7.15 Land Suitability map of Pomegranate

An area of about 42 ha (6%) in the microwatershed has soils that are highly suitable (Class S1) for growing pomegranate and are distributed in the western part of the microwatershed. An area of about 201 ha (28 %) in the microwatershed has soils that are

moderately suitable (Class S2) and distributed in the southern, northern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. Marginally suitable lands (Class S3) cover a maximum area of about 441 ha (60%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing pomegranate and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

7.16 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 7.17) 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 7.16.

An area of about 42 ha (6%) in the microwatershed has soils that are highly suitable (Class S1) for growing guava and are distributed in the western part of the microwatershed. An area of about 159 ha (22 %) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the southern, northern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. Marginally suitable (Class S3) lands cover a maximum area of about 484 ha (66%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing guava and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.17 Crop suitability criteria for Guava

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

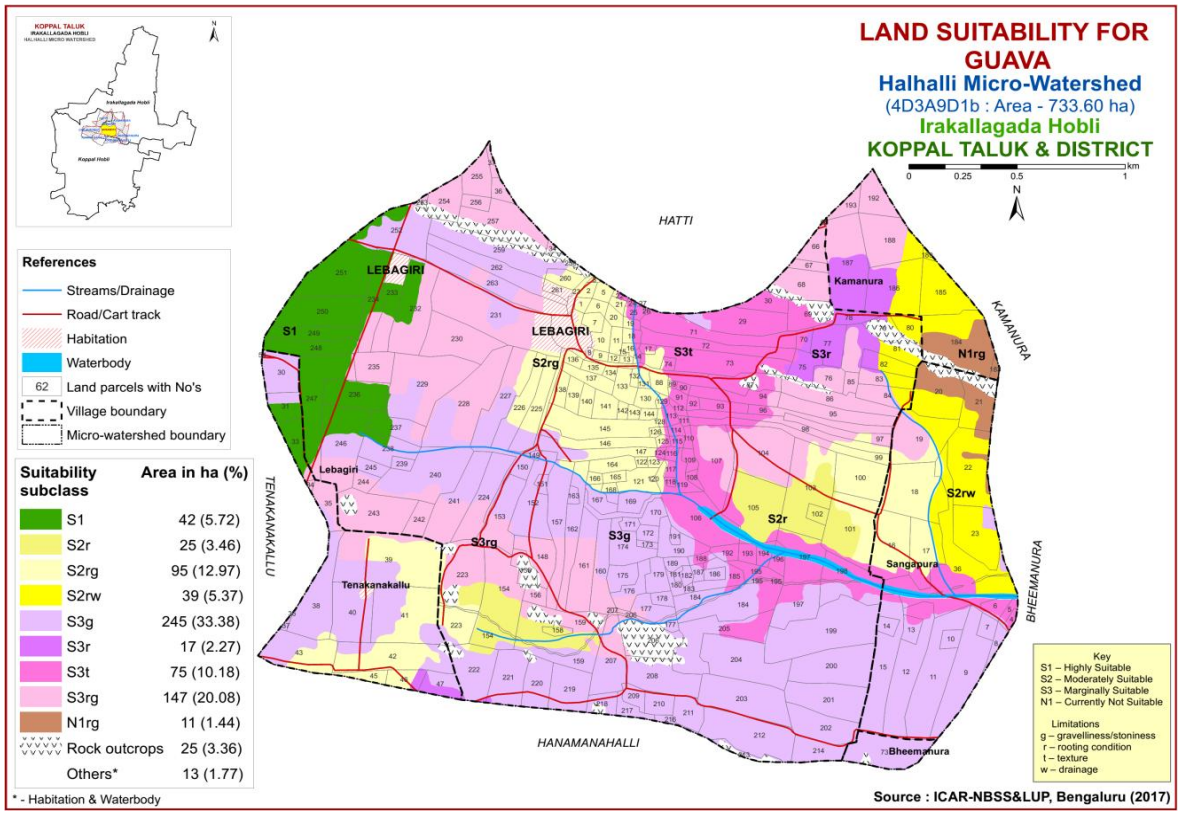


Fig. 7.16 Land Suitability map of Guava

7.17 Land Suitability for 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.7.18) 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 7.17.

An area of about 42 ha (6%) in the microwatershed has soils that are highly suitable (Class S1) for growing jackfruit and are distributed in the western part of the microwatershed. An area of about 159 ha (22%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the southern, northern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. Marginally suitable (Class S3) lands cover a maximum area of about484 ha (66%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing jackfruit and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.18 Crop suitability criteria for Jackfruit

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

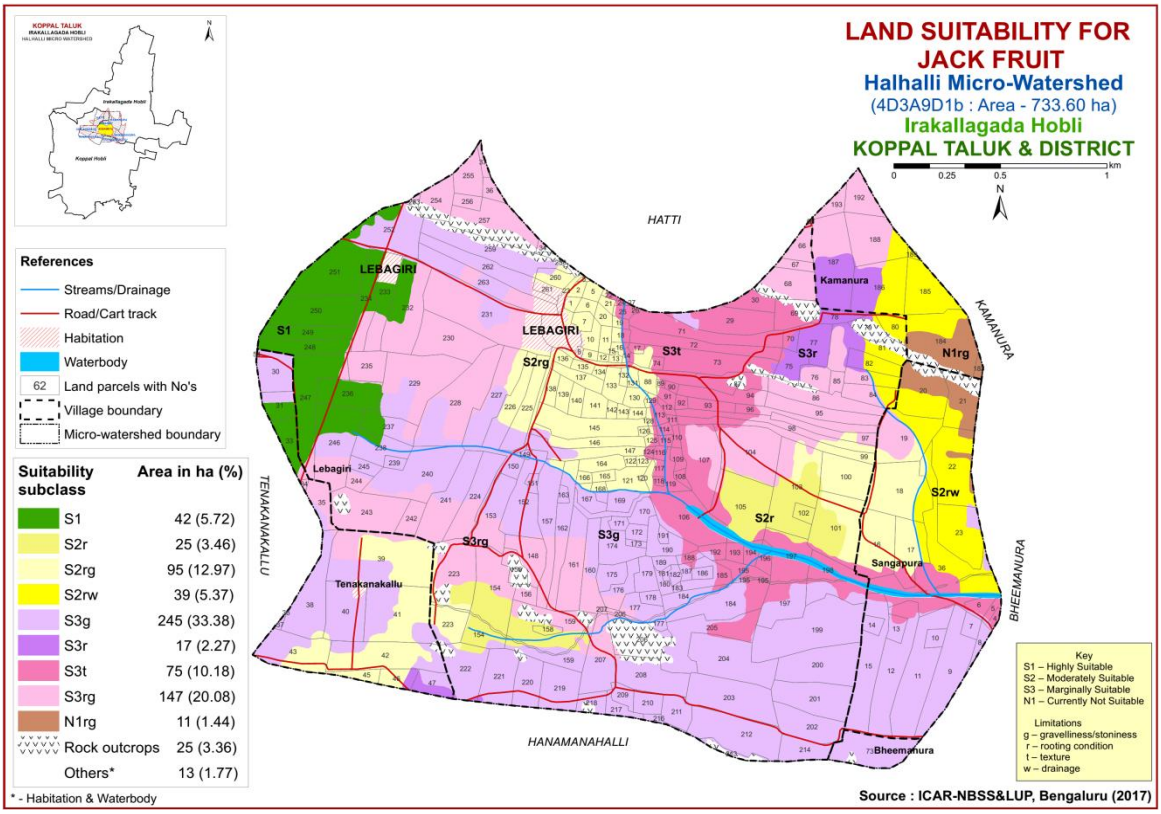


Fig. 7.17 Land Suitability map of Jackfruit

7.18 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the state. The crop requirements (Table 7.19) for growing jamun were matched with the soil-site characteristics 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 7.18.

An area of about 37 ha (5%) in the microwatershed has soils that are highly suitable (Class S1) for growing jamun and are distributed in the western part of the microwatershed. An area of about 167 ha (23%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the southern, northern, central and

eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. Marginally suitable (Class S3) lands cover a maximum area of about481 ha (66%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture, drainage and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing jamun and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

Table 7.19 Crop suitability criteria for Jamun

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

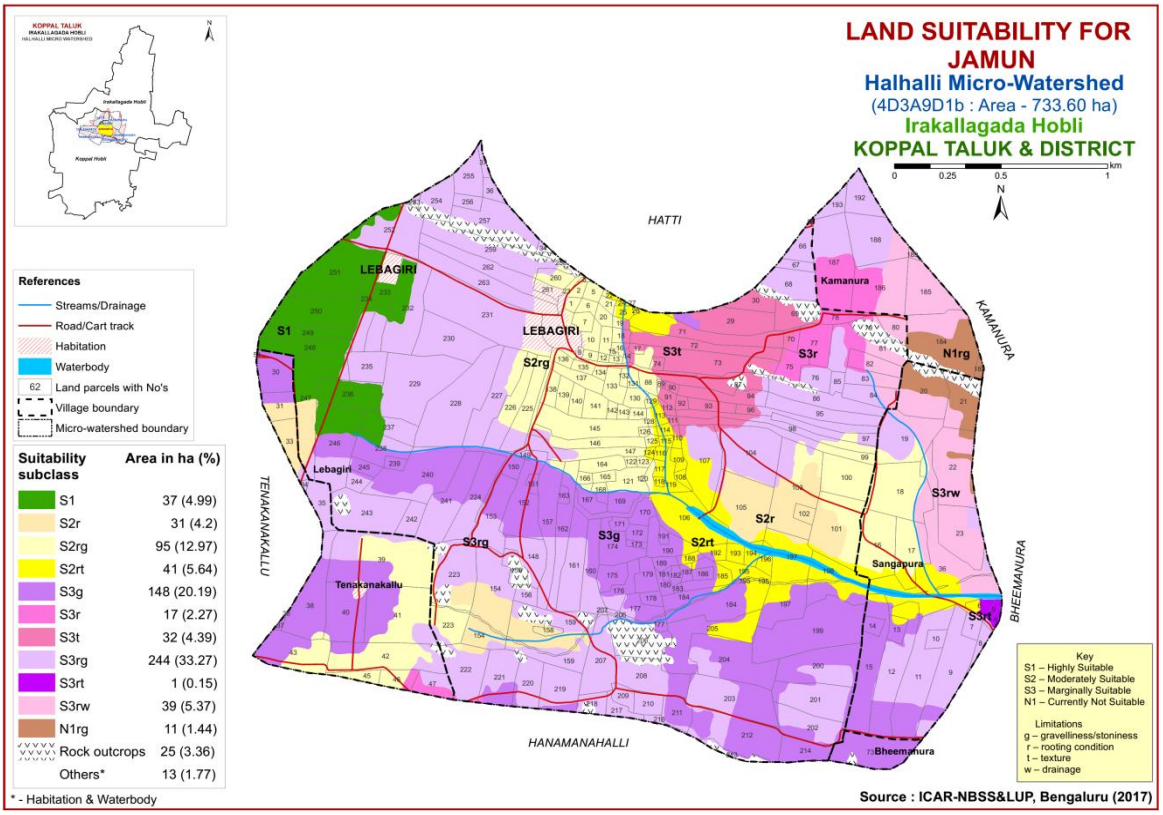


Fig. 7.18 Land Suitability map of Jamun

7.19 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 7.20) 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 7.19.

Table 7.20 Crop suitability criteria for Musambi

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

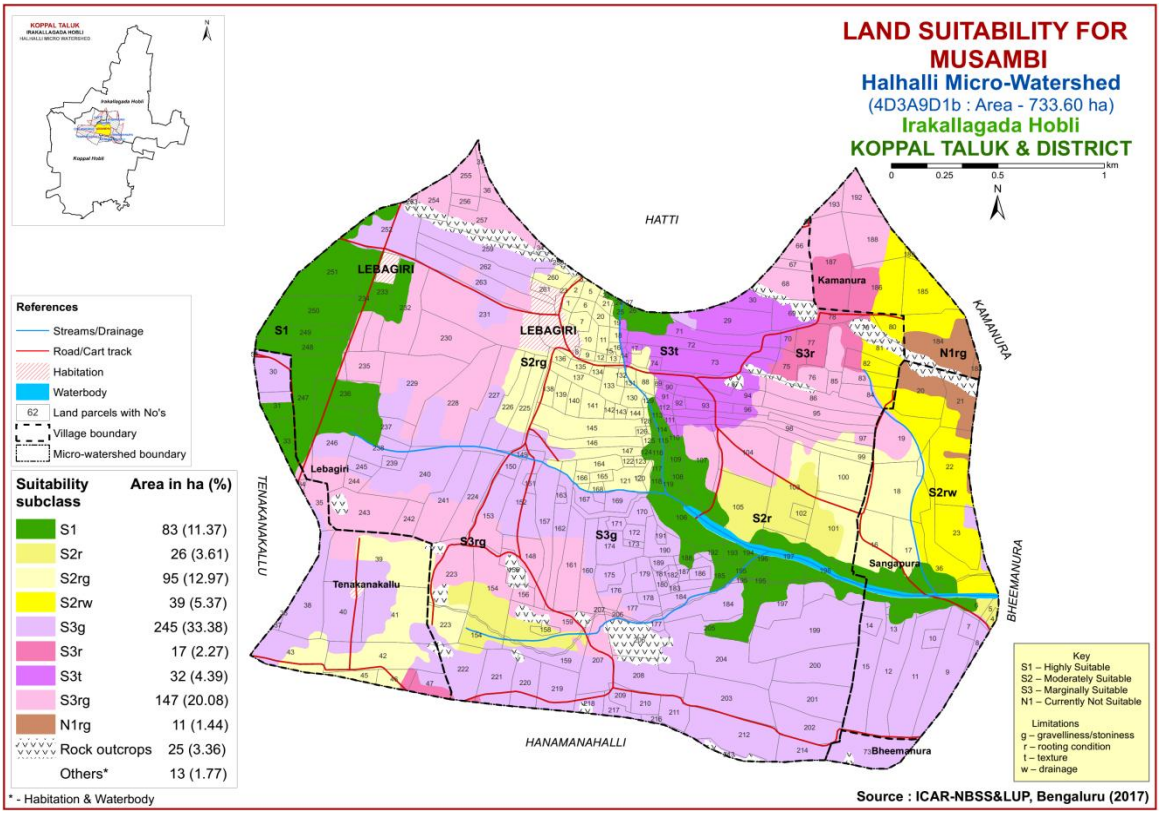


Fig. 7.19 Land Suitability map of Musambi

An area of about 83 ha (11 %) in the microwatershed has soils that are highly suitable (Class S1) for growing musambi and are distributed in the western part of the microwatershed. An area of about 160 ha (22%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the southern, northern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. Marginally suitable (Class S3) lands cover a maximum area of about 441 ha (60%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing musambi and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

7.20 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 for growing lime (Table 7.21) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing lime was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.20.

Table 7.21 Crop suitability criteria for Lime

Crop requirement			**Rating**			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season	^{0}C	28-30	31-35 24-27	36-40 20-23	>40 <20
Soil moisture	Growing period	Days	240-265	180-240	150-180	<150
Soil aeration	Soil drainage	Class	Well drained	Mod. to imperfectly drained	Poorly	Very poorly
Nutrient availability	Texture	Class	Scl, l, sicl, cl, s	Sc, sc, c	C(>70%)	S, ls
	pH	1:2.5	6.0-7.5	5.5-6.4: 7.6-8.0	4.0-5.4 8.1-8.5	<4.0 >8.5
	$CaCO_3$ in root zone	%	Non calcareous	Upto 5	5-10	>10
Rooting conditions	Soil depth	cm	>150	100-150	50-100	<50
	Gravel content	% vol.	Non gravelly	15-35	35-55	>55
Soil toxicity	Salinity	dS/m	Non saline	Upto 1.0	1.0-2.5	>2.5
	Sodicity	%	Non sodic	5-10	10-15	>15
Erosion	Slope	%	<3	3-5	5-10	

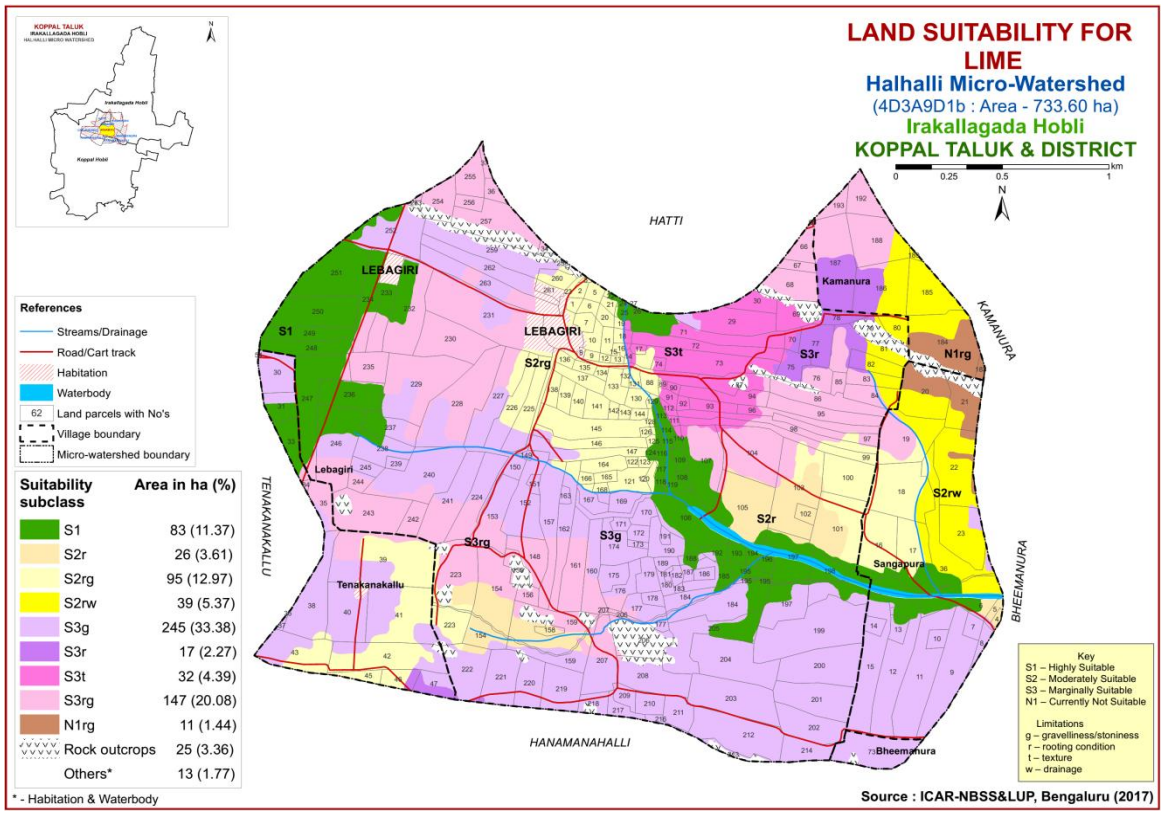


Fig. 7.20 Land Suitability map of Lime

An area of about 83 ha (11 %) in the microwatershed has soils that are highly suitable (Class S1) for growing lime and are distributed in the western part of the microwatershed. An area of about 160 ha (22%) in the microwatershed has soils that are moderately suitable (Class S2) and distributed in the southern, northern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. Marginally suitable (Class S3) lands cover a maximum area of about 441 ha (60%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness, texture and rooting depth. An area of about 11 ha (1%) is currently not suitable (Class N1) for growing lime and distributed in the eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

7.21 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 for growing cashew (Table 7.22) 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 7.21.

An area of about 42 ha (6 %) in the microwatershed has soils that are highly suitable (Class S1) for growing cashew and are distributed in the western part of the microwatershed. An area of about 188 ha (26%) in the microwatershed has soils that are

moderately suitable (Class S2) and distributed in the southern, northern and central part of the microwatershed. They have minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 341 ha (47%) and occur in the major part of the microwatershed. They have moderate limitations of gravelliness and rooting depth. An area of about 125 ha (17%) is currently not suitable (Class N1) for growing cashew and distributed in the northern, central and eastern part of the microwatershed with severe limitations of rooting depth, texture, drainage and gravelliness.

Table 7.22 Crop suitability criteria for Cashew

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

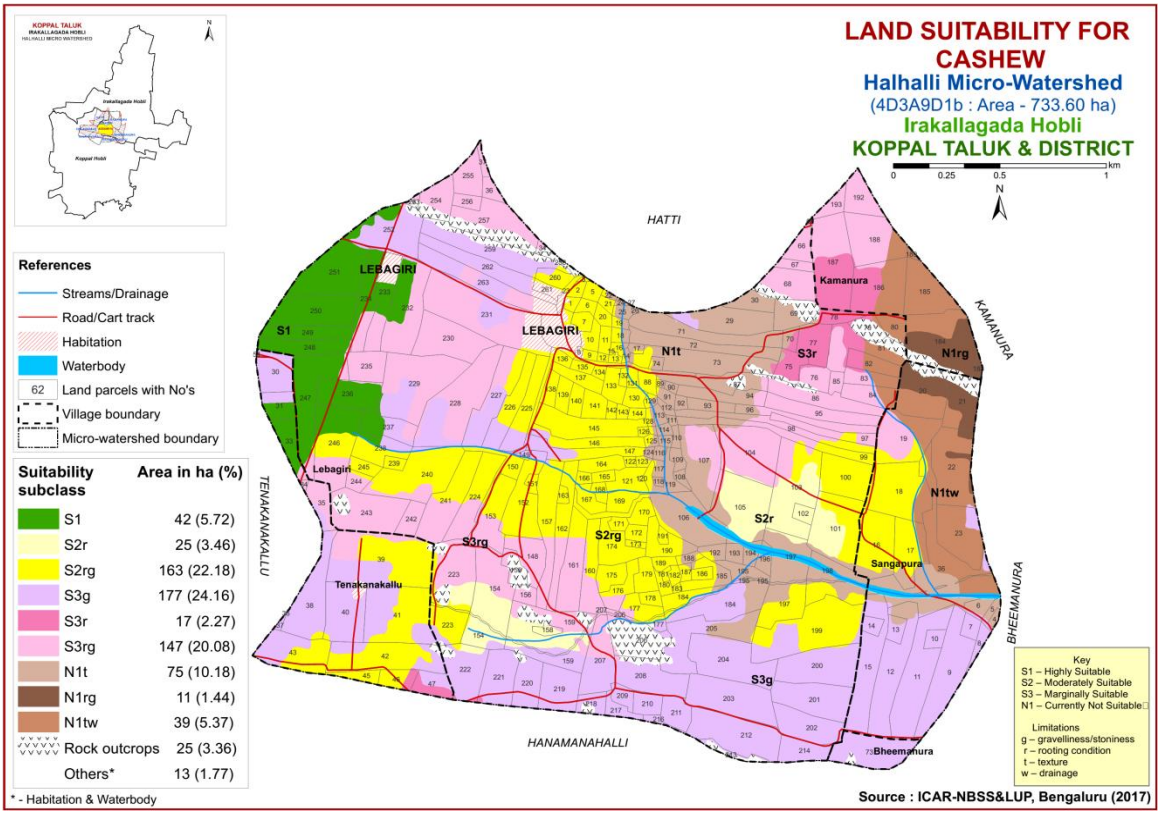


Fig. 7.21 Land Suitability map of Cashew

7.22 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 7.23) 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 7.22.

Table 7.23 Crop suitability criteria for Custard apple

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

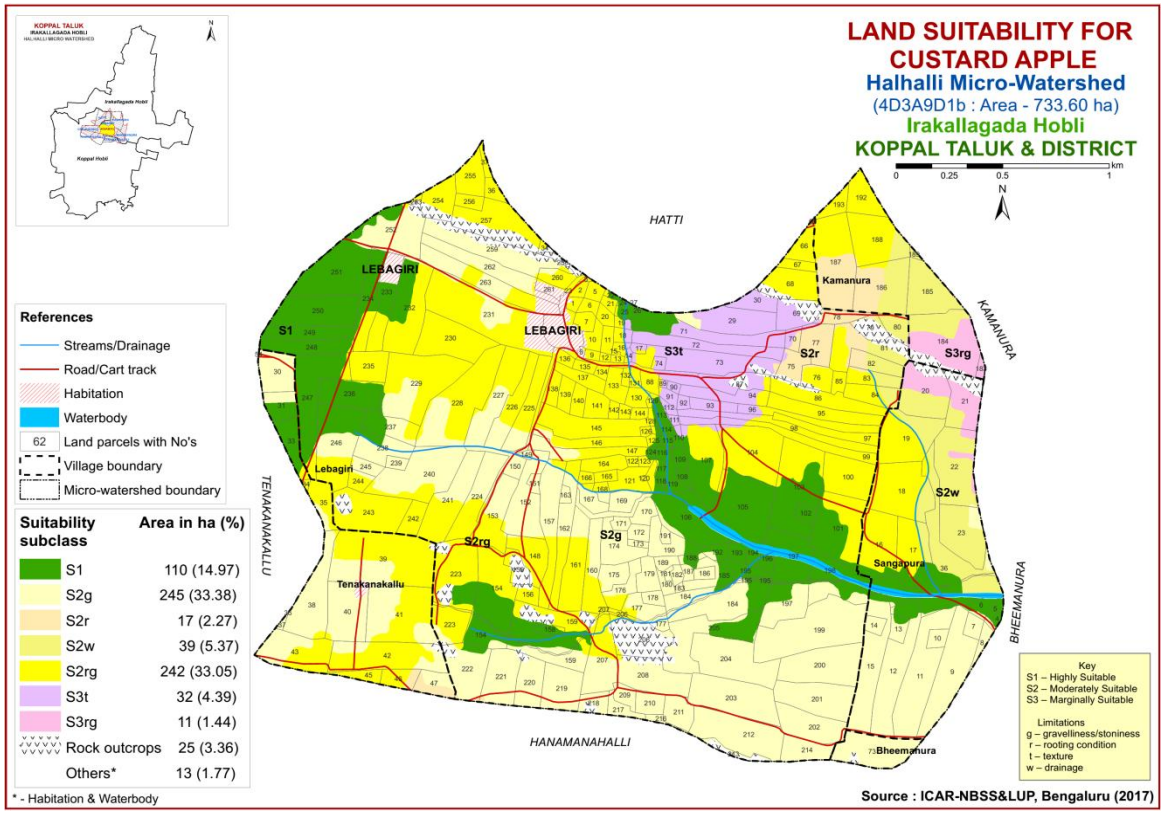


Fig. 7.22 Land Suitability map of Custard Apple

An area of about 110 ha (15%) is highly suitable (Class S1) for growing custard apple and are distributed in the eastern, northern, central and southern part of the microwatershed. Moderately suitable (Class S2) lands cover a maximum area of about

543 ha (74%) and occur in the major part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. An area of about 43 ha (6%) is marginally suitable (Class S3) for growing custard apple and distributed in the northern and eastern part of the microwatershed with moderate limitations of gravelliness, rooting depth and texture.

7.23 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 (Table 7.24) for 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 7.23.

Table 7.24 Crop suitability criteria criteria for Amla

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

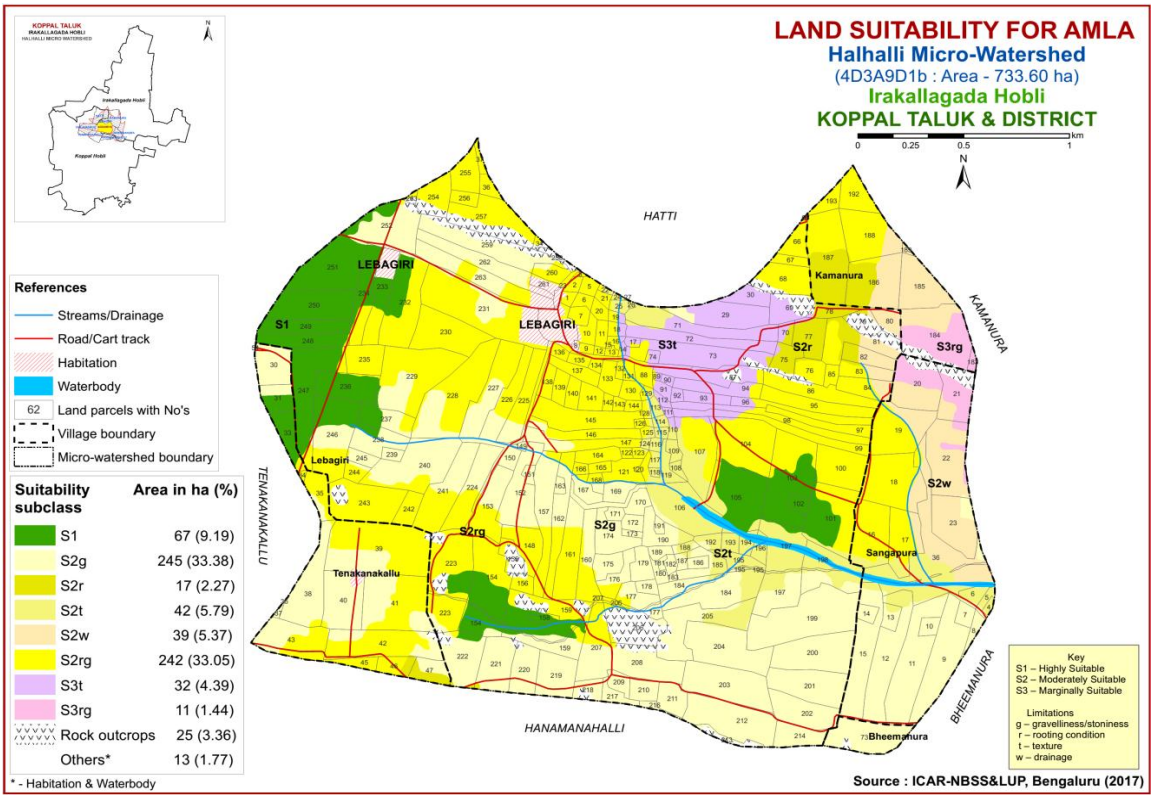


Fig. 7.23 Land Suitability map of Amla

An area of about 67 ha (9%) is highly suitable (Class S1) for growing amla and are distributed in the western, central and southern part of the microwatershed. Moderately suitable (Class S2) lands cover a maximum area of about 585 ha (80%) and occur in the major part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. An area of about 43 ha (6%) is marginally suitable (Class S3) for growing amla and distributed in the northern and eastern part of the microwatershed with moderate limitations of gravelliness, rooting depth and texture.

7.24 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 7.25) 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 are given in Figure 7.24.

Highly suitable lands (Class S1) for growing tamarind cover an area of about 37ha(5%) and distributed in the western part of the microwatershed. An area of about 46 ha (6%) is moderately suitable (Class S2) and occur in the northern, central and western part of the microwatershed. They have minor limitations of texture and rooting depth. Maximum area of about 437 ha (60 %) is marginally suitable (Class S3) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, gravelliness, texture and drainage. An area of about 175 ha (24%) is currently not suitable (Class N1) for growing tamarind and are distributed in the northern, northeastern and western part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

Table 7.25 Crop suitability criteria for Tamarind

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

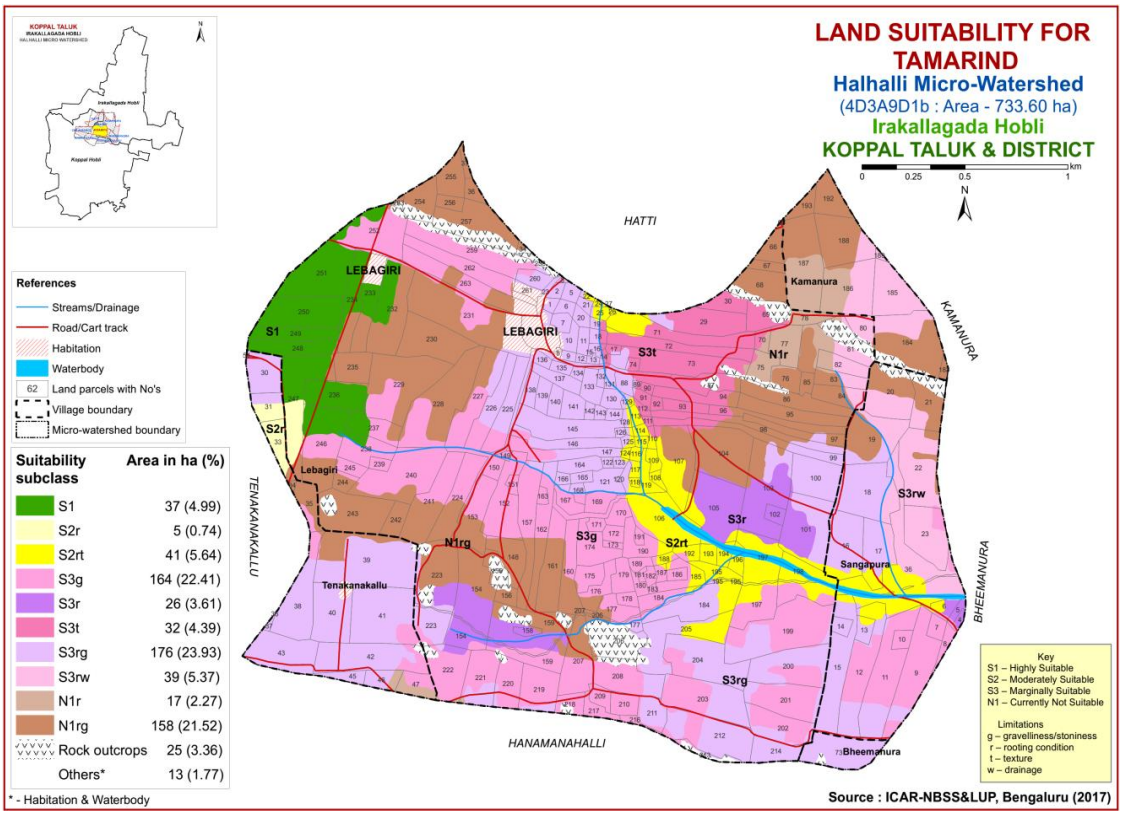


Fig. 7.21 Land Suitability map of Tamarind

7.25 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 7.26) for growing marigold were matched with the soil-site characteristics 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 7.25.

Table 7.26 Crop suitability criteria for Marigold

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

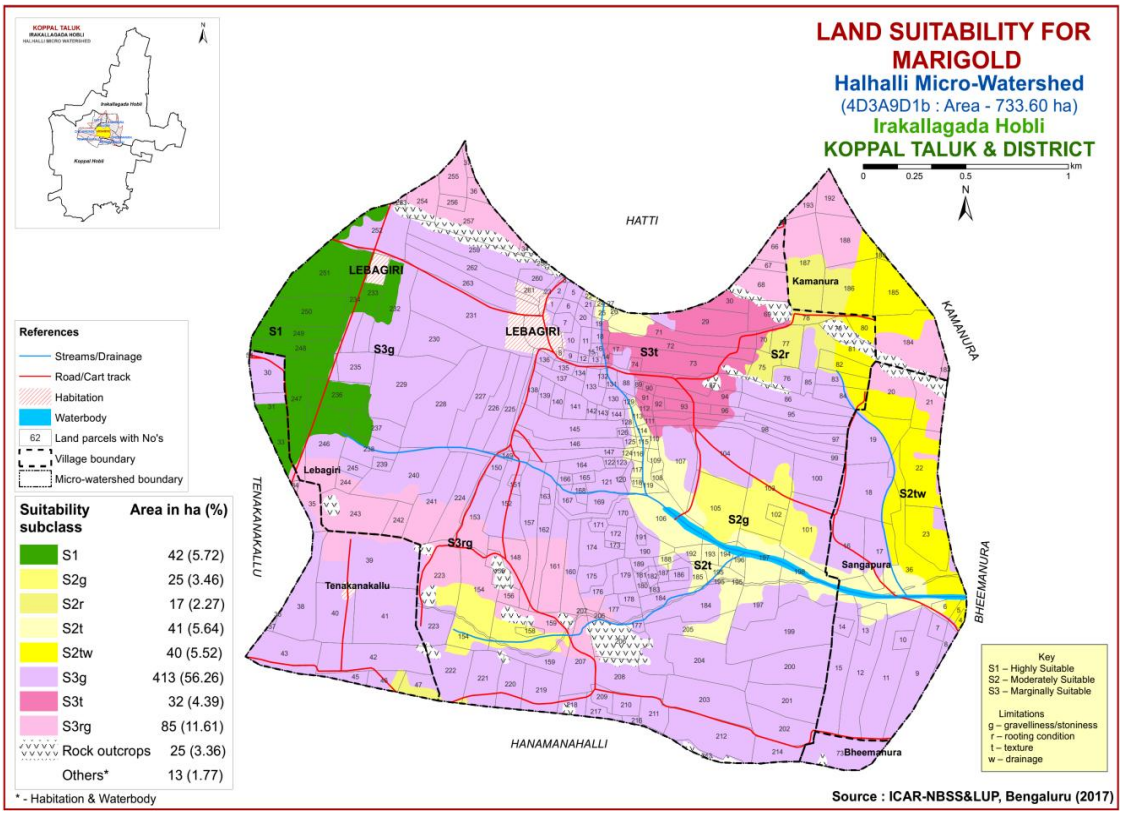


Fig. 7.25 Land Suitability map of Marigold

An area of about 42 ha (6%) is highly suitable (Class S1) for growing marigold and are distributed in the western part of the microwatershed. Moderately suitable (Class S2) lands cover an area of about 123 ha (17%) and occur in the southern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. Maximum area of about 530 ha (72%) is marginally suitable (Class S3) for growing marigold and distributed in the major part of the microwatershed with moderate limitations of gravelliness, rooting depth and texture.

7.26 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 7.27) 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 7.26.

An area of about 42 ha (6%) is highly suitable (Class S1) for growing chrysanthemum and are distributed in the western part of the microwatershed. Moderately suitable (Class S2) lands cover an area of about 123 ha (17%) and occur in the southern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. Maximum area of about 530 ha (72%) is marginally suitable (Class S3) for growing chrysanthemum and distributed in the major

part of the microwatershed with moderate limitations of gravelliness, rooting depth and texture.

Table 7.27 Crop suitability criteria for Chrysanthemum

Crop requirement			Rating			
Soil–site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
climate	Temperature in growing season		18-23	17-15 24-35	35-40 10-14	>40 <10
Soil aeration	Soil drainage	class	Well drained	Moderately well drained	Imperfectly drained	Poorly drained
Nutrient availability	Texture	Class	l ,sl, scl, cl, sil	sicl, sc, sic, c	c	ls, s
	pH	1:2.5	7.0-7.5	5.5-5.9;7.6-8.5	<5;>8.5	
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Strongly calcareous	

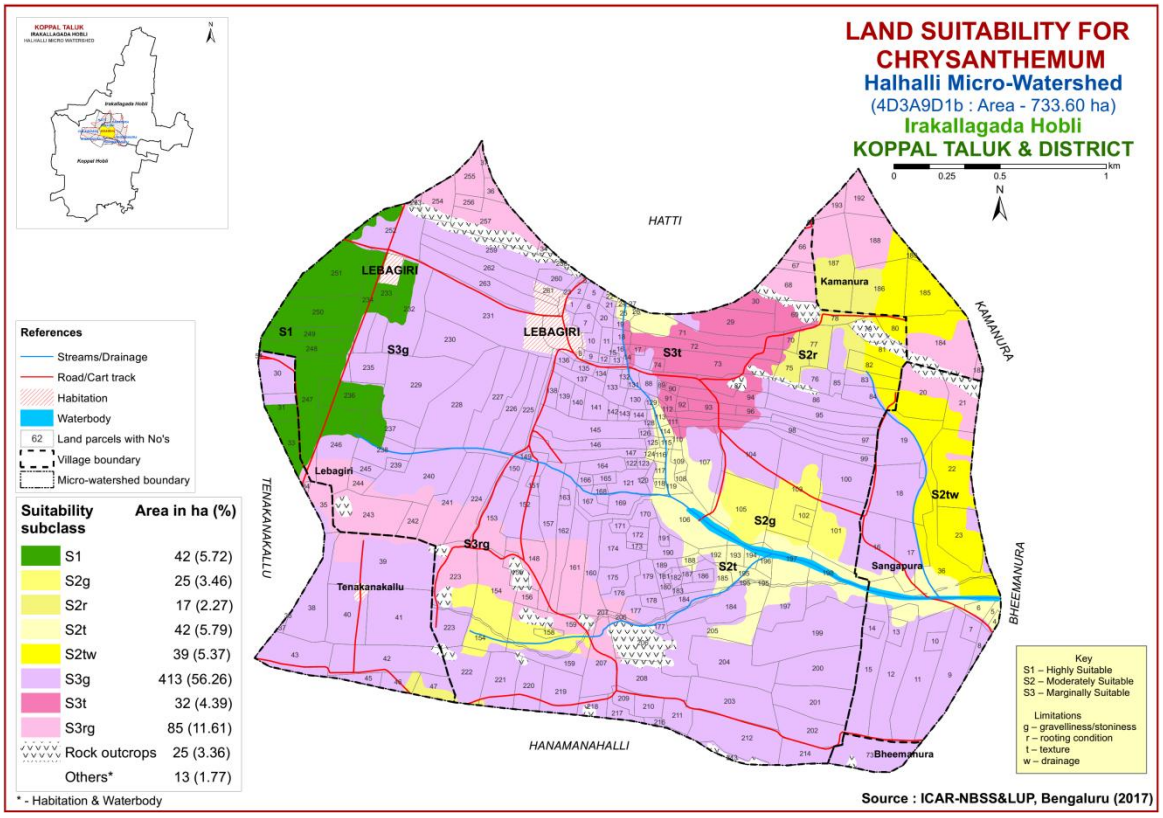


Fig. 7.26 Land Suitability map of Chrysanthemum

7.27 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 7.28) 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 7.27.

Table 7.28 Crop suitability criteria for jasmine (irrigated)

Crop requirement			Rating			
Soil-site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season		18-23	17-15 24-35	35-40 10-14	
Soil aeration	Soil drainage	Class	Well drained	Moderately drained	Imperfectly drained	Poorly drained
Nutrient availability	Texture	Class	Scl, l, scl, cl, sil	sicl,sc,sic,c (m/k)	C(ss),	ls, s
	pH	1:2.5	6.0-7.5	5.5-5.9:7.6-8.5	<5: >8.5	
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Strong calcareous	
Rooting conditions	Soil depth	Cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15	15-35	>35	
Soil toxicity	Salinity	ds/m	Non saline	Slight	Strongly	
	Sodicity	%	Non sodic	Slight	Strongly	
Erosion	Slope	%	1-3	3-5	5-10	

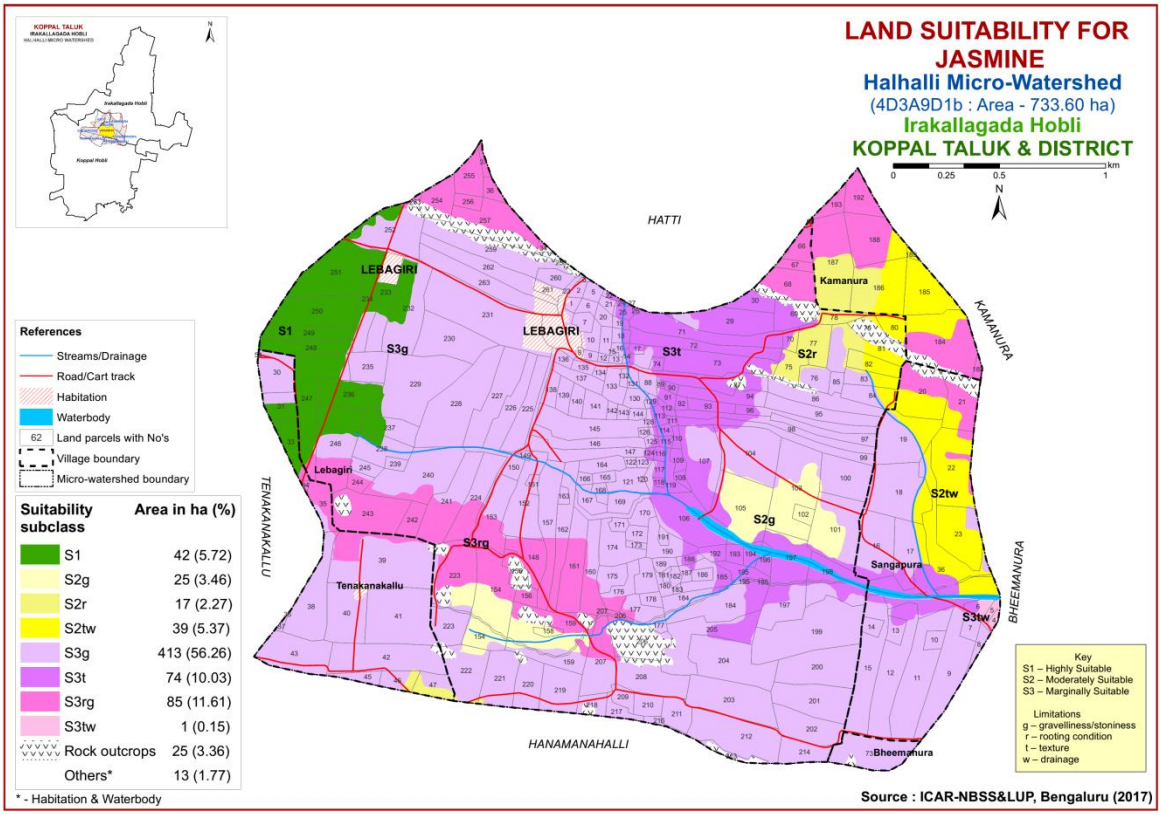


Fig. 7.27 Land Suitability map of Jasmine

An area of about 42 ha (6%) is highly suitable (Class S1) for growing jasmine and are distributed in the western part of the microwatershed. Moderately suitable (Class S2) lands cover an area of about 81 ha (11%) and occur in the southern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. Maximum area of about 573 ha (78%) is marginally suitable (Class

S3) for growing jasmine and distributed in the major part of the microwatershed with moderate limitations of gravelliness, rooting depth, drainage and texture.

7. 28 Land Suitability for Crossandra *(Crossandra infundibuliformis)*

Crossandra is one of the most important flower crop grown in almost all the districts of the State. The crop requirements (Table 7.28) for growing jasmine 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 7.28.

An area of about 42 ha (6%) is highly suitable (Class S1) for growing crossandra and are distributed in the western part of the microwatershed. Moderately suitable (Class S2) lands cover an area of about 122 ha (17%) and occur in the southern, central and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. Maximum area of about 531 ha (73%) is marginally suitable (Class S3) for growing crossandra and distributed in the major part of the microwatershed with moderate limitations of gravelliness, rooting depth, drainage and texture.

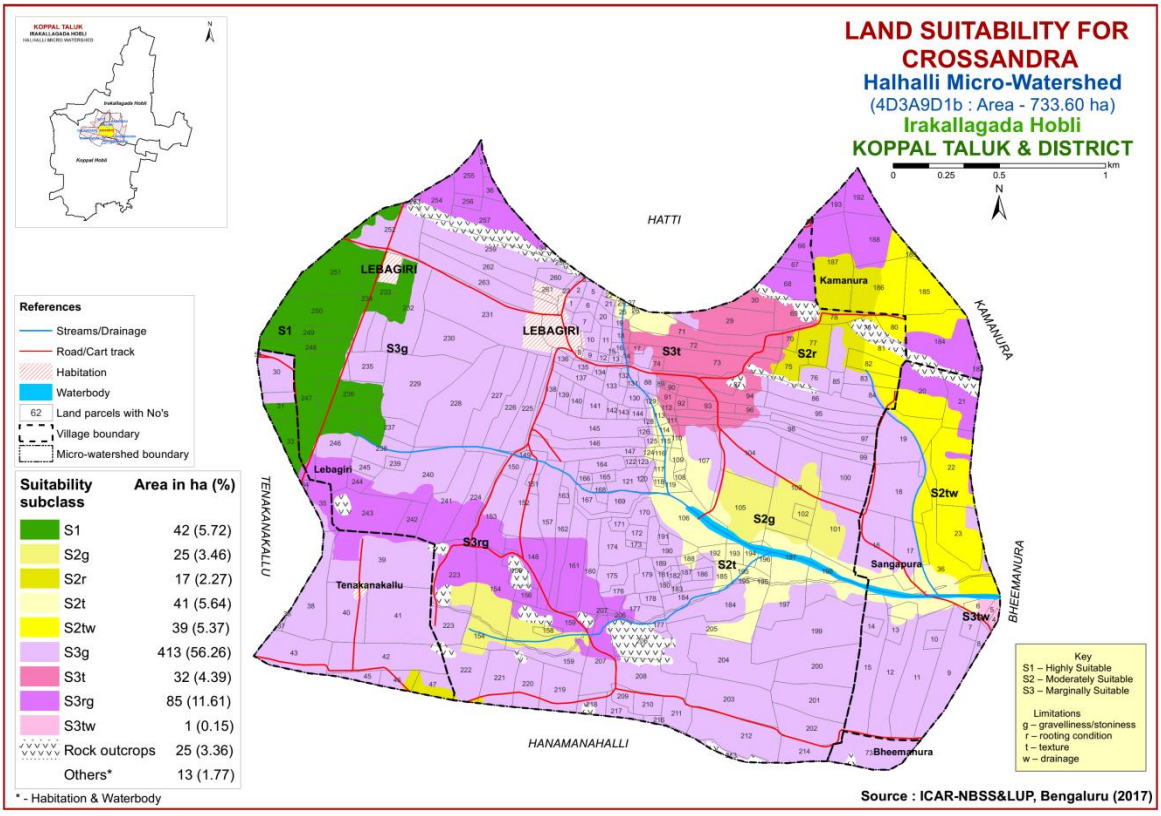


Fig. 7.28 Land Suitability map of Crossandra

7.29 Land Management Units (LMUs)

The 31 soil map units identified in Halhalli microwatershed have been grouped into eight 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 Units map (Fig.7.29) 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 eight Land Management Units along with brief description of soil and site characteristics are given below.

LMU	Mapping unit	Soil and site characteristics
1	RTRiB2, KMHcA1 GHThB2g1	Moderately deep to very deep, red sandy clay loam to clay soils with slopes of 0-3%, slight to moderate erosion, gravelly (15-35%)
2	BPRcA1g1,BPRcB2g1, BPRhB2,BPRiB1g1, BPRmB2,NGPbB1 NGPcB2g1,NGPhB1 NGPhB2,NGPiB2g1, HDHbB2g1,HDHhB2, HDHiB1,HDHmB2g1 BDGcB1g1,BDGcB2	Moderately deep to deep, red gravelly sandy clay to sandy clay loam soils with slopes of 0-3%, slight to moderate erosion, gravelly (15-35%)
3	NSPhB1, HDLmB1	Moderately deep to deep, black clay soils with slopes of 1-3%, slight erosion
4	HLPhB1	Moderately deep, lowland sandy clay soils with slopes of 1-3%, slight erosion
5	TDGmA1	Very deep, sandy loam to sand and lowland soils with slopes of 0-1%, slight erosion
6	LKRcB2g1, LKRiB1g2 LKRcB1, LKRhB2g1	Moderately shallow, red gravelly sandy clay to sandy clay loam soils with slopes of 1-3%, slight to moderate erosion, gravelly to very gravelly (15-60%)
7	TDHcB2g1, KTPcB1g1	Moderately shallow, red sandy clay to sandy clay loam soils with slopes of 1-3%, slight to moderate erosion, gravelly (15-35%)
8	HRVhB1g1	Shallow, gravelly red loamy soils with slopes of 1-3%, slight erosion, gravelly (15-35%)

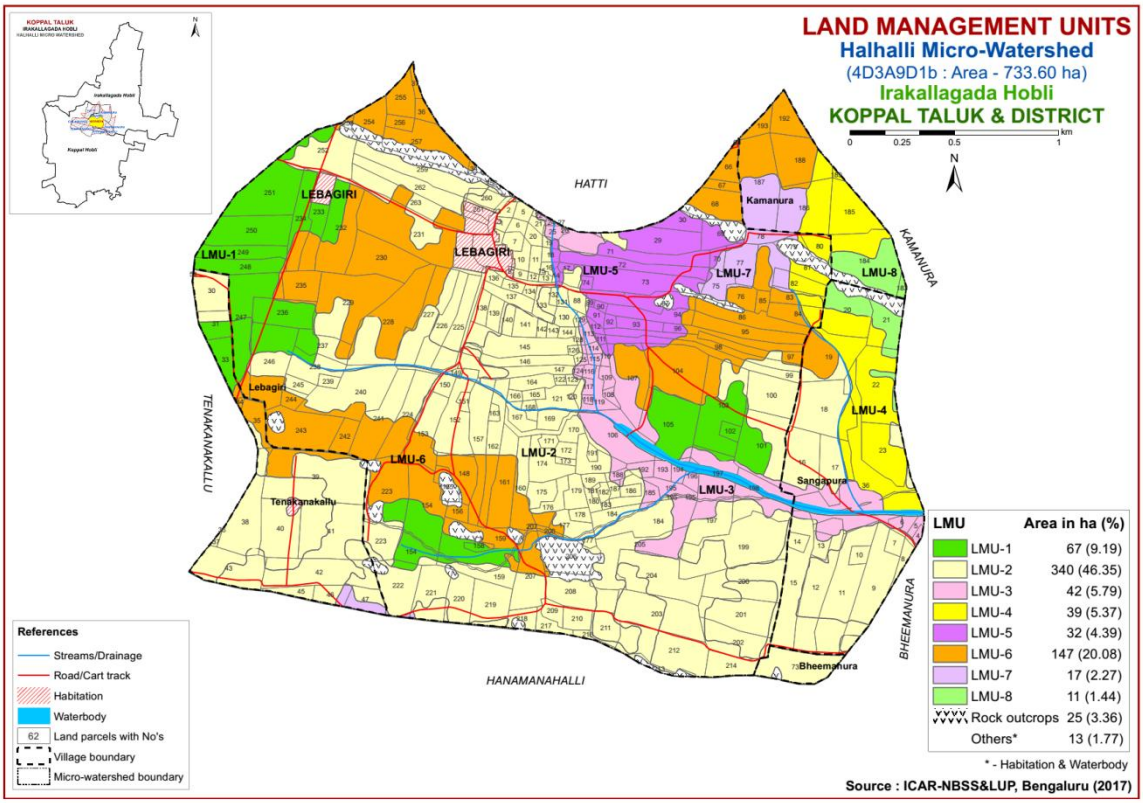


Fig 7.29 Land Management Units map of Halhalli microwatershed

7.30 Proposed Crop Plan for Halhalli Microwatershed

After assessing the land suitability for the 28 crops, the proposed crop plan has been prepared for the 8 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 28 crops. The resultant proposed crop plan is presented in Table 7.28.

Table 7.28 Proposed Crop Plan for Halhalli Microwatershed

Proposed LMU	Soil Map Units	Survey Number	Field Crops	Horticulture Crops	Suitable Interventions
1	288. RTRiB2 196. KMHcA1 142. GHThB2g1 (Moderately deep to very deep, red sandy clay loam to clay soils)	**Lebageri:**102,103,105,154,158,159,233,234,236,237,246,247,248,249,250,251 **Tenakanakallu:** 31,33	Maize, Sorghum, Bajra, Groundnut, Redgram, Castor	**Fruit crops:** Guava, Sapota, Mango, Jackfruit, Jamun, Tamarind**,** Lime, Pomegranate, Musambi, Amla, Custard apple **Vegetables:** Drumstick, Tomato, Chilli, Brinjal **Flowers:** Marigold, Chrysanthemum, Jasmine, crossandra	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit *etc*)
2	221. BPRcA1g1 225.BPRcB2g1 230. BPRhB2 238. BPRiB1g1 240. BPRmB2 249. NGPbB1 251. NGPcB2g1 257. NGPhB1 260 .NGPhB2 265. NGPiB2g1 105. HDHbB2g1 122. HDHhB2 125. HDHiB1 132. HDHmB2g1 180. BDGcB1g1 455. BDGcB2 (Moderately deep to deep, red gravelly sandy clay to sandy clay loam soils)	**Bheemanura :**73 **Chilavadagi**: 54 **Lebageri:**1,2,3,5,6,7,9,10,11,12,13,15, 16,18,19,20,21,88,99,100,101,120,121, 122,123,126,128,129,130,131,132,133, 134,135,136,137,138,139,140,141,142, 143,144,145,146,147,149,150,151,152, 157,162,163,164,165,166,167,168,169, 170,171,172,173,174,175,176,177,178, 179,180,181,182,183,184,185,186,187, 189,190,191,199,200,201,202,203,204, 205,207,208,209,210,211,212,214,216, 217,218,219,220,221,222,224,225,226, 227,238,239,240,245,252,259,260,262, 263 **Sangapura:**7,8,9,10,11,12,13,14,15,16, 17,18 **Tenakanakallu:** 30,36,37,38,39,40,41, 42,43,45,46	Groundnut, Redgram, Bajra, Horse gram, Castor	**Fruit crops:** Lime, Musambi**,** Jackfruit, Jamun, Amla, Cashew, Custard apple **Vegetables:** Drumstick	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit *etc*)
3	355.NSPhB1 380. HDLmB1	**Lebageri:**22,24,25,26,27,106,108,109, 110,113,114,115,116,117,118,119,124,	Sunflower, Sorghum, Cotton,	**Fruit crops:** Jamun, Lime, Musambi, Pomegranate,	Application of FYM, Biofertilizers and

	(Moderately deep to deep, black clay soils)	125,127,188,192,193,194,195,196,197, 198 **Sangapura:** 4,5,6	Bengal gram, Safflower, Linseed, Bajra	Amla, Custard apple **Vegetables:** Drumstick, Chilli, Coriander **Flowers:** Marigold, Chrysanthemum	micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
4	437. HLPhB1 (Moderately deep, lowland sandy clay soils)	**Kamanura:**185,186,189 **Lebageri :** 80,82 **Sangapura:** 20,22,23,36	Paddy	**Vegetables:** Brinjal, Tomato, Drumstick **Fruit crops:** Guava, Sapota, Custard Apple, Amla	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practices
5	441. TDGmA1 (Very deep, sandy loam to sandy and lowland soils)	**Lebageri :** 14,17,29,30,69,70,71,72,73,74, 87,89, 90,91, 92,93,94,111,112	-	**Vegetables:** Brinjal, Tomato, Carrot, Beetroot **Flower crops:** Marigold, Chrysanthemum, Jasmine**,** Crossandra	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practices
6	43. LKRcB2g1 52. LKRiB1g2 451. LKRcB1 452. LKRhB2g1 (Moderately shallow, red gravelly sandy clay to sandy clay loam soils)	**Kamanura:** 188,192,193 **Lebageri:**36,37,65,66,67,68,76,81,83, 84,85,86,95,96,97,98,104,107,148,153, 156,160,161,223,228,229,230,231,232, 235,241,242, 243,244,254,255,256, 257 **Sangapura:** 19 **Tenakanakallu:** 34,35	Bajra, Horse gram	**Fruit crops:** Amla, Custard apple **Vegetables:** Drumstick	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
7	56. TDHcB2g1 71. KTPcB1g1 (Moderately shallow, red sandy clay to sandy clay loam soils)	**Kamanura:** 187 **Lebageri:** 75,77,78 **Tenakanakallu :** 47	Maize, Sorghum, Groundnut, Bajra	**Fruit crops:** Amla, Custard apple **Flowers:** Marigold, Chrysanthemum **Vegetables:** Drumstick	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
8	23. HRVhB1g1 (Shallow, gravelly red loamy soils)	**Kamanura:** 183,184 **Sangapura:** 21	Horsegram, Bajra	**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 & 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 Halhalli Microwatershed

- The soil phases with sizeable area identified in the microwatershed belonged to the soil series of LKR (148 ha), NGP (96 ha), HDH (95ha), BPR (81 ha), BDG (68 ha), HDL (41 ha), HLP (39 ha), RTR (37 ha),TDG (32 ha), GHT (25 ha), TDH (15 ha), HRV (11ha), KMH (5 ha), KTP (2 ha) and NSP (1 ha).
- As per land capability classification, entire area in the microwatershed falls under arable land category (Class II and III). The major limitations identified in the arable lands were soil and erosion.

- On the basis of soil reaction, an area of about 16 ha (2%) is very strongly to strongly acid (pH 4.5-5.5), 200 ha (27%) is moderately to slightly acid (pH 5.5 -6.5), 183 ha (25%) is neutral (pH 6.5-7.3), 265 ha (36%) is slightly alkaline to moderately alkaline (pH 7.3-8.4), 33 ha (4 %) is under strongly alkaline to very strongly alkaline (pH 8.4- >9.0) in reaction. Thus, major portion of the soil are alkaline in 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

Acid soils occupy an area of about 216 ha (295) in the microwatershed. The following measures recommended for reclaiming acid soils.

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

Liming materials:

1. $CaCO_3$ (Calcium Carbonate). More than 90% use in India.
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

Alkaline soils

An area of about 298 ha (40%) is under alkaline soils. The following actions area recommended.

(Slightly alkaline to strongly alkaline soils)

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

Neutral soils

Neutral soils cover about 183 ha (25%) and the following actions are recommended.

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.

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

Soil Degradation

Soil erosion is one of the major factors affecting the soil health in the microwatershed. An area of about 369 ha (50 %) is under moderate erosion. The areas with moderate erosion 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, raddish, potato etc) but not ideal for crops that need stagnant water like lowland paddy. Heavy textured soils are

poor in water infiltration and percolation. They are prone for sheet erosion; such soils can be improved by sand mulching. The technology that is developed by the AICRP-Dryland Agriculture, Vijayapura, Karnataka can be adopted.

- **Gravelliness:** More gravel content is favorable for run-off harvesting but poor in soil moisture storage and nutrient availability. It is a significant parameter that decides the kind of crop to be raised.
- **Land Capability Classification:** The land capability map shows the areas suitable and not suitable for agriculture and the major constraints in each of the plot/survey number. Hence, one can decide what kind of enterprise is possible in each of these units. In general, erosion and soil are the major constraints in Halhalli Microwatershed.
- **Organic Carbon:** An area of about 79 ha (11 %) is low in OC content, 316 ha (43%)is medium (0.5-0.75%) and 301 ha (41%) is high (>0.75%) in OC content. The areas that are low and medium in OC needs to be further improved by applying farmyard manure and rotating crops with cereals and legumes or mixed cropping.
- **Promoting green manuring:** Growing of green manuring crops costs Rs. 1250/ha (green manuring seeds) and about Rs. 2000/ha towards cultivation that totals to Rs. 3250/- per ha. On the other hand, application of organic manure @ 10 tons/ha costs Rs. 5000/ha. The practice needs to be continued for 2-3 years or more. Nitrogen fertilizer needs to be supplemented by 25% in addition to the recommended level in 395 ha area where OC is less than 0.75 per cent. For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg /ha needs to be applied for all the crops grown in these plots.
- **Available Phosphorus**: Available phosphorus is low (<23 kg/ha) in 1 ha (<1%), medium (23-57 kg/ha) in 448 ha (61%) and high (>57 kg/ha) in 246 ha (34 %) of the soils. The areas where phosphorus content is high, reduce 25 per cent from the RDF to avoid the excess application of fertilizer and apply additional 25% phosphorus in areas where it is or low medium.
- **Available Potassium:** Available potassium is low (<145 kg/ha) in 20 ha (3%), medium (145-337 kg/ha) in 553 ha (75%) and high (>337 kg/ha) in 123 ha (17%) area of the microwatershed. The areas where potassium content is high, reduce 25% from the RDF to avoid the excess application of fertilizer and apply additional 25% potassium in areas where it is low or medium.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops. Available sulphur is low (<10 ppm) in 184 ha (25%), medium in 268 ha (37 %) and high (>20ppm) in 244 ha (33%) area of the microwatershed. Areas with low and medium in available sulphur 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 iron:** It is deficient (<4.5 ppm) in 358 ha (49%) and sufficient (>4.5 ppm) in 338 ha (46 %) area of the microwatershed. To manage iron deficiency iron sulphate @ 25 kg/ha needs to be applied for 2-3 years.

- **Available Zinc:** It is deficient (<0.6 ppm) in 594 ha (81%) and sufficient (>0.6ppm) in 102 ha (14%) area of the microwatershed. Application of zinc sulphate @ 25kg/ha is to be followed in areas that are deficient in available zinc.
- **Available Boron:** Area of about 451 ha (62%) is low (<0.5 ppm) in available boron, and 245 ha (33 %) is medium (05-1.0 ppm) in available boron content. The areas with low and medium in boron content need to be applied with sodium borate @ 10kg/ha as a soil application or 0.2% borax as foliar spray to correct the deficiency.
- **Available Manganese**: It is sufficient in the entire area of the microwatershed**.**
- **Available Copper:** It is sufficient in the entire area of the microwatershed**.**
- **Soil acidity:** The microwatershed has 216 ha (29%) area with soils that are very strongly to slightly acid. These areas need application of lime (Calcium Carbonate).
- **Soil alkalinity:** The maximum area of about 298 ha (40 %) in the microwatershed has soils that are slightly acid to very 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.

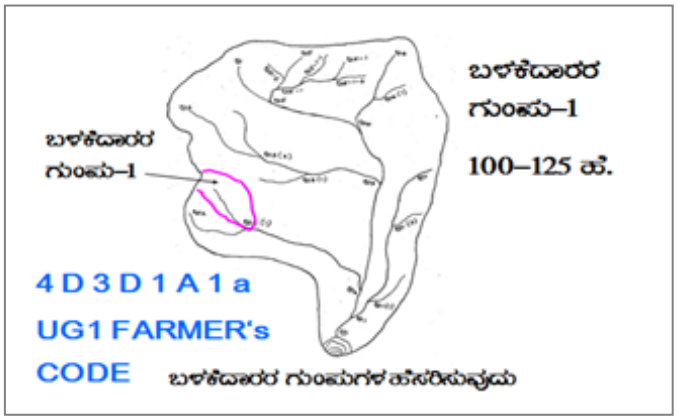
Land Suitability for various crops: Areas that are highly, moderately and marginally suitable and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, 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 Halhalli 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 has to be collected.

Steps for Survey and Preparation of Treatment Plan

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

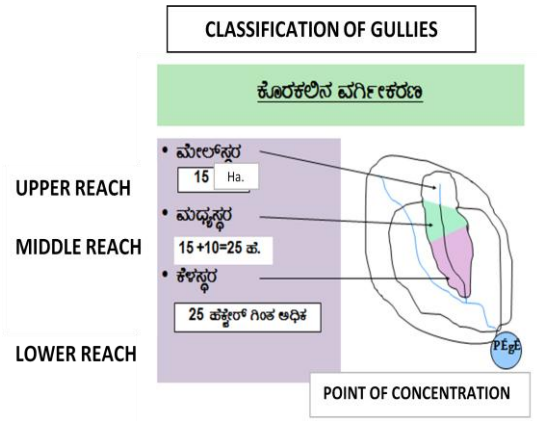
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge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

9.1 Treatment Plan

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

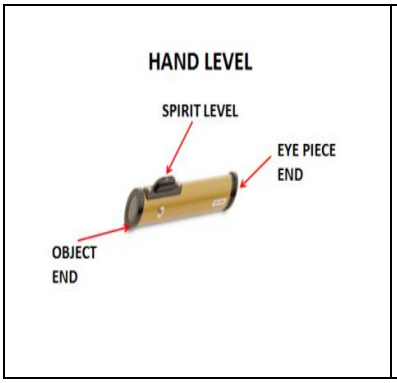
9.1.1 Arable Land Treatment

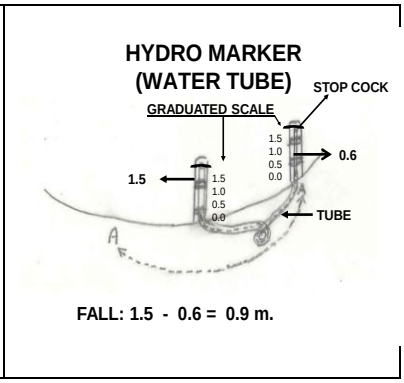
A. BUNDING

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

Measurement of Land Slope

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





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

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

Note: i) The above intervals are maximum.

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

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

Section of the Bund

Bund section is decided considering the soil texture class and gravelliness class (bg_0 .....b =loamy sand, g_0 = <15% gravel). The recommended sections for different soils are given below.

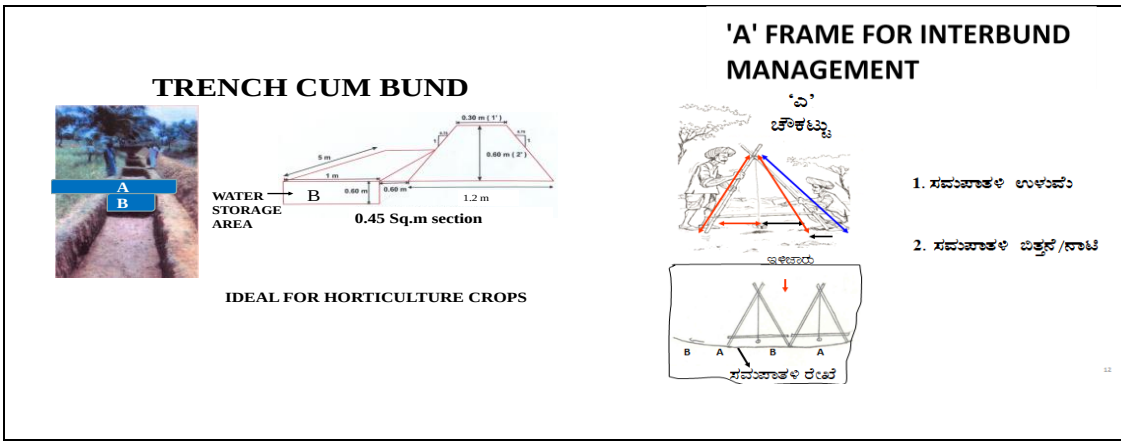
Recommended Bund Section

Top width (m)	Base width (m)	Height (m)	Side slope (Z:1;H :V)	Cross section (sq m)	Soil Texture	Remarks
0.3	0.9	0.3	01:01	0.18	Sandy loam	Vegetative bund
0.3	1.2	0.3	1.5:1	0.225	Sandy clay	
0.3	1.2	0.5	0.9:1	0.375	Red gravelly soils	
0.3	1.2	0.6	0.75:1	0.45		
0.3	1.5	0.6	01:01	0.54	Red sandy loam	
0.3	2.1	0.6	1.5:1	0.72	Very shallow clayey black soils	
0.45	2	0.75	01:01	0.92		
0.45	2.4	0.75	1.3:1	1.07	Shallow clayey black soils	
0.6	3.1	0.7	1.78:1	1.29	Medium clayey black 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 topit)	Soil depth Class
m^2	m	m^3	L(m)	W(m)	D(m)	QUANTITY (m^3)	m	
0.375	6	2.25	5.85	0.85	0.45	2.24	0.15	Shallow
0.45	6	2.7	5.4	1.2	0.43	2.79	0.6	Shallow
0.45	6	2.7	5	0.85	0.65	2.76	1	Moderately Shallow
0.54	5.6	3.02	5.5	0.85	0.7	3.27	0.1	Moderately shallow
0.54	5.5	2.97	5	1.2	0.5	3	0.5	Shallow
0.72	6.2	4.46	6	1.2	0.7	5.04	0.2	Moderately shallow
0.72	5.2	3.74	5.1	0.85	0.9	3.9	0.1	Moderately deep

B. 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. A maximum area of about 573 ha (78 %) needs trench cum bunding, an area of about 82 ha (11 %) needs graded bunding and an area of about 42 ha (6%) requires strengthening of existing bunds. The conservation plan prepared may be presented to all the stakeholders including farmers and after considering their suggestions, the conservation plan for the microwatershed may be finalized in a participatory approach.

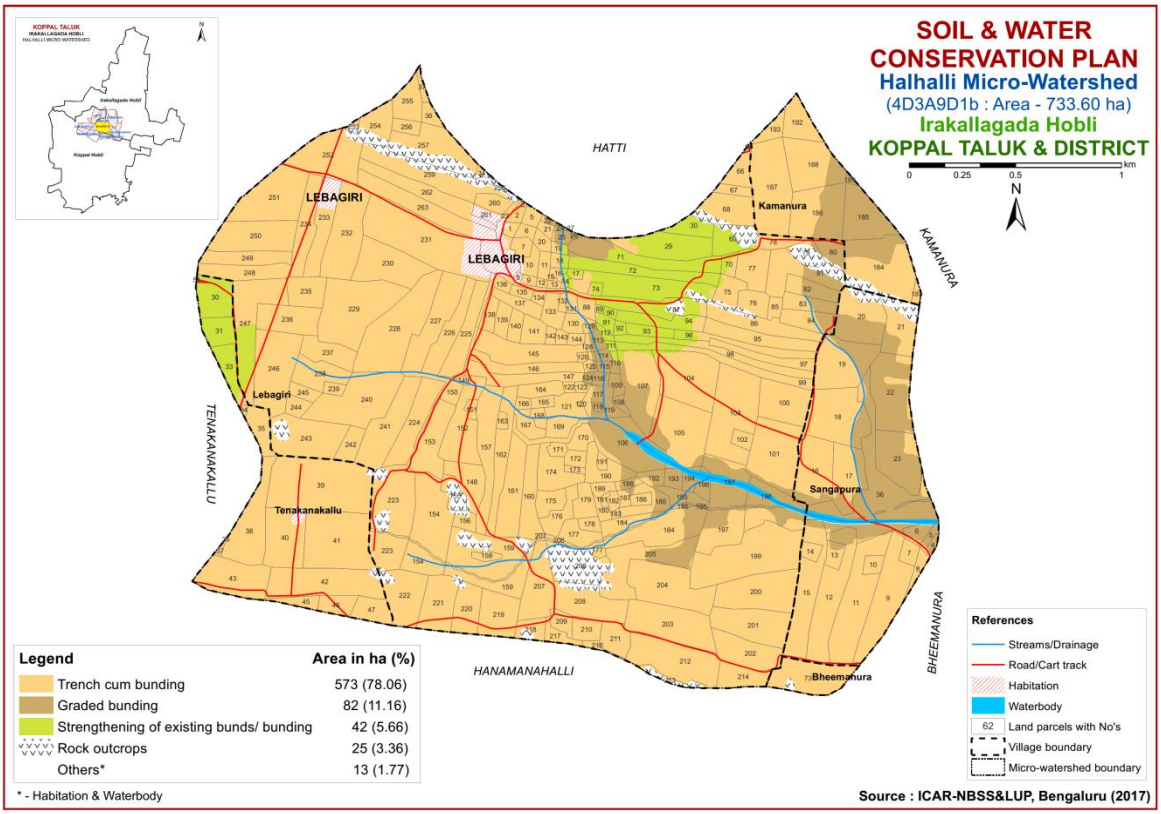


Fig. 9.1 Soil and Water Conservation Plan map of Halhalli Microwatershed

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

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

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

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Appendix I

Halhalli Microwatershed

Soil Phase Information

Village	Sy 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
Bheemanura	73	5.11	BPRmB2	LMU-2	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Chilavadagi	54	0	BPRcA1g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Pearl millet (Pm)	Not Available	IIIs	Field bunds
Kamanura	183	0.35	HRVhB1g1	LMU-8	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Kamanura	184	8.46	HRVhB1g1	LMU-8	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Kamanura	185	4.42	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Jowar (Jw)	Not Available	IIew	Graded bunding
Kamanura	186	6.08	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIew	Graded bunding
Kamanura	187	7.74	TDHcB2g1	LMU-7	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Maize (Jw+Mz)	Not Available	IIes	TCB
Kamanura	188	5.38	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Kamanura	189	0.18	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIew	Graded bunding
Kamanura	192	2.45	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Jowar (Jw)	Not Available	IIIs	TCB
Kamanura	193	1.07	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	1	0.42	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	2	0.47	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	3	0.1	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	5	0.66	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	6	0.56	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	7	0.79	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	8	0.15	Habitation	Habitation	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Lebagiri	9	0.32	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	10	0.96	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	11	0.71	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	12	0.21	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB

Village	Sy 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
Lebagiri	13	0.25	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	14	0.21	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	15	0.05	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	16	0.38	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	17	0.33	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	18	0.58	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	19	0.4	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	20	0.62	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	21	0.41	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	22	0.19	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	23	0.55	Habitation	Habitation	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Lebagiri	24	0.17	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	25	0.52	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	26	0.1	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	27	0	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	29	4.78	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	30	1.6	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	34	0.27	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Bajra (Bj)	Not Available	Rock outcrops	Rock outcrops
Lebagiri	36	0.76	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	37	0.41	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	65	0.04	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIIs	TCB
Lebagiri	66	1.52	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	67	0.77	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	68	3.54	LKRcB1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB

Village	Sy 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
Lebagiri	69	2.55	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	70	0.75	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	71	4.91	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	72	3.77	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	73	6.1	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	74	0.39	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	75	1.72	TDHcB2g1	LMU-7	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	76	1.64	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	77	2.68	TDHcB2g1	LMU-7	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	TCB
Lebagiri	78	1.36	TDHcB2g1	LMU-7	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	TCB
Lebagiri	79	1.45	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Bajra (Bj)	Not Available	Rock outcrops	Rock outcrops
Lebagiri	80	1.48	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIew	Graded bunding
Lebagiri	81	4.37	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	82	1.9	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIew	Graded bunding
Lebagiri	83	1.73	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	84	2.26	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	85	0.65	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	86	3.71	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	87	3.37	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	88	0.8	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	89	0.15	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	90	0.27	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	91	0.56	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	92	0.37	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds

Village	Sy 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
Lebagiri	93	1.14	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	94	2.41	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	95	3.3	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	96	2.31	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	97	1.97	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	98	3.21	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Lebagiri	99	3.36	HDHiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	TCB
Lebagiri	100	4.27	HDHiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	TCB
Lebagiri	101	6.93	HDHiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	TCB
Lebagiri	102	0.72	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	Bajra (Bj)	Not Available	IIes	TCB
Lebagiri	103	8.3	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	Bajra+Maize (Bj+Mz)	Not Available	IIes	TCB
Lebagiri	104	6.76	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Current fallow (Bj+Cf)	Not Available	IIIes	TCB
Lebagiri	105	7.28	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	TCB
Lebagiri	106	7.18	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIs	Graded bunding
Lebagiri	107	5.73	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	108	0.4	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	109	0.61	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	110	0.37	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	111	0.21	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIw	Field bunds
Lebagiri	112	0.33	TDGmA1	LMU-5	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIw	Field bunds
Lebagiri	113	0.48	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	114	0.39	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	115	0.35	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding

Village	Sy 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
Lebagiri	116	0.37	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	117	0.41	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	118	0.22	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	119	1.74	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	120	0.06	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	121	1.82	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	122	0.28	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	123	0.33	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	124	0.21	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	125	0.36	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	126	0.23	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	TCB
Lebagiri	127	0.14	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	128	0.32	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	129	0.35	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	130	0.91	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	131	0.51	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	132	0.31	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	133	1.38	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	134	0.36	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	135	0.52	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	136	0.5	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	137	1.48	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	138	1.04	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	139	1.06	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB

Village	Sy 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
Lebagiri	140	0.95	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	141	1.4	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	142	0.39	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	143	0.38	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	144	0.43	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	145	4.94	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Sugarcane (Mz+Sc)	Not Available	IIes	TCB
Lebagiri	146	2.66	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Banana (Bn)	Not Available	IIes	TCB
Lebagiri	147	2.9	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	148	2.78	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	149	0.25	NGPbB1	LMU-2	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	150	0.79	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	151	0.46	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	152	4.83	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	153	4.11	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	154	8.08	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	TCB
Lebagiri	155	1.36	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Maize (Mz)	Not Available	Rock outcrops	Rock outcrops
Lebagiri	156	0.89	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	157	4.97	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	158	0.57	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	Bajra+Maize (Bj+Mz)	Not Available	IIes	TCB
Lebagiri	159	8.9	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	TCB
Lebagiri	160	3.26	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	161	4.54	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	162	3.71	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	163	0.38	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB

Village	Sy 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
Lebagiri	164	1.42	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	165	0.56	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	166	0.4	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	167	1.26	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	168	0.6	HDHmB2g1	LMU-2	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	169	1.26	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	170	1.13	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	171	0.54	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	172	0.77	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	173	0.3	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	174	2.82	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	175	1.52	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	176	1.8	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	177	2.11	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	178	0.65	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	179	1.47	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	180	0.55	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	181	0.21	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	182	0.45	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	183	0.16	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	184	6.67	BPRiB1g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	185	1.82	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	186	0.56	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	187	0.44	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB

Village	Sy 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
Lebagiri	188	0.51	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	189	0.63	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	190	2.28	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	191	0.35	BDGcB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	192	0.84	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	193	0.76	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	194	0.82	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	195	1.36	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	196	0.88	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Lebagiri	197	7.81	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Current fallow (Bj+Cf)	Not Available	IIs	Graded bunding
Lebagiri	198	4.88	HDLmB1	LMU-3	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Lebagiri	199	9.99	BDGcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Lebagiri	200	6.18	BPRmB2	LMU-2	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Lebagiri	201	5.23	NGPhB1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	202	4.06	NGPhB1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	203	6.68	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	204	6.86	BPRiB1g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	205	6.08	BPRiB1g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	206	4.43	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Sugarcane (Sc)	Not Available	Rock outcrops	Rock outcrops
Lebagiri	207	4.49	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	208	4.7	NGPcB2g1	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	TCB
Lebagiri	209	1	NGPcB2g1	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	TCB
Lebagiri	210	1.4	NGPcB2g1	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	TCB

Village	Sy 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
Lebagiri	211	1.94	BPRiB1g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	212	6.78	BPRiB1g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	213	0.86	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Scrubland (Sl)	Not Available	Rock outcrops	Rock outcrops
Lebagiri	214	2.34	BPRiB1g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIIs	TCB
Lebagiri	216	0.4	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	217	0.97	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Scrubland (Mz+Sl)	Not Available	IIIes	TCB
Lebagiri	218	1.34	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	219	3.69	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	220	2.87	NGPcB2g1	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	TCB
Lebagiri	221	3.99	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Lebagiri	222	4.54	NGPcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	223	9	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	224	4.15	BDGcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut+Maize (Gn+Mz)	Not Available	IIIes	TCB
Lebagiri	225	3.41	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	226	3.35	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	TCB
Lebagiri	227	5.17	NGPbB1	LMU-2	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	228	9.27	LKRcB2g1	LMU-6	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	IIes	TCB
Lebagiri	229	9.1	LKRcB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIes	TCB
Lebagiri	230	5.45	LKRcB2g1	LMU-6	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	IIes	TCB
Lebagiri	231	11.6	LKRcB2g1	LMU-6	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	IIes	TCB
Lebagiri	232	6.77	LKRcB2g1	LMU-6	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	IIes	TCB
Lebagiri	233	3.76	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIe	TCB
Lebagiri	234	3.62	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIe	TCB

Village	Sy 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
Lebagiri	235	2.49	LKRcB2g1	LMU-6	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	IIes	TCB
Lebagiri	236	3.78	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIe	TCB
Lebagiri	237	2.62	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIe	TCB
Lebagiri	238	2.92	BDGcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	239	0.56	BDGcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	240	7.69	BDGcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	241	5.46	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Lebagiri	242	1.47	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	243	6.08	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Lebagiri	244	0.92	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	245	0.88	BDGcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	246	6.99	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIe	TCB
Lebagiri	247	7.06	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIe	TCB
Lebagiri	248	2.98	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIe	TCB
Lebagiri	249	2.7	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIe	TCB
Lebagiri	250	5.44	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIe	TCB
Lebagiri	251	6.71	RTRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIe	TCB
Lebagiri	252	6.18	NGPhB1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIIs	TCB
Lebagiri	253	0.26	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Bajra (Bj)	Not Available	Rock outcrops	Rock outcrops
Lebagiri	254	2.63	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	255	2.23	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	256	0.84	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Lebagiri	257	5.83	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Lebagiri	258	0.49	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Bajra (Bj)	Not Available	Rock outcrops	Rock outcrops

Village	Sy 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
Lebagiri	259	6.11	NGPhB1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIIs	TCB
Lebagiri	260	1.2	HDHbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	TCB
Lebagiri	261	0.69	Habitation	Habitation	Others	Others	Others	Others	Others	Others	Bajra (Bj)	Not Available	Others	Others
Lebagiri	262	4.1	NGPhB1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Lebagiri	263	5.27	NGPhB1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Sangapura	4	0.27	NSPhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	Graded bunding
Sangapura	5	0.4	NSPhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Sangapura	6	0.81	NSPhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	Graded bunding
Sangapura	7	0.84	NGPiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Sangapura	8	0.75	NGPiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Sangapura	9	6.75	NGPiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Sangapura	10	0.76	NGPiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Sangapura	11	7.84	NGPiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Sangapura	12	6.66	NGPiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Sangapura	13	0.94	BPRmB2	LMU-2	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Sangapura	14	0.72	BPRmB2	LMU-2	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Sangapura	15	6.27	BPRmB2	LMU-2	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIIes	TCB
Sangapura	16	5.25	HDHiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Cotton+Maize (Ct+Mz)	Not Available	IIs	TCB
Sangapura	17	4.13	HDHiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	TCB
Sangapura	18	6.88	HDHiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	TCB
Sangapura	19	5.91	LKRiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIes	TCB
Sangapura	20	5.43	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIew	Graded bunding
Sangapura	21	3.97	HRVhB1g1	LMU-8	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	TCB
Sangapura	22	6.56	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIew	Graded bunding

Village	Sy 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
Sangapura	23	5.06	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIew	Graded bunding
Sangapura	36	12.58	HLPhB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIew	Graded bunding
Tenakanakallu	30	3.12	BPRcA1g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Tamarind (Td)	Not Available	IIIs	Field bunds
Tenakanakallu	31	1.93	KMHcA1	LMU-1	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Tamarind (Td)	Not Available	IIs	Field bunds
Tenakanakallu	33	2.14	KMHcA1	LMU-1	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Jowar (Jw)	Not Available	IIs	Field bunds
Tenakanakallu	34	0.14	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Pearl millet (Pm)	Not Available	IIIes	TCB
Tenakanakallu	35	1.97	LKRhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Tenakanakallu	36	0.01	BPRhB2	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Fallow land (Bj+Fl)	Not Available	IIIes	TCB
Tenakanakallu	37	0.17	BPRhB2	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Tenakanakallu	38	5.73	BPRhB2	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Tenakanakallu	39	11.57	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	Pearl millet+Redgram (Pm+Rg)	Not Available	IIes	TCB
Tenakanakallu	40	5.24	BPRhB2	LMU-2	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Mango (Mn)	Not Available	IIIes	TCB
Tenakanakallu	41	8.42	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	Pearl millet+Redgram (Pm+Rg)	Not Available	IIes	TCB
Tenakanakallu	42	7.12	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	Mango+Jowar (Mn+Jw)	Not Available	IIes	TCB
Tenakanakallu	43	5.18	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	Pearl millet+Redgram (Pm+Rg)	Not Available	IIes	TCB
Tenakanakallu	45	0.96	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	Fallow land+Redgram (Fl+Rg)	Not Available	IIes	TCB
Tenakanakallu	46	1.49	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	Mango (Mn)	Not Available	IIes	TCB
Tenakanakallu	47	1.92	KTPcB1g1	LMU-7	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Pearl millet+Redgram (Pm+Rg)	Not Available	IIs	TCB

Appendix II

Halhalli 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
Bheemanura	73	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Chilavadagi	54	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kamanura	183	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 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)	Deficient (< 0.6 ppm)
Kamanura	184	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	185	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	186	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	187	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	188	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	189	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	192	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)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kamanura	193	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)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	1	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Others	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	2	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Others	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	3	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	5	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	6	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	7	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Others	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	8	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Lebagiri	9	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	10	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Others	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	11	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	12	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	13	Moderately alkaline	Non saline	High (> 0.75	Medium (23 –	High (> 337	High (> 20	Medium (0.5 –	Deficient (<	Sufficient (>	Sufficient (>	Deficient (< 0.6

		(pH 7.8 – 8.4)	(<2 dsm)	%)	57 kg/ha)	kg/ha)	ppm)	1.0 ppm)	4.5 ppm)	1.0 ppm)	0.2 ppm)	ppm)
Lebagiri	14	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	15	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	16	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	17	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	18	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	19	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	20	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	21	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	22	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	23	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Lebagiri	24	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	25	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	26	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	27	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	29	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	30	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	34	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	36	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	Low (<145 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)
Lebagiri	37	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Low (< 0.5 %)	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)
Lebagiri	65	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)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	66	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	67	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	68	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	69	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	70	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Lebagiri	**71**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**72**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**73**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**74**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**75**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**76**	**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)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**77**	**Slightly alkaline (pH 7.3 – 7.8)**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**78**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**79**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**
Lebagiri	**80**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**81**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**82**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**83**	**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)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**84**	**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)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**85**	**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)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**86**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**87**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**88**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**89**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**90**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**91**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**92**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**93**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**94**	**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)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**95**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	**96**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**97**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**98**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**99**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**100**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**101**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**102**	**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)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**103**	**Slightly acid (pH 6.0 – 6.5)**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**104**	**Slightly acid (pH 6.0 – 6.5)**	**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)**
Lebagiri	**105**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**106**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**107**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**High (> 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**108**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**109**	**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)**
Lebagiri	**110**	**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)**
Lebagiri	**111**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**112**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**113**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**114**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**115**	**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)**	**Medium (0.5 – 1.0 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**116**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**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)**
Lebagiri	**117**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**118**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**119**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**120**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	**121**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**122**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**123**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**124**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**125**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**126**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**127**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**128**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**129**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**130**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**131**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**132**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**133**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**134**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**135**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**136**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**137**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**138**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**139**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**140**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**141**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**142**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**143**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**144**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**145**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	**146**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**147**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**148**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**149**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**150**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**151**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**152**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**153**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**154**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**155**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**
Lebagiri	**156**	**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)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**157**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**158**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**159**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**160**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**161**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**162**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**163**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**164**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**165**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**166**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**167**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**168**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**169**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**170**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	**171**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**172**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 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)**
Lebagiri	**173**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 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)**
Lebagiri	**174**	**Slightly alkaline (pH 7.3 – 7.8)**	**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)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**175**	**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)**
Lebagiri	**176**	**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)**
Lebagiri	**177**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**178**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**179**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**High (> 57 kg/ha)**	**Low (<145 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**180**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**High (> 57 kg/ha)**	**Low (<145 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**181**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**182**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**183**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**184**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**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)**
Lebagiri	**185**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**186**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 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)**
Lebagiri	**187**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**188**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**189**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**190**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**191**	**Strongly alkaline (pH 8.4 – 9.0)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**192**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**193**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**194**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**195**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	**196**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**197**	**Moderately alkaline (pH 7.8 – 8.4)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**198**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**High (> 57 kg/ha)**	**Low (<145 kg/ha)**	**Medium (10 – 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**199**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**High (> 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**200**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**High (> 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**201**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**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)**	**Deficient (< 0.6 ppm)**
Lebagiri	**202**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**203**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**204**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**205**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**206**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**
Lebagiri	**207**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**208**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**209**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**210**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**211**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**212**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**213**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**	**Rock outcrops**
Lebagiri	**214**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Low (< 0.5 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**216**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**217**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**218**	**Strongly acid (pH 5.0 – 5.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**219**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 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)**
Lebagiri	**220**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Low (<145 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**221**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	**222**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Rock outcrops**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**223**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**224**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**225**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**226**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**227**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Medium (0.5 – 1.0 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**228**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**229**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**230**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**231**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Sufficient (> 0.6 ppm)**
Lebagiri	**232**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**High (> 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Others**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**233**	**Moderately acid (pH 5.5 – 6.0)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**High (> 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Others**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**234**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Others**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**235**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**High (> 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**236**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**237**	**Slightly alkaline (pH 7.3 – 7.8)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**238**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**239**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**240**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**241**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**242**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Low (<10 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**243**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**244**	**Slightly acid (pH 6.0 – 6.5)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**245**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Lebagiri	**246**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**Medium (0.5 – 0.75 %)**	**Medium (23 – 57 kg/ha)**	**High (> 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Deficient (< 4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Lebagiri	247	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	248	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	249	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	250	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	251	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	252	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Others	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	253	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	254	Very strongly acid (pH 4.5 – 5.0)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Rock outcrops	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Lebagiri	255	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	Low (<145 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)
Lebagiri	256	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	Low (<145 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)
Lebagiri	257	Rock outcrops	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Rock outcrops
Lebagiri	258	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	259	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	260	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	261	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Lebagiri	262	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Lebagiri	263	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Sangapura	4	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	5	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	6	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	7	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	8	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	9	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	10	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	11	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapur	12	Slightly acid (pH 6.0 –	Non saline	Low (< 0.5 %)	High (> 57	High (> 337	Medium (10 –	Medium (0.5 –	Deficient (<	Sufficient (>	Sufficient (>	Deficient (< 0.6

a		6.5)	(<2 dsm)		kg/ha)	kg/ha)	20 ppm)	1.0 ppm)	4.5 ppm)	1.0 ppm)	0.2 ppm)	ppm)
Sangapura	13	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	14	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	15	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Low (< 0.5 %)	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)	Deficient (< 0.6 ppm)
Sangapura	16	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	17	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	18	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	19	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	20	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Sangapura	21	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	22	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	23	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangapura	36	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	30	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	31	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	33	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	34	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	35	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	36	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	37	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	38	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	39	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	40	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	41	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakanakallu	42	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Tenakana	43	Slightly acid (pH 6.0 –	Non saline	High (> 0.75	Medium (23 –	Medium (145 –	Medium (10 –	Low (< 0.5	Sufficient	Sufficient (>	Sufficient (>	Deficient (< 0.6

kallu		**6.5)**	**(<2 dsm)**	**%)**	**57 kg/ha)**	**337 kg/ha)**	**20 ppm)**	**ppm)**	**(>4.5 ppm)**	**1.0 ppm)**	**0.2 ppm)**	**ppm)**
Tenakana kallu	**45**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Tenakana kallu	**46**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**
Tenakana kallu	**47**	**Neutral (pH 6.5 – 7.3)**	**Non saline (<2 dsm)**	**High (> 0.75 %)**	**Medium (23 – 57 kg/ha)**	**Medium (145 – 337 kg/ha)**	**Medium (10 – 20 ppm)**	**Low (< 0.5 ppm)**	**Sufficient (>4.5 ppm)**	**Sufficient (> 1.0 ppm)**	**Sufficient (> 0.2 ppm)**	**Deficient (< 0.6 ppm)**

Appendix III

Halhalli Microwatershed

Soil Suitability Information

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Bheemanura	73	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	S3g	S2g	S2g
Chilavadagi	54	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	S3g	S2g	S2g
Kamanura	183	N1rg	S3rg	N1rg	S3rg	N1rg	S3rt	N1rg	N1rg	S3rt	N1rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Kamanura	184	N1rg	S3rg	N1rg	S3rg	N1rg	S3rt	N1rg	N1rg	S3rt	N1rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Kamanura	185	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Kamanura	186	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Kamanura	187	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Kamanura	188	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Kamanura	189	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Kamanura	192	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Kamanura	193	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	1	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	S2g
Lebagiri	2	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	S2g
Lebagiri	3	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	S2g
Lebagiri	5	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	S2g
Lebagiri	6	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	S2g
Lebagiri	7	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	S2g
Lebagiri	8	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
Lebagiri	9	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	S2g
Lebagiri	10	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	S2g
Lebagiri	11	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	S2g
Lebagiri	12	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	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	13	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	S2g
Lebagiri	14	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	15	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	S2g
Lebagiri	16	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	S2g
Lebagiri	17	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	18	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	S2g
Lebagiri	19	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	S2g
Lebagiri	20	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	S2g
Lebagiri	21	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	S2g
Lebagiri	22	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	23	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
Lebagiri	24	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	25	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	26	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	27	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	29	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	30	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	34	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	36	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	37	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	65	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	66	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	67	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	68	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	69	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	70	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	71	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	72	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	73	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	74	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	75	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Lebagiri	76	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	77	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Lebagiri	78	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Lebagiri	79	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	80	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Lebagiri	81	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	82	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Lebagiri	83	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	84	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	85	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	86	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	87	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	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	S2g
Lebagiri	89	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	90	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	91	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	92	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	93	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	94	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	95	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	96	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	97	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	98	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	99	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	S2g
Lebagiri	100	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	S2g
Lebagiri	101	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	S2g
Lebagiri	102	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	S2g	S2rg	S2r
Lebagiri	103	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	S2g	S2rg	S2r
Lebagiri	104	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	105	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	S2g	S2rg	S2r
Lebagiri	106	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	107	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	108	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	109	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	110	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	111	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	112	S3t	S2t	S3t	S3t	S3t	N1t	S3t	S3t	N1t	S3t	S3t	S3t	S3t	S3t	N1t	S3t	S3t	S2t	S3t	S3t	S3t	S3t	S3t	S2t	S3t	S3t	S3t	S3t
Lebagiri	113	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	114	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	115	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	116	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	117	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	118	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	119	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	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	S2g
Lebagiri	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	S2g
Lebagiri	122	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	S2g
Lebagiri	123	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	S2g
Lebagiri	124	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	125	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	126	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	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	127	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	128	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	S2g
Lebagiri	129	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	S2g
Lebagiri	130	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	S2g
Lebagiri	131	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	S2g
Lebagiri	132	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	S2g
Lebagiri	133	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	S2g
Lebagiri	134	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	S2g
Lebagiri	135	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	S2g
Lebagiri	136	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	S2g
Lebagiri	137	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	S2g
Lebagiri	138	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	S2g
Lebagiri	139	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	S2g
Lebagiri	140	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	S2g
Lebagiri	141	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	S2g
Lebagiri	142	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	S2g
Lebagiri	143	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	S2g
Lebagiri	144	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	S2g
Lebagiri	145	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	S2g
Lebagiri	146	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	S2g
Lebagiri	147	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	S2g
Lebagiri	148	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	149	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	150	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	151	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	152	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	153	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	154	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	S2g	S2rg	S2r

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	155	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	156	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	157	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	158	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	S2g	S2rg	S2r
Lebagiri	159	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	S2g	S2rg	S2r
Lebagiri	160	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	161	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	162	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	163	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	164	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	S2g
Lebagiri	165	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	S2g
Lebagiri	166	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	S2g
Lebagiri	167	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	168	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	S2g
Lebagiri	169	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	170	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	171	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	172	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	173	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	174	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	175	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	176	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	177	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	178	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	179	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	180	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	181	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	182	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	183	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	184	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	S3g	S2g	S2g
Lebagiri	185	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	186	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	187	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	188	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	189	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	190	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	191	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	192	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	193	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	194	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	195	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	196	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	197	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	198	S3t	S3t	S3t	S1	S3t	S1	S2rt	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t
Lebagiri	199	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	200	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	S3g	S2g	S2g
Lebagiri	201	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	202	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	203	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	204	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	S3g	S2g	S2g
Lebagiri	205	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	S3g	S2g	S2g
Lebagiri	206	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	207	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	208	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	209	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	210	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	211	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	S3g	S2g	S2g
Lebagiri	212	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	S3g	S2g	S2g
Lebagiri	213	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	214	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	S3g	S2g	S2g
Lebagiri	216	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	217	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	218	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	219	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	220	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	221	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	222	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	223	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	224	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	225	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	S2g
Lebagiri	226	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	S2g
Lebagiri	227	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	228	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	229	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	230	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	231	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	232	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	233	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	234	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	235	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Lebagiri	236	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Lebagiri	237	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	238	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	239	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	240	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	241	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	242	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	243	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	244	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	245	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g
Lebagiri	246	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	247	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	248	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	249	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	250	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	251	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Lebagiri	252	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	253	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	254	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	255	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	256	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	257	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Lebagiri	258	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Lebagiri	259	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	260	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	S2g
Lebagiri	261	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
Lebagiri	262	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Lebagiri	263	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Sangapura	4	S3rt	S3t	S3rt	S1	S3t	S1	S3r	S2r	S1	S2r	S2t	S2t	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3t	S2tw	S2t	S2rt	S3t	S3tw	S3tw	S2rt	S2t
Sangapura	5	S3rt	S3t	S3rt	S1	S3t	S1	S3r	S2r	S1	S2r	S2t	S2t	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3t	S2tw	S2t	S2rt	S3t	S3tw	S3tw	S2rt	S2t
Sangapura	6	S3rt	S3t	S3rt	S1	S3t	S1	S3r	S2r	S1	S2r	S2t	S2t	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3t	S2tw	S2t	S2rt	S3t	S3tw	S3tw	S2rt	S2t
Sangapura	7	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Sangapura	8	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Sangapura	9	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Sangapura	10	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Sangapura	11	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Sangapura	12	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g
Sangapura	13	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	S3g	S2g	S2g
Sangapura	14	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	S3g	S2g	S2g
Sangapura	15	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	S3g	S2g	S2g
Sangapura	16	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	S2g
Sangapura	17	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	S2g
Sangapura	18	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	S2g
Sangapura	19	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3rg	S3rg
Sangapura	20	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Sangapura	21	N1rg	S3rg	N1rg	S3rg	N1rg	S3rt	N1rg	N1rg	S3rt	N1rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Sangapura	22	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Sangapura	23	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Sangapura	36	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2tw	S2tw	S2rw	S2rw
Tenakanakallu	30	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	S3g	S2g	S2g
Tenakanakallu	31	S2r	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S1	S1	S1	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1

Village	Survey Number	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Crossandra	Drumstick	Mulberry
Tenakana kallu	33	S2r	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S1	S1	S1	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1
Tenakana kallu	34	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Tenakana kallu	35	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg
Tenakana kallu	36	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	S3g	S2g	S2g
Tenakana kallu	37	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	S3g	S2g	S2g
Tenakana kallu	38	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	S3g	S2g	S2g
Tenakana kallu	39	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	S2g
Tenakana kallu	40	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	S3g	S2g	S2g
Tenakana kallu	41	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	S2g
Tenakana kallu	42	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	S2g
Tenakana kallu	43	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	S2g
Tenakana kallu	45	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	S2g
Tenakana kallu	46	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	S2g
Tenakana kallu	47	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

CONTENTS

LIST OF TABLES

Chapter 1

SALIENT FINDINGS OF THE STUDY

- *The results indicated that 37 farmers were sampled in Halhalli micro watershed among them 5 (13.51%) were landless, 9 (24.32%) were marginal farmers, 5 (13.51%) were small farmers, 13 (35.14%) were semi medium farmers and 5 (13.51%) were medium farmers.*
- *The data indicated that there were 103 (56.59%) men and 79 (43.41%) were women among the sampled households. The average family size of landless farmers was 5.40, marginal farmers were 3.44, small farmers were 4, semi medium farmers were 6, and medium farmers were 5.20.*
- *The data indicated that, 36 (19.78%) people were in 0-15 years of age, 89 (48.90%) were in 16-35 years of age, 44 (24.18%) were in 36-60 years of age and 13 (7.14 %) were above 61 years of age.*
- *The results indicated that Halhalli had 25.27 per cent illiterates, 34.07 per cent of them had primary school education, 3.30 per cent of them had middle school education, 10.44 per cent of them had high school education, 12.64 per cent of them had PUC education, 0.55 per cent of them did diploma, 1.10 per cent of them had ITI and 7.14 per cent of them had degree education.*
- *The results indicate that, 83.78 per cent of households practicing agriculture, 13.51 per cent of the households were agricultural laborers and 2.70 per cent were general laborers.*
- *The results indicate that agriculture was the major occupation for 17.58 per cent of the household members, 47.25 per cent were agricultural labourers, 0.55 per cent were general laborers, 1.10 percent were in private service, 24.73 per cent of them were student, 3.85 per cent of them were housewife 4.95 per cent were children.*
- *The results indicate that, in case of landless farmers, 44.44 per cent were agricultural labour and were students respectively and 11.11 per cent were children. In case of marginal farmers 25.81 per cent were agriculturists, 45.16 per cent were agricultural labourer, 3.23 per cent were general labour, 19.35 per cent were students and 3.23 per cent were housewives and children respectively. In case of small farmers 25 per cent were agriculturists, 50 agricultural labour and 10 per cent were students. In case of semi medium farmers 17.95 per cent were agriculturists, 46.15 per cent of them were agricultural labour, 26.92 per cent were students, 5.13 per cent were housewives and 3.85 per cent were children. In case of medium farmers 19.23 per cent were agriculturists, 53.85 per cent were agricultural labour, 15.38 per cent were students and 3.85 per cent of the households were in private service, were housewives and children.*
- *The results show that 100 per cent of the households have not participated in any local institutions.*

- *The results indicate that 48.65 per cent of the households possess thatched house, 32.43 per cent of the households possess Katcha house and 18.92 per cent of them possess Pucca house.*
- *The results shows that 97.30 per cent of the households possess TV, 83.78 per cent of the households possess Mixer grinder, 13.51 per cent of the households possess bicycle, 48.65 per cent of the households possess motor cycle and 97.30 per cent of the households possess mobile phones.*
- *The results shows that the average value of television was Rs.6444, mixer grinder was Rs.1516, bicycle was Rs. 1400, motor cycle was Rs.30388 and mobile phone was Rs.1683.*
- *The results indicate that about 27.03 per cent of the households possess bullock cart, 32.43 per cent of them possess plough, 5.41 per cent of them possess both power tiller and tractor, 32.43 per cent of them posses sprayer, 91.89 per cent of them possess weeder and 13.15 percent of them possess chaff cutter.*
- *The results show that the average value of bullock cart was Rs. 18500, plough was Rs.931, the average value of power tiller was Rs.110000, the average value of tractor was Rs.500000 and the average value of sprayer was Rs.2148, chaff cutter was Rs.3000 and the average value of weeder Rs.69.*
- *The results indicate that, 32.43 per cent of the households possess bullocks and local cow respectively, 2.70 per cent of the households possess crossbred cow and buffalo correspondingly and 8.11 per cent of the households possess goat.*
- *The results indicate that, in case of landless farmers 20 per cent households possess bullock and local cow. In case of marginal farmers 22.22 per cent of the households possess bullock and 11.11 per cent of the households possess local cow. In case of small farmers, 40 per cent of the households possess bullock, 20 per cent possess local cow and 20 per cent possess buffalo. In case of semi medium farmers, 38.46 per cent of households possess bullock, 53.85 per cent of households possess local cow and 15.38 per cent possess goat. In case of medium farmers, 40 per cent of the households possess both bullocks and local cow respectively and 20 per cent of the households possess crossbreed cow.*
- *The results indicate that, average own labour men available in the micro watershed was 1.92, average own labour (women) available was 1.35, average hired labour (men) available was 5.62 and average hired labour (women) available was 6.05.*
- *The results showed that, in case of marginal farmers, average own labour men available was 1.56, average own labour (women) was 1, average hired labour (men) was 6.89 and average hired labour (women) available was 8. In case of small farmers, average own labour men available was 1.80, average own labour (women) was 1.40, average hired labour (men) was 6.60 and average hired labour (women) available was 7. In case of semi medium farmers, average own labour men available was 2.31, average own labour (women) was 1.46, average hired labour (men) was*

5.46 and average hired labour (women) available was 5.69. In case of medium farmers, average own labour men available was 2.60, average own labour (women) was 2, average hired labour (men) was 5.40 and average hired labour (women) available was 5.60.

- *The results indicate that 100 per cent of the household opined that hired labour was inadequate.*
- *The results indicate that, households of the Halhalli micro watershed possess 23.05 ha (46.30%) of dry land and 26.73 ha (53.70%) of irrigated land. Marginal farmers possess 5.99 ha (92.55%) of dry land and 0.48 ha (7.45%) of irrigated land. Small farmers possess 3.95 ha (70.47%) of dry land and 1.66 ha (29.53%) of irrigated land. Semi medium possess 11.09 ha (50.01%) of dry land and 11.08 ha (49.99%) of irrigated land. Medium farmers possess 2.02 ha (13.03%) of dry land and 13.50 ha (86.97%) of irrigated land.*
- *The results indicate that, the average value of dry land was Rs. 264,565.41 and average value of irrigated was Rs. 310,433.07. In case of marginal famers, the average land value was Rs. 534,415.16 for dry land and Rs. 1,037,815.08 for irrigated land. In case of small famers, the average land value was Rs. 227,766.39 for dry land and Rs. 603,911.99 for irrigated land. In case of semi medium famers, the average land value was Rs. 153,248.18 for dry land and Rs. 378,751.37 for irrigated land. In case of medium famers, the average land value was Rs. 148,200 for dry land and Rs. 192,448.31 for irrigated land.*
- *The results indicate that, there were 22 functioning and 23 defunctioning bore wells in the micro watershed.*
- *The results indicate that, bore well was the major irrigation source in the micro water shed for 59.46 per cent of the farmers.*
- *The results indicate that, the depth of bore well was found to be 41.02 meters.*
- *The results indicate that, marginal farmers had irrigated area of 0.97 hectares, small farmers had 1.66 hectares, semi medium farmers had 13.75 hectares and medium farmers had 19.43 hectares. On an average there were 35.81 ha of irrigated land.*
- *The results indicate that, farmers have grown maize (26.02 ha), bajra (9.94 ha), groundnut (5.67ha), tomato (2.14 ha), brijal (1.44 ha), cotton (0.81 ha), paddy (0.81ha), sunflower (0.81 ha) and chilly (0.40 ha). Marginal farmers had grown bajra, maize, tomato and brinjal. Small farmers had grown maize, tomato and paddy. Semi medium farmers had grown maize, bajra, groundnut, brinjal, sunflower and chilly. Medium farmers had grown maize, groundnut, tomato and cotton.*
- *The results indicate that, the cropping intensity in Halhalli micro watershed was found to be 66.60 per cent. In case of marginal and small farmers it was 100 per cent, in case of semi medium farmers it was 77.31 per cent and medium farmers had cropping intensity of 45 per cent.*

- *The results indicated that, 89.19 per cent of the households have bank account and 91.89 per cent of the households have savings. 60 percent of landless farmers possess bank account and 80 per cent of marginal household possess savings. In case of marginal farmers 88.89 per cent of the household possess both bank account and savings. In small farmers, 100 per cent of the households possess bank account and savings. In case of semi medium farmers, 92.31 per cent of possess both bank account and savings. In Medium farmers, 100 per cent of farmers possess bank account and savings respectively.*
- *The results indicated that, 80 per cent of landless, 88.89 percent of marginal and 100 per cent of small, semi medium and medium farmers have borrowed credit from different sources.*
- *The results indicate that, the total cost of cultivation for maize was Rs. 26912.86. The gross income realized by the farmers was Rs. 27487.58. The net income from Maize cultivation was Rs. 574.73, thus the benefit cost ratio was found to be 1:1.02.*
- *The results indicate that, the total cost of cultivation for bajra was Rs. 25301.48. The gross income realized by the farmers was Rs. 35990.07. The net income from bajra cultivation was Rs. 10688.59. Thus the benefit cost ratio was found to be 1:1.42.*
- *The results indicate that, the total cost of cultivation for Tomato was Rs. 55711.33. The gross income realized by the farmers was Rs. 130947.42. The net income from Tomato cultivation was Rs. 75236.10. Thus the benefit cost ratio was found to be 1:2.35.*
- *The results indicate that, the total cost of cultivation for paddy was Rs. 34746.32. The gross income realized by the farmers was Rs. 133380. The net income from paddy cultivation was Rs. 98633.68. Thus the benefit cost ratio was found to be 1:3.84.*
- *The results indicate that, the total cost of cultivation for groundnut was Rs. 41531.19. The gross income realized by the farmers was Rs. 59649.21. The net income from groundnut cultivation was Rs. 18118.03. Thus the benefit cost ratio was found to be 1:1.44.*
- *The results indicate that, the total cost of cultivation for cotton was Rs. 53845.74. The gross income realized by the farmers was Rs. 74100. The net income from cotton cultivation was Rs. 20254.26. Thus the benefit cost ratio was found to be 1:1.38.*
- *The results indicate that, the total cost of cultivation for sunflower was Rs. 14726.20. The gross income realized by the farmers was Rs. 22230. The net income from sunflower cultivation was Rs. 7503.80. Thus the benefit cost ratio was found to be 1:1.51.*
- *The results indicate that, the total cost of cultivation for chilly was Rs. 46771.49. The gross income realized by the farmers was Rs. 49400. The net income from chilly cultivation was Rs. 2628.51. Thus the benefit cost ratio was found to be 1:1.06.*
- *The results indicate that, the total cost of cultivation for brinjal was Rs. 60217.54. The gross income realized by the farmers was Rs. 135751.98. The net income from*

brinjal cultivation was Rs. 75534.44. Thus the benefit cost ratio was found to be 1:2.25.

- *The results indicate that, 32.43 per cent of the households opined that dry fodder was adequate, 13.51 per cent of the households opined that dry fodder was inadequate and 2.70 per cent of the households opined that green fodder was adequate.*
- *The results indicate that in landless farmers, the average annual gross income from business was Rs.12000, wage was Rs.23000 and dairy farm was Rs. 1000. In marginal farmers the average gross income from service/salary was Rs.13333.33, wage was Rs.24333.33 and agriculture was Rs.42711.11. In small farmers the average annual income from business was Rs. 44000, wage was Rs.17600 and agriculture was Rs.58700. In semi medium farmers the average annual income from service/salary was Rs.3846.15, wage was Rs.12538.46 and agriculture was Rs.54461.54. In case of medium farmers the average annual gross income from service/salary was Rs.12000, wage was Rs.4000, agriculture was Rs.112000 and dairy farm was Rs.600.*
- *The results indicate that, in the land less farmers, the average annual expenditure from business and wage was Rs.10000 and from dairy farm was Rs.2000. In marginal farmers, the average annual expenditure from wage was Rs.5714.29 and agriculture was Rs.22888.89. In small farmers, the annual expenditure from business was Rs.52500, wage was Rs.5250 and agriculture was Rs.32000. In semi medium farmers, the average annual expenditure from service/salary was Rs.20000, wage was Rs.4272.73 and agriculture was Rs.20153.85. In case of medium farmers, the average annual expenditure from service/salary was Rs.30000, wage was Rs.5000 and agriculture was Rs.42000.*
- *The results indicate that, sampled households have grown 14 coconut, 1 jack fruit and 11 mango trees in their field. Farmers have also grown 1 coconut trees in their backyard.*
- *The results indicate that, households have planted 2 teak, 60 neem trees and 9 tarmind trees in the field and also planted 1 neem tree in their back yard.*
- *The results indicate that, households have an average investment capacity of Rs. 4,486.71 for land development, Rs. 1,729.95 in irrigation facility, Rs. 2,513.51 for improved crop production and Rs.81.08 for improved livestock management.*
- *The data showed that, marginal households have an average investment capacity of Rs. 1334.0 for land development, Rs. 760 for irrigation facility, Rs.1000 for improved crop production and Rs.333.33 for improved livestock management. Small farmers have an average investment capacity of Rs. 4000 for land development and Rs.3400 for improved crop production. Semi medium farmers have an average investment capacity of Rs. 6,461.64 for land development, Rs. 2,307.80 in irrigation facility and Rs. 3,538.46 for improved crop production. Medium farmers have an average*

investment capacity of Rs. 10000 for land development, Rs. 6800 for irrigation facility and Rs.4200 for improved crop production.

- *The results indicated that, for land development 64.86 per cent of the households, 40.54 per cent of the households for irrigation facility, 43.24 per cent of the households were for improved crop production and 2.70 per cent of the households for improved livestock management were dependent on government subsidy.*
- *The results indicated that, brinjal, chilly, cotton, groundnut, maize, sunflower and tomato were sold to the extent of 100 per cent. Bajra and paddy were sold to the extent of 96.86 per cent and 50 per cent.*
- *The results indicated that, about 100 per cent of farmers sold their produce to regulated market and 2.70 per cent have sold their produce in cooperative marketing society.*
- *The results indicated that 18.92 per cent have used cart and 86.49 per cent have used tractor.*
- *The results indicated that, 64.86 per cent of the households have experienced the soil and water erosion problems i.e. 44.44 percent of marginal farmers, 60 per cent of small farmers, 92.31 per cent of semi medium farmers and 100 percent of medium farmers.*
- *The results indicated that, 86.49 per cent of the households have shown interest in soil testing including 100 per cent of marginal farmers, small farmers, semi medium farmers and medium farmers respectively.*
- *The results indicated that, 2.70 per cent of the households have adopted field bunding which includes 11.11 per cent of marginal farmers.*
- *The results indicated that, 100 per cent of the households who adopted field bunding opined that bunds required full replacement.*
- *The results indicated that 2.70 per cent of soil conservation structure is constructed by government.*
- *The results indicated that, piped supply was the source of drinking water for 21.62 per cent of the households and bore well was the source of drinking water for 81.08 per cent of the households.*
- *The results indicated that 100 per cent of the households have used fire wood as fuel.*
- *The results indicated that, Electricity was the major source of light for 100 per cent of the households in micro watershed.*
- *The results indicated that, 67.57 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, 100 per cent of marginal, 100 per cent of small, 7.69 per cent of semi medium and 100 per cent of medium farmers had sanitary toilet facility.*
- *The results indicated that, 97.30 per cent of the sampled households possessed BPL card.*
- *The results indicated that, 43.24 per cent of the households participated in NREGA programme which includes 40 per cent of the land less, 11.11 per cent of marginal,*

40 per cent of the small, 46.15 per cent of the semi medium and 100 per cent of the medium farmers.

- *The results indicated that, cereals, pulses, oilseed, vegetables, fruits and meat were adequate for 97.30 per cent, 37.84 per cent, 24.32 per cent, 29.73 per cent, 40.54 per cent and 5.41per cent of the households respectively. Milk and egg were adequate for 21.62 per cent of the households.*
- *The results indicated that, cereals were inadequate for 2.70 per cent of the households, pulses were inadequate for 62.16 per cent, oilseeds were inadequate for 70.27 per cent, vegetables were inadequate for 56.76 per cent, fruits were inadequate for 35.14 per cent, milk was inadequate for 48.65 per cent, egg was inadequate for 56.76 per cent and meat was inadequate for 2.70 per cent of the households.*
- *The results indicated that, lower fertility status of the soil was the constraint experienced by 83.78 per cent of the households, wild animal menace on farm field (37.84%), frequent incidence of pest and diseases (27.03%), inadequacy of irrigation water (18.92%), high cost of fertilizers and plant protection chemicals (27.03%), high rate of interest on credit (18.92%), low price for the agricultural commodities (18.92%), lack of marketing facilities in the area (27.03%), inadequate extension services (27.03%) lack of transport for safe transport of the agricultural produce to the market (32.43%), less rainfall (59.46%) and source of agri technology information (18.92%).*

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. 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

Halhalli micro-watershed (Shahpura sub-watershed, Koppal Taluk and District) is located at North latitude $15^0$25'3.028'' to 15^0 23'33.043'' and East longitude 76^0 13'31.559'' to 76^0 11'35.456'' covering an area of 733.86 ha and spread across Hatti, Kamanura, Sangapura, Tenakanakallu and Bheemanura 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 37 households located in the micro watershed were interviewed for the survey.

Chapter 4

SALIENT FEATURES OF THE SURVEY

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

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Halhalli micro watershed is presented in Table 1 and it indicated that 37 farmers were sampled in Halhalli micro watershed among them 5 (13.51%) were landless, 9 (24.32%) were marginal farmers, 5 (13.51%) were small farmers, 13 (35.14%) were semi medium farmers and 5 (13.51%) were medium farmers.

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

S.N.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	5	13.51	9	24.32	5	13.51	13	35.14	5	13.51	37	100

Population characteristics: The population characteristics of households sampled for socio-economic survey in Halhalli micro watershed is presented in Table 2. The data indicated that there were 103 (56.59%) men and 79 (43.41%) were women among the sampled households. The average family size of landless farmers was 5.40, marginal farmers were 3.44, small farmers were 4, semi medium farmers were 6, and medium farmers were 5.20.

Table 2: Population characteristics of Halhalli micro-watershed

Sl.No.	Particulars	LL (27)		MF (31)		SF (20)		SMF (78)		MDF (26)		All (182)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Male	13	48.15	17	54.84	13	65.00	43	55.13	17	65.38	103	56.59
2	Female	14	51.85	14	45.16	7	35.00	35	44.87	9	34.62	79	43.41
Total		27	100	31	100	20	100	78	100	26	100	182	100
Average		5.40		3.44		4.00		6.00		5.20		4.92	

Age wise classification of population: The age wise classification of household members in Halhalli micro watershed is presented in Table 3. The data indicated that, 36 (19.78%) people were in 0-15 years of age, 89 (48.90%) were in 16-35 years of age, 44 (24.18%) were in 36-60 years of age and 13 (7.14 %) were above 61 years of age.

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

Sl. No.	Particulars	LL (27)		MF (31)		SF (20)		SMF (78)		MDF (26)		All (182)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years	12	44.44	6	19.35	2	10.00	13	16.67	3	11.54	36	19.78
2	16-35 years	9	33.33	18	58.06	9	45.00	37	47.44	16	61.54	89	48.90
3	36-60 years	4	14.81	5	16.13	8	40.00	22	28.21	5	19.23	44	24.18
4	> 61 years	2	7.41	2	6.45	1	5.00	6	7.69	2	7.69	13	7.14
Total		27	100	31	100	20	100	78	100	26	100	182	100

Education level of household members: Education level of household members in Halhalli micro watershed is presented in Table 4. The results indicated that Halhalli had 25.27 per cent illiterates, 34.07 per cent of them had primary school education, 3.30 per cent of them had middle school education, 10.44 per cent of them had high school education, 12.64 per cent of them had PUC education, 0.55 per cent of them did diploma, 1.10 per cent of them had ITI and 7.14 per cent of them had degree education.

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

Sl. No.	Particulars	LL (27)		MF (31)		SF (20)		SMF (78)		MDF (26)		All (182)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	5	18.52	8	25.81	5	25.00	19	24.36	9	34.62	46	25.27
2	Primary School	12	44.44	12	38.71	4	20.00	27	34.62	7	26.92	62	34.07
3	Middle School	0	0.00	0	0.00	0	0.00	6	7.69	0	0.00	6	3.30
4	High School	3	11.11	7	22.58	3	15.00	5	6.41	1	3.85	19	10.44
5	PUC	3	11.11	2	6.45	3	15.00	10	12.82	5	19.23	23	12.64
6	Diploma	0	0.00	0	0.00	1	5.00	0	0.00	0	0.00	1	0.55
7	ITI	0	0.00	0	0.00	0	0.00	1	1.28	1	3.85	2	1.10
8	Degree	1	3.70	1	3.23	3	15.00	6	7.69	2	7.69	13	7.14
9	Others	3	11.11	1	3.23	1	5.00	4	5.13	1	3.85	10	5.49
Total		27	100	31	100	20	100	78	100	26	100	182	100

Occupation of household heads: The data regarding the occupation of the household heads in Halhalli micro watershed is presented in Table 5. The results indicate that, 83.78 per cent of households practicing agriculture, 13.51 per cent of the households were agricultural laborers and 2.70 per cent were general laborers.

Table 5: Occupation of household heads in Halhalli micro watershed

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	8	88.89	5	100	13	100	5	100	31	83.78
2	Agricultural Labour	5	100	0	0	0	0	0	0	0	0	5	13.51
3	General Labour	0	0	1	11.11	0	0	0	0	0	0	1	2.70
Total		5	100	9	100	5	100	13	100	5	100	37	100

Occupation of the household members: The data regarding the occupation of the household members in Halhalli micro watershed is presented in Table 6. The results indicate that agriculture was the major occupation for 17.58 per cent of the household members, 47.25 per cent were agricultural labourers, 0.55 per cent were general laborers, 1.10 percent were in private service, 24.73 per cent of them were student, 3.85 per cent of them were housewife 4.95 per cent were children.

In case of landless farmers, 44.44 per cent were agricultural labour and were students respectively and 11.11 per cent were children. In case of marginal farmers 25.81 per cent were agriculturists, 45.16 per cent were agricultural labourer, 3.23 per cent were general labour, 19.35 per cent were students and 3.23 per cent were housewives and children respectively. In case of small farmers 25 per cent were agriculturists, 50

agricultural labour and 10 per cent were students. In case of semi medium farmers 17.95 per cent were agriculturists, 46.15 per cent of them were agricultural labour, 26.92 per cent were students, 5.13 per cent were housewives and 3.85 per cent were children. In case of medium farmers 19.23 per cent were agriculturists, 53.85 per cent were agricultural labour, 15.38 per cent were students and 3.85 per cent of the households were in private service, were housewives and children.

Table 6: Occupation of family members in Halhalli micro watershed

Sl. No.	Particulars	LL (27)		MF (31)		SF (20)		SMF (78)		MDF (26)		All (182)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	8	25.81	5	25	14	17.95	5	19.23	32	17.58
2	Agricultural Labour	12	44.44	14	45.16	10	50	36	46.15	14	53.85	86	47.25
3	General Labour	0	0	1	3.23	0	0	0	0	0	0	1	0.55
4	Private Service	0	0	0	0	1	5	0	0	1	3.85	2	1.10
5	Student	12	44.44	6	19.35	2	10	21	26.92	4	15.38	45	24.73
6	Housewife	0	0.00	1	3.23	1	5	4	5.13	1	3.85	7	3.85
7	Children	3	11.11	1	3.23	1	5	3	3.85	1	3.85	9	4.95
Total		27	100	31	100	20	100	78	100	26	100	182	100

Institutional participation of the household members: The data regarding the institutional participation of the household members in Halhalli micro watershed is presented in Table 7. The results show that 100 per cent of the households have not participated in any local institutions.

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

Sl. No.	Particulars	LL (27)		MF (31)		SF (20)		SMF (78)		MDF (26)		All (182)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	No Participation	27	100	31	100	20	100	78	100	26	100	182	100
Total		27	100	31	100	20	100	78	100	26	100	182	100

Type of house owned: The data regarding the type of house owned by the households in Halhalli micro watershed is presented in Table 8. The results indicate that 48.65 per cent of the households possess thatched house, 32.43 per cent of the households possess Katcha house and 18.92 per cent of them possess Pucca house.

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

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	4	80	1	11.11	2	40	8	61.54	3	60	18	48.65
2	Katcha	0	0	7	77.78	2	40	3	23.08	0	0	12	32.43
3	Pucca/RCC	1	20	1	11.11	1	20	2	15.38	2	40	7	18.92
Total		5	100	9	100	5	100	13	100	5	100	37	100

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Halhalli micro watershed is presented in Table 9. The results shows that 97.30 per cent of the households possess TV, 83.78 per cent of the households possess Mixer grinder, 13.51 per cent of the households possess bicycle, 48.65 per cent of

the households possess motor cycle and 97.30 per cent of the households possess mobile phones.

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

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	5	100	8	88.89	5	100	13	100	5	100	36	97.30
2	Mixer/Grinder	5	100	4	44.44	5	100	12	92.31	5	100	31	83.78
3	Bicycle	0	0	3	33.33	1	20	1	7.69	0	0	5	13.51
4	Motor Cycle	1	20	5	55.56	2	40	8	61.54	2	40	18	48.65
5	Mobile Phone	5	100.	9	100	5	100	13	100	4	80	36	97.30

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Halhalli micro watershed is presented in Table 10. The results shows that the average value of television was Rs.6444, mixer grinder was Rs.1516, bicycle was Rs. 1400, motor cycle was Rs.30388 and mobile phone was Rs.1683.

Table 10: Average value of durable assets owned by households in Halhalli micro watershed

Average value (Rs.)

Sl.No.	Particulars	LL (5)	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
1	Television	6,000.00	3,000.00	4,400.00	9,692.00	6,000.00	6,444.00
2	Mixer/Grinder	1,560.00	1,350.00	1,360.00	1,625.00	1,500.00	1,516.00
3	Bicycle	0.00	1,000.00	1,000.00	3,000.00	0.00	1,400.00
4	Motor Cycle	40,000.00	23,400.00	35,000.00	31,250.00	35,000.00	30,388.00
5	Mobile Phone	2,375.00	1,283.00	1,088.00	1,808.00	1,875.00	1,683.00

Farm Implements owned: The data regarding the farm implements owned by the households in Halhalli micro watershed is presented in Table 11. About 27.03 per cent of the households possess bullock cart, 32.43 per cent of them possess plough, 5.41 per cent of them possess both power tiller and tractor, 32.43 per cent of them posses sprayer, 91.89 per cent of them possess weeder and 13.15 percent of them possess chaff cutter.

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

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	1	20.00	1	11.11	1	20.00	5	38.46	2	40.00	10	27.03
2	Plough	1	20.00	2	22.22	2	40.00	5	38.46	2	40.00	12	32.43
3	Power Tiller	0	0.00	0	0.00	0	0.00	1	7.69	1	20.00	2	5.41
4	Tractor	0	0.00	0	0.00	0	0.00	1	7.69	1	20.00	2	5.41
5	Sprayer	0	0.00	3	33.33	4	80.00	4	30.77	1	20.00	12	32.43
6	Weeder	5	100.00	9	100.00	5	100.00	11	84.62	4	80.00	34	91.89
7	Chaff Cutter	0	0.00	2	22.22	2	40.00	1	7.69	0	0.00	5	13.51

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Halhalli micro watershed is presented in Table 12. The results show that the average value of bullock cart was Rs. 18500, plough was Rs.931, the average value of power tiller was Rs.110000, the average value of tractor was

Rs.500000 and the average value of sprayer was Rs.2148, chaff cutter was Rs.3000 and the average value of weeder Rs.69.

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

Sl.No.	Particulars	LL (5)	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
1	Bullock Cart	18,000	20,000	20,000	18,200	18,000	18,500
2	Plough	1,500	666	666	1,142	1,500	931
3	Power Tiller	0	0	0	200,000	20,000	110,000
4	Tractor	0	0	0	500,000	500,000	500,000
5	Sprayer	0	1,875	1,916	3,120	750	2,148
6	Chaff Cutter	0	3,000	3,000	3,000	0	3,000
7	Weeder	49.00	23	233	42	58	69

Livestock possession by the households: The data regarding the Livestock possession by the households in Halhalli micro watershed is presented in Table 13. The results indicate that, 32.43 per cent of the households possess bullocks and local cow respectively, 2.70 per cent of the households possess crossbred cow and buffalo correspondingly and 8.11 per cent of the households possess goat.

In case of landless farmers 20 per cent households possess bullock and local cow. In case of marginal farmers 22.22 per cent of the households possess bullock and 11.11 per cent of the households possess local cow. In case of small farmers, 40 per cent of the households possess bullock, 20 per cent possess local cow and 20 per cent possess buffalo. In case of semi medium farmers, 38.46 per cent of households possess bullock, 53.85 per cent of households possess local cow and 15.38 per cent possess goat. In case of medium farmers, 40 per cent of the households possess both bullocks and local cow respectively and 20 per cent of the households possess crossbreed cow.

Table 13: Livestock possession by households in Halhalli micro watershed

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock	1	20.00	2	22.22	2	40.00	5	38.46	2	40.00	12	32.43
2	Local cow	1	20.00	1	11.11	1	20.00	7	53.85	2	40.00	12	32.43
3	Crossbred cow	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00	1	2.70
4	Buffalo	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00	1	2.70
5	Goat	0	0.00	1	11.11	0	0.00	2	15.38	0	0.00	3	8.11
6	blank	4	80.00	6	66.67	2	40.00	4	30.77	2	40.00	18	48.65

Average Labour availability: The data regarding the average labour availability in Halhalli micro watershed is presented in Table 14. The results indicate that, average own labour men available in the micro watershed was 1.92, average own labour (women) available was 1.35, average hired labour (men) available was 5.62 and average hired labour (women) available was 6.05.

In case of marginal farmers, average own labour men available was 1.56, average own labour (women) was 1, average hired labour (men) was 6.89 and average hired labour (women) available was 8. In case of small farmers, average own labour men available was 1.80, average own labour (women) was 1.40, average hired labour (men)

was 6.60 and average hired labour (women) available was 7. In case of semi medium farmers, average own labour men available was 2.31, average own labour (women) was 1.46, average hired labour (men) was 5.46 and average hired labour (women) available was 5.69. In case of medium farmers, average own labour men available was 2.60, average own labour (women) was 2, average hired labour (men) was 5.40 and average hired labour (women) available was 5.60.

Table 14: Average Labour availability in Halhalli micro watershed

Sl.No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
		N	N	N	N	N
1	Own labour Male	1.56	1.80	2.31	2.60	1.92
2	Own Labour Female	1.00	1.40	1.46	2.00	1.35
3	Hired labour Male	6.89	6.60	5.46	5.40	5.62
4	Hired labour Female	8.00	7.00	5.69	5.60	6.05

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Halhalli micro watershed is presented in Table 15. The results indicate that 100 per cent of the household opined that hired labour was inadequate.

Table 15: Adequacy of Hired Labour in Halhalli micro watershed

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Inadequate	5	100	9	100	5	100	13	100	5	100	37	100

Distribution of land (ha): The data regarding the distribution of land (ha) in Halhalli micro watershed is presented in Table 16. The results indicate that, households of the Halhalli micro watershed possess 23.05 ha (46.30%) of dry land and 26.73 ha (53.70%) of irrigated land. Marginal farmers possess 5.99 ha (92.55%) of dry land and 0.48 ha (7.45%) of irrigated land. Small farmers possess 3.95 ha (70.47%) of dry land and 1.66 ha (29.53%) of irrigated land. Semi medium possess 11.09 ha (50.01%) of dry land and 11.08 ha (49.99%) of irrigated land. Medium farmers possess 2.02 ha (13.03%) of dry land and 13.50 ha (86.97%) of irrigated land.

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

Sl. No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	5.99	92.55	3.95	70.47	11.09	50.01	2.02	13.03	23.05	46.30
2	Irrigated	0.48	7.45	1.66	29.53	11.08	49.99	13.50	86.97	26.73	53.70
Total		6.47	100	5.61	100	22.17	100	15.53	100	49.77	100

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Halhalli micro watershed is presented in Table 17. The results indicate that, the average value of dry land was Rs. 264,565.41 and average value of irrigated was Rs. 310,433.07. In case of marginal famers, the average land value was Rs. 534,415.16 for dry land and Rs. 1,037,815.08 for irrigated land. In case of small famers, the average land value was Rs. 227,766.39 for dry land and Rs. 603,911.99 for irrigated land. In case of semi medium famers, the average land value was Rs. 153,248.18 for dry land and Rs. 378,751.37 for

irrigated land. In case of medium famers, the average land value was Rs. 148,200 for dry land and Rs. 192,448.31 for irrigated land.

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

Sl. No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
		N	N	N	N	N
1	Dry	534,415.16	227,766.39	153,248.18	148,200.00	264,565.41
2	Irrigated	1,037,815.08	603,911.99	378,751.37	192,448.31	310,433.07

Status of bore wells: The data regarding the status of bore wells in Halhalli micro watershed is presented in Table 18. The results indicate that, there were 22 functioning and 23 defunctioning bore wells in the micro watershed.

Table 18: Status of bore wells in Halhalli micro watershed

Sl.No.	Particulars	LL (5)	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
		N	N	N	N	N	N
1	De-functioning	0	3	4	10	6	23
2	Functioning	0	3	3	10	6	22

Source of irrigation: The data regarding the source of irrigation in Halhalli micro watershed is presented in Table 19. The results indicate that, bore well was the major irrigation source in the micro water shed for 59.46 per cent of the farmers.

Table 19: Source of irrigation in Halhalli micro watershed

Sl.No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Bore Well	3	33.33	3	60	10	76.92	5	100	22	59.46

Depth of water (Avg in meters): The data regarding the depth of water in Halhalli micro watershed is presented in Table 20. The results indicate that, the depth of bore well was found to be 41.02 meters.

Table 20: Depth of water (Avg in meters) in Halhalli micro watershed

Sl.No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
		N	N	N	N	N
1	Bore Well	17.95	23.16	55.33	104.24	41.02

Irrigated Area (ha): The data regarding the irrigated area (ha) in Halhalli micro watershed is presented in Table 21. The results indicate that, marginal farmers had irrigated area of 0.97 hectares, small farmers had 1.66 hectares, semi medium farmers had 13.75 hectares and medium farmers had 19.43 hectares. On an average there were 35.81 ha of irrigated land.

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

Sl.No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
1	Kharif	0.97	1.66	10.11	13.36	26.09
2	Rabi	0.00	0.00	3.64	6.07	9.72
Total		0.97	1.66	13.75	19.43	35.81

Cropping pattern: The data regarding the cropping pattern in Halhalli micro watershed is presented in Table 22. The results indicate that, farmers have grown maize (26.02 ha), bajra (9.94 ha), groundnut (5.67ha), tomato (2.14 ha), brijal (1.44 ha), cotton (0.81 ha), paddy (0.81ha), sunflower (0.81 ha) and chilly (0.40 ha). Marginal farmers had grown

bajra, maize, tomato and brinjal. Small farmers had grown maize, tomato and paddy. Semi medium farmers had grown maize, bajra, groundnut, brinjal, sunflower and chilly. Medium farmers had grown maize, groundnut, tomato and cotton.

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

Sl.No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
1	Kharif - Maize	3.66	3.95	9.9	8.5	26.02
2	Kharif - Bajra	1.84	0	8.1	0	9.94
3	Kharif - Groundnut	0	0	1.21	4.45	5.67
4	Kharif - Tomato	0.49	0.85	0	0.81	2.14
5	Kharif - Brinjal	0.48	0	0.96	0	1.44
6	Kharif - Cotton	0	0	0	0.81	0.81
7	Kharif - Paddy	0	0.81	0	0	0.81
8	Kharif - Sunflower	0	0	0.81	0	0.81
9	Rabi - Chilly	0	0	0.4	0	0.4
Total		6.47	5.61	21.38	14.57	48.04

Cropping intensity: The data regarding the cropping intensity in Halhalli micro watershed is presented in Table 23. The results indicate that, the cropping intensity in Halhalli micro watershed was found to be 66.60 per cent. In case of marginal and small farmers it was 100 per cent, in case of semi medium farmers it was 77.31 per cent and medium farmers had cropping intensity of 45 per cent.

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

Sl.No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
1	Cropping Intensity	100	100	77.31	45	66.60

Possession of Bank account and savings: The data regarding the possession of Bank account and savings in Halhalli micro watershed is presented in Table 24. The results indicated that, 89.19 per cent of the households have bank account and 91.89 per cent of the households have savings. 60 percent of landless farmers possess bank account and 80 per cent of marginal household possess savings. In case of marginal farmers 88.89 per cent of the household possess both bank account and savings. In small farmers, 100 per cent of the households possess bank account and savings. In case of semi medium farmers, 92.31 per cent of possess both bank account and savings. In Medium farmers, 100 per cent of farmers possess bank account and savings respectively.

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

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Account	3	60	8	88.89	5	100	12	92.31	5	100	33	89.19
2	Savings	4	80	8	88.89	5	100	12	92.31	5	100	34	91.89

Borrowing status: The data regarding the possession of borrowing status in Halhalli micro watershed is presented in Table 25. The results indicated that, 80 per cent of landless, 88.89 percent of marginal and 100 per cent of small, semi medium and medium farmers have borrowed credit from different sources.

Table 25: Borrowing status in Halhalli micro watershed

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%

1	Credit Availed	4	80	8	88.89	5	100	13	100	5	100	35	94.59

Cost of Cultivation of Maize: The data regarding the cost of cultivation of maize in Halhalli micro watershed is presented in Table 26. The results indicate that, the total cost of cultivation for maize was Rs. 26912.86. The gross income realized by the farmers was Rs. 27487.58. The net income from Maize cultivation was Rs. 574.73, thus the benefit cost ratio was found to be 1:1.02.

Table 26: Cost of Cultivation of maize in Halhalli micro watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	33.71	7448.60	27.68
2	Bullock		Pairs/day	1.06	585.53	2.18
3	Tractor		Hours	2.50	1877.76	6.98
4	Machinery		Hours	1.17	704.95	2.62
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	18.96	2282.57	8.48
6	FYM		Quintal	12.91	2337.01	8.68
7	Fertilizer + micronutrients		Quintal	2.02	3018.67	11.22
8	Pesticides (PPC)		Kgs / liters	0.87	969.68	3.60
9	Irrigation		Number	3.56	0.00	0.00
10	Depreciation charges			0.00	1086.14	4.04
11	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
12	Interest on working capital				1034.15	3.84
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				21345.06	79.31
III	**Cost B2**					
14	Rental Value of Land				264.71	0.98
15	**Cost B2 = (Cost B1 + Rental value)**				21609.76	80.30
IV	**Cost C1**					
16	Family Human Labour			10.58	2846.47	10.58
17	**Cost C1 = (Cost B2 + Family Labour)**				24456.23	90.87
V	**Cost C2**					
18	Risk Premium				10.00	0.04
19	**Cost C2 = (Cost C1 + Risk Premium)**				24466.23	90.91
VI	**Cost C3**					
20	Managerial Cost				2446.62	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				26912.86	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		21.47	24244.00	
		b) Main Crop Sales Price (Rs.)			1129.41	
	By Product	e) Main Product (q)		17.12	3243.58	
		f) Main Crop Sales Price (Rs.)			189.41	
b.	Gross Income (Rs.)				27487.58	
c.	Net Income (Rs.)				574.73	
d.	Cost per Quintal (Rs./q.)				1253.74	
e.	Benefit Cost Ratio (BC Ratio)				1:1.02	

Cost of cultivation of Bajra: The data regarding the cost of cultivation of bajra in Halhalli micro watershed is presented in Table 27. The results indicate that, the total cost of cultivation for bajra was Rs. 25301.48. The gross income realized by the farmers was Rs. 35990.07. The net income from bajra cultivation was Rs. 10688.59. Thus the benefit cost ratio was found to be 1:1.42.

Table 27: Cost of Cultivation of bajra in Halhalli micro watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	34.10	7437.55	29.40
2	Bullock		Pairs/day	1.78	977.21	3.86
3	Tractor		Hours	2.89	2169.25	8.57
4	Machinery		Hours	0.91	547.89	2.17
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	9.20	973.65	3.85
6	FYM		Quintal	9.28	1856.22	7.34
7	Fertilizer + micronutrients		Quintal	2.32	3498.05	13.83
8	Pesticides (PPC)		Kgs / liters	0.68	755.65	2.99
9	Irrigation		Number	0.00	0.00	0.00
10	Depreciation charges			0.00	39.02	0.15
11	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
12	Interest on working capital				851.23	3.36
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				19105.71	75.51
III	**Cost B2**					
14	Rental Value of Land				166.67	0.66
15	**Cost B2 = (Cost B1 + Rental value)**				19272.38	76.17
IV	**Cost C1**					
16	Family Human Labour			14.22	3718.96	14.70
17	**Cost C1 = (Cost B2 + Family Labour)**				22991.34	90.87
V	**Cost C2**					
18	Risk Premium				10.00	0.04
19	**Cost C2 = (Cost C1 + Risk Premium)**				23001.34	90.91
VI	**Cost C3**					
20	Managerial Cost				2300.13	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				25301.48	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		20.62	32251.23	
		b) Main Crop Sales Price (Rs.)			1564.29	
	By Product	e) Main Product (q)		16.36	3738.84	
		f) Main Crop Sales Price (Rs.)			228.57	
b.	Gross Income (Rs.)				35990.07	
c.	Net Income (Rs.)				10688.59	

d.	Cost per Quintal (Rs./q.)		1227.20	
e.	Benefit Cost Ratio (BC Ratio)		1:1.42	

Cost of cultivation of Tomato: The data regarding the cost of cultivation of Tomato in Halhalli micro watershed is presented in Table 28. The results indicate that, the total cost of cultivation for Tomato was Rs. 55711.33. The gross income realized by the farmers was Rs. 130947.42. The net income from Tomato cultivation was Rs. 75236.10. Thus the benefit cost ratio was found to be 1:2.35.

Table 28: Cost of Cultivation of Tomato in Halhalli micro watershed

Sl. No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	75.62	16440.72	29.51
2	Bullock	Pairs/day	2.34	1287.27	2.31
3	Tractor	Hours	3.18	2382.84	4.28
4	Machinery	Hours	2.15	1288.77	2.31
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	1839.20	1839.20	3.30
6	FYM	Quintal	34.73	6945.15	12.47
7	Fertilizer + micronutrients	Quintal	4.09	6467.11	11.61
8	Pesticides (PPC)	Kgs / liters	2.05	1903.10	3.42
9	Irrigation	Number	14.92	0.00	0.00
10	Depreciation charges		0.00	417.42	0.75
11	Land revenue and Taxes		0.00	0.00	0.00
II	**Cost B1**				
12	Interest on working capital			2059.75	3.70
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**			41031.33	73.65
III	**Cost B2**				
14	Rental Value of Land			333.33	0.60
15	**Cost B2 = (Cost B1 + Rental value)**			41364.66	74.25
IV	**Cost C1**				
16	Family Human Labour		35.85	9272.00	16.64
17	**Cost C1 = (Cost B2 + Family Labour)**			50636.66	90.89
V	**Cost C2**				
18	Risk Premium			10.00	0.02
19	**Cost C2 = (Cost C1 + Risk Premium)**			50646.66	90.91
VI	**Cost C3**				
20	Managerial Cost			5064.67	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**			55711.33	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	163.68	130947.42	
		b) Main Crop Sales Price (Rs.)		800.00	
b.	Gross Income (Rs.)			130947.42	
c.	Net Income (Rs.)			75236.10	
d.	Cost per Quintal (Rs./q.)			340.36	
e.	Benefit Cost Ratio (BC Ratio)			1:2.35	

Cost of Cultivation of Paddy: The data regarding the cost of cultivation of paddy in Halhalli micro watershed is presented in Table 29. The results indicate that, the total cost of cultivation for paddy was Rs. 34746.32. The gross income realized by the farmers was Rs. 133380. The net income from paddy cultivation was Rs. 98633.68. Thus the benefit cost ratio was found to be 1:3.84.

Table 29: Cost of Cultivation of Paddy in Halhalli micro watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	27.17	6298.50	18.13
2	Bullock		Pairs/day	0.00	0.00	0.00
3	Tractor		Hours	0.00	0.00	0.00
4	Machinery		Hours	1.24	741.00	2.13
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	80.28	4013.75	11.55
6	FYM		Quintal	24.70	4940.00	14.22
7	Fertilizer + micronutrients		Quintal	3.71	5928.00	17.06
8	Pesticides (PPC)		Kgs / liters	12.35	2470.00	7.11
9	Irrigation		Number	24.70	0.00	0.00
10	Depreciation charges			0.00	200.07	0.58
11	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
12	Interest on working capital				2083.41	6.00
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				26674.73	76.77
III	**Cost B2**					
14	Rental Value of Land				333.33	0.96
15	**Cost B2 = (Cost B1 + Rental value)**				27008.06	77.73
IV	**Cost C1**					
16	Family Human Labour			17.29	4569.50	13.15
17	**Cost C1 = (Cost B2 + Family Labour)**				31577.56	90.88
V	**Cost C2**					
18	Risk Premium				10.00	0.03
19	**Cost C2 = (Cost C1 + Risk Premium)**				31587.56	90.91
VI	**Cost C3**					
20	Managerial Cost				3158.76	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				34746.32	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		98.80	128440.00	
		b) Main Crop Sales Price (Rs.)			1300.00	
	By Product	e) Main Product (q)		24.70	4940.00	
		f) Main Crop Sales Price (Rs.)			200.00	
b.	Gross Income (Rs.)				133380.00	
c.	Net Income (Rs.)				98633.68	

d.	Cost per Quintal (Rs./q.)		351.68	
e.	Benefit Cost Ratio (BC Ratio)		1:3.84	

Cost of Cultivation of groundnut: The data regarding the cost of cultivation of groundnut in Halhalli micro watershed is presented in Table 30. The results indicate that, the total cost of cultivation for groundnut was Rs. 41531.19. The gross income realized by the farmers was Rs. 59649.21. The net income from groundnut cultivation was Rs. 18118.03. Thus the benefit cost ratio was found to be 1:1.44.

Table 30: Cost of Cultivation of groundnut in Halhalli micro watershed

Sl. No	Particulars		Units	Phy Units	Value (Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	29.73	6601.33	15.89
2	Bullock		Pairs/day	1.16	635.38	1.53
3	Tractor		Hours	2.51	1885.30	4.54
4	Machinery		Hours	1.22	730.19	1.76
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	131.22	14665.62	35.31
6	FYM		Quintal	12.50	2500.87	6.02
7	Fertilizer + micronutrients		Quintal	1.46	2418.54	5.82
8	Pesticides (PPC)		Kgs / liters	0.75	746.79	1.80
9	Irrigation		Number	4.44	0.00	0.00
10	Depreciation charges			0.00	1413.88	3.40
11	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
12	Interest on working capital				2441.02	5.88
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				34038.94	81.96
III	**Cost B2**					
14	Rental Value of Land				333.33	0.80
15	**Cost B2 = (Cost B1 + Rental value)**				34372.27	82.76
IV	**Cost C1**					
16	Family Human Labour			12.36	3373.35	8.12
17	**Cost C1 = (Cost B2 + Family Labour)**				37745.63	90.89
V	**Cost C2**					
18	Risk Premium				10.00	0.02
19	**Cost C2 = (Cost C1 + Risk Premium)**				37755.63	90.91
VI	**Cost C3**					
20	Managerial Cost				3775.56	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				41531.19	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		18.76	53925.12	
		b) Main Crop Sales Price (Rs.)			2875.00	
	By Product	e) Main Product (q)		20.81	5724.10	
		f) Main Crop Sales Price (Rs.)			275.00	
b.	Gross Income (Rs.)				59649.21	
c.	Net Income (Rs.)				18118.03	

d.	Cost per Quintal (Rs./q.)		2214.22	
e.	Benefit Cost Ratio (BC Ratio)		1:1.44	

Cost of Cultivation of Cotton: The data regarding the cost of cultivation of cotton in Halhalli micro watershed is presented in Table 31. The results indicate that, the total cost of cultivation for cotton was Rs. 53845.74. The gross income realized by the farmers was Rs. 74100. The net income from cotton cultivation was Rs. 20254.26. Thus the benefit cost ratio was found to be 1:1.38.

Table 31: Cost of Cultivation of Cotton in Halhalli micro watershed

Sl. No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	34.58	7657.00	14.22
2	Bullock	Pairs/day	2.47	1358.50	2.52
3	Tractor	Hours	2.47	1852.50	3.44
4	Machinery	Hours	1.24	741.00	1.38
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	2.47	2420.60	4.50
6	FYM	Quintal	12.35	2470.00	4.59
7	Fertilizer + micronutrients	Quintal	4.94	6916.00	12.84
8	Pesticides (PPC)	Kgs / liters	2.47	3705.00	6.88
9	Irrigation	Number	6.18	0.00	0.00
10	Depreciation charges		0.00	13325.65	24.75
11	Land revenue and Taxes		0.00	0.00	0.00
II	**Cost B1**				
12	Interest on working capital			1862.59	3.46
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**			42308.84	78.57
III	**Cost B2**				
14	Rental Value of Land			333.33	0.62
15	**Cost B2 = (Cost B1 + Rental value)**			42642.18	79.19
IV	**Cost C1**				
16	Family Human Labour		24.70	6298.50	11.70
17	**Cost C1 = (Cost B2 + Family Labour)**			48940.68	90.89
V	**Cost C2**				
18	Risk Premium			10.00	0.02
19	**Cost C2 = (Cost C1 + Risk Premium)**			48950.68	90.91
VI	**Cost C3**				
20	Managerial Cost			4895.07	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**			53845.74	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	24.70	74100.00	
		b) Main Crop Sales Price (Rs.)		3000.00	
b.	Gross Income (Rs.)			74100.00	
c.	Net Income (Rs.)			20254.26	
d.	Cost per Quintal (Rs./q.)			2179.99	

e.	Benefit Cost Ratio (BC Ratio)		1:1.38	

Cost of cultivation of Sunflower: The data regarding the cost of cultivation of sunflower in Halhalli micro watershed is presented in Table 32. The results indicate that, the total cost of cultivation for sunflower was Rs. 14726.20. The gross income realized by the farmers was Rs. 22230. The net income from sunflower cultivation was Rs. 7503.80. Thus the benefit cost ratio was found to be 1:1.51.

Table 32: Cost of Cultivation of Sunflower in Halhalli micro watershed

Sl. No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	55.57	0.00	0.00
2	Bullock	Pairs/day	1.24	0.00	0.00
3	Tractor	Hours	2.47	0.00	0.00
4	Machinery	Hours	3.71	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	12.35	1482.00	10.06
6	FYM	Quintal	12.35	2470.00	16.77
7	Fertilizer + micronutrients	Quintal	4.94	6916.00	46.96
8	Pesticides (PPC)	Kgs / liters	1.24	926.25	6.29
9	Irrigation	Number	0.00	0.00	0.00
10	Depreciation charges		0.00	0.02	0.00
11	Land revenue and Taxes		0.00	0.00	0.00
II	**Cost B1**				
12	Interest on working capital			1416.51	9.62
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**			13210.78	89.71
III	**Cost B2**				
14	Rental Value of Land			166.67	1.13
15	**Cost B2 = (Cost B1 + Rental value)**			13377.45	90.84
IV	**Cost C1**				
16	Family Human Labour		14.82	0.00	0.00
17	**Cost C1 = (Cost B2 + Family Labour)**			13377.45	90.84
V	**Cost C2**				
18	Risk Premium			10.00	0.07
19	**Cost C2 = (Cost C1 + Risk Premium)**			13387.45	90.91
VI	**Cost C3**				
20	Managerial Cost			1338.75	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**			14726.20	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	7.41	22230.00	
		b) Main Crop Sales Price (Rs.)		3000.00	
b.	Gross Income (Rs.)			22230.00	
c.	Net Income (Rs.)			7503.80	
d.	Cost per Quintal (Rs./q.)			1987.34	

e.	Benefit Cost Ratio (BC Ratio)		1:1.51	

Cost of cultivation of Chilly: The data regarding the cost of cultivation of chilly in Halhalli micro watershed is presented in Table 33. The results indicate that, the total cost of cultivation for chilly was Rs. 46771.49. The gross income realized by the farmers was Rs. 49400. The net income from chilly cultivation was Rs. 2628.51. Thus the benefit cost ratio was found to be 1:1.06.

Table 33: Cost of Cultivation of chilly in Halhalli micro watershed

Sl. No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	74.10	17043.00	36.44
2	Bullock	Pairs/day	0.00	0.00	0.00
3	Tractor	Hours	4.94	3705.00	7.92
4	Machinery	Hours	2.47	1482.00	3.17
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	2.47	2420.60	5.18
6	FYM	Quintal	24.70	4940.00	10.56
7	Fertilizer + micronutrients	Quintal	2.47	1976.00	4.22
8	Pesticides (PPC)	Kgs / liters	2.47	1852.50	3.96
9	Irrigation	Number	12.35	0.00	0.00
10	Depreciation charges		0.00	3.21	0.01
11	Land revenue and Taxes		0.00	0.00	0.00
II	**Cost B1**				
12	Interest on working capital			1343.89	2.87
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**			34766.20	74.33
III	**Cost B2**				
14	Rental Value of Land			333.33	0.71
15	**Cost B2 = (Cost B1 + Rental value)**			35099.54	75.04
IV	**Cost C1**				
16	Family Human Labour		27.17	7410.00	15.84
17	**Cost C1 = (Cost B2 + Family Labour)**			42509.54	90.89
V	**Cost C2**				
18	Risk Premium			10.00	0.02
19	**Cost C2 = (Cost C1 + Risk Premium)**			42519.54	90.91
VI	**Cost C3**				
20	Managerial Cost			4251.95	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**			46771.49	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	49.40	49400.00	
		b) Main Crop Sales Price (Rs.)		1000.00	
b.	Gross Income (Rs.)			49400.00	
c.	Net Income (Rs.)			2628.51	
d.	Cost per Quintal (Rs./q.)			946.79	

e.	Benefit Cost Ratio (BC Ratio)		1:1.06	

Cost of cultivation of brinjal: The data regarding the cost of cultivation of brinjal in Halhalli micro watershed is presented in Table 34. The results indicate that, the total cost of cultivation for brinjal was Rs. 60217.54. The gross income realized by the farmers was Rs. 135751.98. The net income from brinjal cultivation was Rs. 75534.44. Thus the benefit cost ratio was found to be 1:2.25.

Table 34: Cost of Cultivation of brinjal in Halhalli micro watershed

Sl. No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	70.31	14992.97	24.90
2	Bullock	Pairs/day	1.30	713.50	1.18
3	Tractor	Hours	4.37	3279.50	5.45
4	Machinery	Hours	2.94	1766.36	2.93
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	1913.04	1913.04	3.18
6	FYM	Quintal	36.36	7271.62	12.08
7	Fertilizer + micronutrients	Quintal	7.27	10180.27	16.91
8	Pesticides (PPC)	Kgs / liters	2.12	1590.45	2.64
9	Irrigation	Number	23.14	0.00	0.00
10	Depreciation charges		0.00	513.92	0.85
11	Land revenue and Taxes		0.00	0.00	0.00
II	**Cost B1**				
12	Interest on working capital			2515.85	4.18
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**			44737.48	74.29
III	**Cost B2**				
14	Rental Value of Land			333.33	0.55
15	**Cost B2 = (Cost B1 + Rental value)**			45070.82	74.85
IV	**Cost C1**				
16	Family Human Labour		35.74	9662.40	16.05
17	**Cost C1 = (Cost B2 + Family Labour)**			54733.22	90.89
V	**Cost C2**				
18	Risk Premium			10.00	0.02
19	**Cost C2 = (Cost C1 + Risk Premium)**			54743.22	90.91
VI	**Cost C3**				
20	Managerial Cost			5474.32	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**			60217.54	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	95.82	135751.98	
		b) Main Crop Sales Price (Rs.)		1416.67	
b.	Gross Income (Rs.)			135751.98	

c.	Net Income (Rs.)		75534.44	
d.	Cost per Quintal (Rs./q.)		628.41	
e.	Benefit Cost Ratio (BC Ratio)		1:2.25	

Adequacy of fodder: The data regarding the adequacy of fodder in Halhalli micro watershed is presented in Table 35. The results indicate that, 32.43 per cent of the households opined that dry fodder was adequate, 13.51 per cent of the households opined that dry fodder was inadequate and 2.70 per cent of the households opined that green fodder was adequate.

Table 35: Adequacy of fodder in Halhalli micro watershed

Sl. No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	1	11.11	1	20	6	46.15	4	80	12	32.43
2	Inadequate-Dry Fodder	1	11.11	2	40	2	15.38	0	0	5	13.51
3	Adequate-Green Fodder	0	0	0	0	1	7.69	0	0	1	2.70

Average annual gross income: The data regarding the average annual gross income in Halhalli micro watershed is presented in Table 36. The results indicate that in landless farmers, the average annual gross income from business was Rs.12000, wage was Rs.23000 and dairy farm was Rs. 1000. In marginal farmers the average gross income from service/salary was Rs.13333.33, wage was Rs.24333.33 and agriculture was Rs.42711.11. In small farmers the average annual income from business was Rs. 44000, wage was Rs.17600 and agriculture was Rs.58700. In semi medium farmers the average annual income from service/salary was Rs.3846.15, wage was Rs.12538.46 and agriculture was Rs.54461.54. In case of medium farmers the average annual gross income from service/salary was Rs.12000, wage was Rs.4000, agriculture was Rs.112000 and dairy farm was Rs.600.

Table 36: Average annual gross income in Halhalli micro watershed

(Avg value in Rs.)

Sl.No.	Particulars	LL (5)	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0	13,333.33	0	3,846.15	12,000	6,216.22
2	Business	12,000	0	44,000	0	0	7,567.57
3	Wage	23,000	24,333.33	17,600	12,538.46	4,000	16,351.35
4	Agriculture	0	42,711.11	58,700	54,461.54	112,000	52,591.89
5	Dairy Farm	1,000	0	0	0	600	216.22
Income(Rs.)		36,000	80,377.78	120,3000	70,846.15	128,600	82,943.24

Average annual expenditure: The data regarding the average annual expenditure in Halhalli micro watershed is presented in Table 37. The results indicate that, in the land less farmers, the average annual expenditure from business and wage was Rs.10000 and from dairy farm was Rs.2000. In marginal farmers, the average annual expenditure from wage was Rs.5714.29 and agriculture was Rs.22888.89. In small farmers, the annual expenditure from business was Rs.52500, wage was Rs.5250 and agriculture was Rs.32000. In semi medium farmers, the average annual expenditure from service/salary was Rs.20000, wage was Rs.4272.73 and agriculture was Rs.20153.85. In case of medium farmers, the average annual expenditure from service/salary was Rs.30000, wage was Rs.5000 and agriculture was Rs.42000.

Table 37: Average annual expenditure in Halhalli micro watershed

(Avg value in Rs.)

Sl. No.	Particulars	LL (5)	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0	0	0	20,000	30,000	1,351.35
2	Business	10,000	0	52,500	0	0	3,108.11
3	Wage	10,000	5,714.29	5,250	4,272.73	5,000	4,270.27
4	Agriculture	0.00	22,888.89	32,000	20,153.85	42,000	22,648.65
5	Dairy Farm	2,000	0	0	0	0	54.05
Total		22,000	28,603.17	89,750	44,426.57	77,000	261,779.75
Average		4,400	3,178.13	17,950	3,417.43	15,400	7,075.13

Horticulture species grown: The data regarding horticulture species grown in Halhalli micro watershed is presented in Table 38. The results indicate that, sampled households have grown 14 coconut, 1 jack fruit and 11 mango trees in their field. Farmers have also grown 1 coconut trees in their backyard.

Table 38: Horticulture species grown in Halhalli micro watershed

Sl.No.	Particulars	SMF (13)		MDF (5)		LF (0)		All (37)	
		F	B	F	B	F	B	F	B
1	Coconut	7	1	7	0	0	0	14	1
2	Jack fruit	0	0	1	0	0	0	1	0
3	Mango	10	0	1	0	0	0	11	0

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

Forest species grown: The data regarding forest species grown in Halhalli micro watershed is presented in Table 39. The results indicate that, households have planted 2 teak, 60 neem trees and 9 tamrind trees in the field and also planted 1 neem tree in their back yard.

Table 39: Forest species grown in Halhalli micro watershed

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		LF (0)		All (37)	
		F	B	F	B	F	B	F	B	F	B	F	B	F	B

1	Teak	0	0	0	0	0	0	2	0	0	0	0	0	2	0
2	Neem	0	0	16	0	10	0	23	1	11	0	0	0	60	1
3	Tamarind	0	0	6	0	2	0	1	0	0	0	0	0	9	0

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

Average Additional investment capacity: The data regarding average additional investment capacity in Halhalli micro watershed is presented in Table 40. The results indicate that, households have an average investment capacity of Rs. 4,486.71 for land development, Rs. 1,729.95 in irrigation facility, Rs. 2,513.51 for improved crop production and Rs.81.08 for improved livestock management.

Marginal households have an average investment capacity of Rs. 1334.0 for land development, Rs. 760 for irrigation facility, Rs.1000 for improved crop production and Rs.333.33 for improved livestock management. Small farmers have an average investment capacity of Rs. 4000 for land development and Rs.3400 for improved crop production. Semi medium farmers have an average investment capacity of Rs. 6,461.64 for land development, Rs. 2,307.80 in irrigation facility and Rs. 3,538.46 for improved crop production. Medium farmers have an average investment capacity of Rs. 10000 for land development, Rs. 6800 for irrigation facility and Rs.4200 for improved crop production.

Table 40: Average additional investment capacity of households in Halhalli micro watershed

Sl. No.	Particulars	MF (9)	SF (5)	SMF (13)	MDF (5)	All (37)
1	Land development	1,334.09	4,000	6,461.64	10,000	4,486.71
2	Irrigation facility	760	0	2,307.80	6,800	1,729.95
3	Improved crop production	1,000	3,400	3,538.46	4,200	2,513.51
4	Improved livestock management	333.33	0	0	0	81.08

Source of additional investment: The data regarding source of funds for additional investment in Halhalli micro watershed is presented in Table 41. The results indicated that, for land development 64.86 per cent of the households, 40.54 per cent of the households for irrigation facility, 43.24 per cent of the households were for improved crop production and 2.70 per cent of the households for improved livestock management were dependent on government subsidy.

Table 41: Source of funds for additional investment capacity in Halhalli micro watershed

Sl. No	Item	Land development		Irrigation facility		Improved crop production		Improved livestock management	
		N	%	N	%	N	%	N	%
1	Government	24	64.86	15	40.54	16	43.24	1	2.70

	subsidy								

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Halhalli micro watershed is presented in Table 42. The results indicated that, brinjal, chilly, cotton, groundnut, maize, sunflower and tomato were sold to the extent of 100 per cent. Bajra and paddy were sold to the extent of 96.86 per cent and 50 per cent.

Table 42: Marketing of the agricultural produce in Halhalli micro watershed

Sl. No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Bajra	159.0	5.0	154.0	96.86	1564.29
2	Brinjal	140.0	0.0	140.0	100.0	1416.67
3	Chilly	20.0	0.0	20.0	100.0	1000.0
4	Cotton	20.0	0.0	20.0	100.0	3000.0
5	Groundnut	130.0	0.0	130.0	100.0	2875.0
6	Maize	524.0	0.0	524.0	100.0	1129.41
7	Paddy	80.0	40.0	40.0	50.0	1300.0
8	Sunflower	6.0	0.0	6.0	100.0	3000.0
9	Tomato	385.0	0.0	385.0	100.0	800.0

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Halhalli micro watershed is presented in Table 43. The results indicated that, about 100 per cent of farmers sold their produce to regulated market and 2.70 per cent have sold their produce in cooperative marketing society.

Table 43. Marketing Channels used for sale of agricultural produce in Halhalli micro watershed

Sl. No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF(5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Regulated Market	9	100	5	100	13	115.38	5	100	36	100
2	Cooperative marketing Society	0	0	0	0	1	7.69	0	0	1	2.70

Mode of transport of agricultural produce: The data regarding Mode of transport of agricultural produce in Halhalli micro watershed is presented in Table 44. The results indicated that 18.92 per cent have used cart and 86.49 per cent have used tractor.

Table 44: Mode of transport of agricultural produce in Halhalli micro watershed

Sl.No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Cart	2	22.22	1	20.00	1	7.69	3	60.00	7	18.92
2	Tractor	7	77.78	4	80.00	15	115.38	6	120.00	32	86.49

Incidence of soil and water erosion problems: The data regarding incidence of soil and water erosion problems in Halhalli micro watershed is presented in Table 45. The results indicated that, 64.86 per cent of the households have experienced the soil and water erosion problems i.e. 44.44 percent of marginal farmers, 60 per cent of small farmers, 92.31 per cent of semi medium farmers and 100 percent of medium farmers.

Table 45: Incidence of soil and water erosion problems in Halhalli micro watershed

Sl.No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF(5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Soil and water erosion problems in the farm	4	44.44	3	60	12	92.31	5	100	24	64.86

Interest towards soil testing: The data regarding interest shown towards soil testing in Halhalli micro watershed is presented in Table 46. The results indicated that, 86.49 per cent of the households have shown interest in soil testing including 100 per cent of marginal farmers, small farmers, semi medium farmers and medium farmers respectively.

Table 46: Interest shown towards soil testing in Halhalli micro watershed

Sl.No.	Particulars	MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	9	100	5	100	13	100	5	100	32	86.49

Soil and water conservation practices and structures adopted: The data regarding soil and water conservation practices and structures adopted in Halhalli micro watershed is presented in Table 47. The results indicated that, 2.70 per cent of the households have adopted field bunding which includes 11.11 per cent of marginal farmers.

Table 47: Soil and water conservation practices and structures adopted in Halhalli micro watershed

Sl.No.	Particulars	MF (9)		SF (5)		All (37)	
		N	%	N	%	N	%
1	Field Bunding	1	11.11	0	0.00	1	2.70

Status of soil and water conservation structures adopted: The data regarding status of soil and water conservation structures adopted in Halhalli micro watershed is presented in Table 48. The results indicated that, 100 per cent of the households who adopted field bunding opined that bunds required full replacement.

Table 48: Status of soil and water conservation structures adopted in Halhalli micro watershed

Sl. No	Item	Full Replacement Required	
		N	%
1	Field Bunding	1	100

Agencies involved in soil conservation structures: The data regarding agencies involved in soil conservation structures in Halhalli micro watershed is presented in Table 49. The results indicated that 2.70 per cent of soil conservation structure is constructed by government.

Table 49: Agencies involved in soil conservation structures in Halhalli micro watershed

Sl.No.	Particulars	MF (9)		All (37)	
		N	%	N	%
1	Govt.	1	11.11	1	2.70

Source of drinking water: The data regarding source of drinking water in Halhalli micro watershed is presented in Table 50. The results indicated that, piped supply was the source of drinking water for 21.62 per cent of the households and bore well was the source of drinking water for 81.08 per cent of the households.

Table 50: Source of drinking water in Halhalli micro watershed

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	0	0	7	77.78	1	20.00	0	0	0	0	8	21.62
2	Bore Well	5	100	3	33.33	4	80.00	13	100	5	100	30	81.08

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Halhalli micro watershed is presented in Table 51. The results indicated that 100 per cent of the households have used fire wood as fuel.

Table 51: Usage pattern of fuel for domestic use in Halhalli micro watershed

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	5	100	9	100	5	100	13	100	5	100	37	100

Source of light: The data regarding source of light in Halhalli micro watershed is presented in Table 52. The results indicated that, Electricity was the major source of light for 100 per cent of the households in micro watershed.

Table 52: Source of light in Halhalli micro watershed

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Electricity	5	100	9	100	5	100	13	100	5	100	37	100

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facilit**y** in Halhalli micro watershed is presented in Table 53. The results indicated that, 67.57 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, 100 per cent of marginal, 100 per cent of small, 7.69 per cent of semi medium and 100 per cent of medium farmers had sanitary toilet facility.

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

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	5	100	9	100	5	100	1	7.69	5	100	25	67.57

Possession of PDS card: The data regarding possession of PDS card in Halhalli micro watershed is presented in Table 54. The results indicated that, 97.30 per cent of the sampled households possessed BPL card.

Table 54: Possession of PDS card in Halhalli micro watershed

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	BPL	5	100	9	100	5	100	12	92.31	5	100	36	97.30

Participation in NREGA program: The data regarding participation in NREGA programme in Halhalli micro watershed is presented in Table 55. The results indicated that, 43.24 per cent of the households participated in NREGA programme which includes 40 per cent of the land less, 11.11 per cent of marginal, 40 per cent of the small, 46.15 per cent of the semi medium and 100 per cent of the medium farmers.

Table 55: Participation in NREGA programme in Halhalli micro watershed

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	2	40	1	11.11	2	40	6	46.15	5	100	16	43.24

Adequacy of food items: The data regarding adequacy of food items in Halhalli micro watershed is presented in Table 56. The results indicated that, cereals, pulses, oilseed, vegetables, fruits and meat were adequate for 97.30 per cent, 37.84 per cent, 24.32 per cent, 29.73 per cent, 40.54 per cent and 5.41per cent of the households respectively. Milk and egg were adequate for 21.62 per cent of the households.

Table 56: Adequacy of food items in Halhalli micro watershed

Sl. No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	5	100	8	88.89	5	100	13	100	5	100	36	97.30
2	Pulses	3	60	2	22.22	2	40	4	30.77	3	60	14	37.84
3	Oilseed	1	20	3	33.33	3	60	2	15.38	0	0	9	24.32
4	Vegetables	3	60	4	44.44	0	0	3	23.08	1	20	11	29.73
5	Fruits	3	60	4	44.44	1	20	6	46.15	1	20	15	40.54
6	Milk	1	20	1	11.11	2	40	2	15.38	2	40	8	21.62
7	Egg	2	40	2	22.22	1	20	2	15.38	1	20	8	21.62
8	Meat	0	0	1	11.11	1	20	0	0	0	0	2	5.41

Response on Inadequacy of food items: The data regarding inadequacy of food items in Halhalli micro watershed is presented in Table 57. The results indicated that, cereals, pulses, oilseed, vegetables, fruits, milk , egg and meat were inadequate for 2.70 per cent, 62.16 per cent, 70.27 per cent, 56.76 per cent, 35.14 per cent, 48.65 per cent, 56.76 per cent and 2.70 per cent of the households.

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

Sl.No.	Particulars	LL (5)		MF (9)		SF (5)		SMF (13)		MDF (5)		All (37)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	0	0	1	11.11	0	0	0	0	0	0	1	2.70
2	Pulses	2	40	7	77.78	3	60	9	69.23	2	40	23	62.16

3	Oilseed	4	80	5	55.56	2	40	10	76.92	5	100	26	70.27
4	Vegetables	2	40	4	44.44	3	60	10	76.92	2	40	21	56.76
5	Fruits	2	40	2	22.22	4	80	3	23.08	2	40	13	35.14
6	Milk	2	40	6	66.67	2	40	5	38.46	3	60	18	48.65
7	Egg	2	40	5	55.56	3	60	8	61.54	3	60	21	56.76
8	Meat	0	0	0	0	0	0	0	0	1	20	1	2.70

Farming constraints: The data regarding farming constraints experienced by households in Halhalli micro watershed is presented in Table 58. The results indicated that, lower fertility status of the soil was the constraint experienced by 83.78 per cent of the households, wild animal menace on farm field (37.84%), frequent incidence of pest and diseases (27.03%), inadequacy of irrigation water (18.92%), high cost of fertilizers and plant protection chemicals (27.03%), high rate of interest on credit (18.92%), low price for the agricultural commodities (18.92%), lack of marketing facilities in the area (27.03%), inadequate extension services (27.03%) lack of transport for safe transport of the agricultural produce to the market (32.43%), less rainfall (59.46%) and source of agri technology information (18.92%).

Table 58: Farming constraints Experienced in Halhalli micro watershed

Sl. No.	Particulars	MF (9)		SF (5)		SMF(13)		MDF(5)		All (37)	
		N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	8	88.89	5	100	13	100	5	100	31	83.78
2	Wild animal menace on farm field	1	11.11	3	60	6	46.15	4	80	14	37.84
3	Frequent incidence of pest and diseases	2	22.22	1	20	7	53.85	0	0	10	27.03
4	Inadequacy of irrigation water	1	11.11	1	20	3	23.08	2	40	7	18.92
5	High cost of Fertilizers and plant protection chemicals	2	22.22	3	60	4	30.77	1	20	10	27.03
6	High rate of interest on credit	1	11.11	0	0	4	30.77	2	40	7	18.92
7	Low price for the agricultural commodities	2	22.22	0	0	4	30.77	1	20	7	18.92
8	Lack of marketing facilities in the area	4	44.44	2	40	4	30.77	0	0	10	27.03
9	Inadequate extension services	6	66.67	0	0	2	15.38	2	40	10	27.03
10	Lack of transport for safe transport of the Agril produce to the market.	0	0.00	3	60	7	53.85	2	40	12	32.43
11	Less rainfall	7	77.78	2	40	8	61.54	5	100	22	59.46
12	Source of Agri-technology information	1	11.11	1	20	4	30.77	1	20	7	18.92

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 37 households located in the micro watershed were interviewed for the survey.

The results indicated that 37 farmers were sampled in Halhalli micro watershed among them 5 (13.51%) were landless, 9 (24.32%) were marginal farmers, 5 (13.51%) were small farmers, 13 (35.14%) were semi medium farmers and 5 (13.51%) were medium farmers. The data indicated that there were 103 (56.59%) men and 79 (43.41%) were women among the sampled households. The average family size of landless farmers was 5.40, marginal farmers were 3.44, small farmers were 4, semi medium farmers were 6, and medium farmers were 5.20. The data indicated that, 36 (19.78%) people were in 0-15 years of age, 89 (48.90%) were in 16-35 years of age, 44 (24.18%) were in 36-60 years of age and 13 (7.14 %) were above 61 years of age.

The results indicated that Halhalli had 25.27 per cent illiterates, 34.07 per cent of them had primary school education, 3.30 per cent of them had middle school education, 10.44 per cent of them had high school education, 12.64 per cent of them had PUC education, 0.55 per cent of them did diploma, 1.10 per cent of them had ITI and 7.14 per cent of them had degree education. The results indicate that, 83.78 per cent of households practicing agriculture, 13.51 per cent of the households were agricultural laborers and 2.70 per cent were general laborers. The results indicate that agriculture was the major occupation for 17.58 per cent of the household members, 47.25 per cent were agricultural labourers, 0.55 per cent were general laborers, 1.10 percent were in private service, 24.73 per cent of them were student, 3.85 per cent of them were housewife 4.95 per cent were children.

The results indicate that, in case of landless farmers, 44.44 per cent were agricultural labour and were students respectively and 11.11 per cent were children. In case of marginal farmers 25.81 per cent were agriculturists, 45.16 per cent were agricultural labourer, 3.23 per cent were general labour, 19.35 per cent were students and 3.23 per cent were housewives and children respectively. In case of small farmers 25 per cent were agriculturists, 50 agricultural labour and 10 per cent were students. In case of semi medium farmers 17.95 per cent were agriculturists, 46.15 per cent of them were agricultural labour, 26.92 per cent were students, 5.13 per cent were housewives and 3.85 per cent were children. In case of medium farmers 19.23 per cent were agriculturists,

53.85 per cent were agricultural labour, 15.38 per cent were students and 3.85 per cent of the households were in private service, were housewives and children.

The results show that 100 per cent of the households have not participated in any local institutions. The results indicate that 48.65 per cent of the households possess thatched house, 32.43 per cent of the households possess Katcha house and 18.92 per cent of them possess Pucca house. The results shows that 97.30 per cent of the households possess TV, 83.78 per cent of the households possess Mixer grinder, 13.51 per cent of the households possess bicycle, 48.65 per cent of the households possess motor cycle and 97.30 per cent of the households possess mobile phones. The results shows that the average value of television was Rs.6444, mixer grinder was Rs.1516, bicycle was Rs. 1400, motor cycle was Rs.30388 and mobile phone was Rs.1683.

The results indicate that about 27.03 per cent of the households possess bullock cart, 32.43 per cent of them possess plough, 5.41 per cent of them possess both power tiller and tractor, 32.43 per cent of them posses sprayer, 91.89 per cent of them possess weeder and 13.15 percent of them possess chaff cutter. The results show that the average value of bullock cart was Rs. 18500, plough was Rs.931, the average value of power tiller was Rs.110000, the average value of tractor was Rs.500000 and the average value of sprayer was Rs.2148, chaff cutter was Rs.3000 and the average value of weeder Rs.69.

The results indicate that, 32.43 per cent of the households possess bullocks and local cow respectively, 2.70 per cent of the households possess crossbred cow and buffalo correspondingly and 8.11 per cent of the households possess goat. The results indicate that, in case of landless farmers 20 per cent households possess bullock and local cow. In case of marginal farmers 22.22 per cent of the households possess bullock and 11.11 per cent of the households possess local cow. In case of small farmers, 40 per cent of the households possess bullock, 20 per cent possess local cow and 20 per cent possess buffalo. In case of semi medium farmers, 38.46 per cent of households possess bullock, 53.85 per cent of households possess local cow and 15.38 per cent possess goat. In case of medium farmers, 40 per cent of the households possess both bullocks and local cow respectively and 20 per cent of the households possess crossbreed cow. The results indicate that, average own labour men available in the micro watershed was 1.92, average own labour (women) available was 1.35, average hired labour (men) available was 5.62 and average hired labour (women) available was 6.05.

The results showed that, in case of marginal farmers, average own labour men available was 1.56, average own labour (women) was 1, average hired labour (men) was 6.89 and average hired labour (women) available was 8. In case of small farmers, average own labour men available was 1.80, average own labour (women) was 1.40, average hired labour (men) was 6.60 and average hired labour (women) available was 7. In case of semi medium farmers, average own labour men available was 2.31, average own labour (women) was 1.46, average hired labour (men) was 5.46 and average hired labour

(women) available was 5.69. In case of medium farmers, average own labour men available was 2.60, average own labour (women) was 2, average hired labour (men) was 5.40 and average hired labour (women) available was 5.60. The results indicate that 100 per cent of the household opined that hired labour was inadequate.

The results indicate that, households of the Halhalli micro watershed possess 23.05 ha (46.30%) of dry land and 26.73 ha (53.70%) of irrigated land. Marginal farmers possess 5.99 ha (92.55%) of dry land and 0.48 ha (7.45%) of irrigated land. Small farmers possess 3.95 ha (70.47%) of dry land and 1.66 ha (29.53%) of irrigated land. Semi medium possess 11.09 ha (50.01%) of dry land and 11.08 ha (49.99%) of irrigated land. Medium farmers possess 2.02 ha (13.03%) of dry land and 13.50 ha (86.97%) of irrigated land. The results indicate that, the average value of dry land was Rs. 264,565.41 and average value of irrigated was Rs. 310,433.07. In case of marginal famers, the average land value was Rs. 534,415.16 for dry land and Rs. 1,037,815.08 for irrigated land. In case of small famers, the average land value was Rs. 227,766.39 for dry land and Rs. 603,911.99 for irrigated land. In case of semi medium famers, the average land value was Rs. 153,248.18 for dry land and Rs. 378,751.37 for irrigated land. In case of medium famers, the average land value was Rs. 148,200 for dry land and Rs. 192,448.31 for irrigated land.

The results indicate that, there were 22 functioning and 23 defunctioning bore wells in the micro watershed. The results indicate that, bore well was the major irrigation source in the micro water shed for 59.46 per cent of the farmers. The results indicate that, the depth of bore well was found to be 41.02 meters. The results indicate that, marginal farmers had irrigated area of 0.97 hectares, small farmers had 1.66 hectares, semi medium farmers had 13.75 hectares and medium farmers had 19.43 hectares. On an average there were 35.81 ha of irrigated land.

The results indicate that, farmers have grown maize (26.02 ha), bajra (9.94 ha), groundnut (5.67ha), tomato (2.14 ha), brijal (1.44 ha), cotton (0.81 ha), paddy (0.81ha), sunflower (0.81 ha) and chilly (0.40 ha). Marginal farmers had grown bajra, maize, tomato and brinjal. Small farmers had grown maize, tomato and paddy. Semi medium farmers had grown maize, bajra, groundnut, brinjal, sunflower and chilly. Medium farmers had grown maize, groundnut, tomato and cotton.

The results indicate that, the cropping intensity in Halhalli micro watershed was found to be 66.60 per cent. In case of marginal and small farmers it was 100 per cent, in case of semi medium farmers it was 77.31 per cent and medium farmers had cropping intensity of 45 per cent. The results indicated that, 89.19 per cent of the households have bank account and 91.89 per cent of the households have savings. 60 percent of landless farmers possess bank account and 80 per cent of marginal household possess savings. In case of marginal farmers 88.89 per cent of the household possess both bank account and savings. In small farmers, 100 per cent of the households possess bank account and

savings. In case of semi medium farmers, 92.31 per cent of possess both bank account and savings. In Medium farmers, 100 per cent of farmers possess bank account and savings respectively.

The results indicated that, 80 per cent of landless, 88.89 percent of marginal and 100 per cent of small, semi medium and medium farmers have borrowed credit from different sources. The results indicate that, the total cost of cultivation for maize was Rs. 26912.86. The gross income realized by the farmers was Rs. 27487.58. The net income from Maize cultivation was Rs. 574.73, thus the benefit cost ratio was found to be 1:1.02. The results indicate that, the total cost of cultivation for bajra was Rs. 25301.48. The gross income realized by the farmers was Rs. 35990.07. The net income from bajra cultivation was Rs. 10688.59. Thus the benefit cost ratio was found to be 1:1.42. The results indicate that, the total cost of cultivation for Tomato was Rs. 55711.33. The gross income realized by the farmers was Rs. 130947.42. The net income from Tomato cultivation was Rs. 75236.10. Thus the benefit cost ratio was found to be 1:2.35. The results indicate that, the total cost of cultivation for paddy was Rs. 34746.32. The gross income realized by the farmers was Rs. 133380. The net income from paddy cultivation was Rs. 98633.68. Thus the benefit cost ratio was found to be 1:3.84. The results indicate that, the total cost of cultivation for groundnut was Rs. 41531.19. The gross income realized by the farmers was Rs. 59649.21. The net income from groundnut cultivation was Rs. 18118.03. Thus the benefit cost ratio was found to be 1:1.44. The results indicate that, the total cost of cultivation for cotton was Rs. 53845.74. The gross income realized by the farmers was Rs. 74100. The net income from cotton cultivation was Rs. 20254.26. Thus the benefit cost ratio was found to be 1:1.38. The results indicate that, the total cost of cultivation for sunflower was Rs. 14726.20. The gross income realized by the farmers was Rs. 22230. The net income from sunflower cultivation was Rs. 7503.80. Thus the benefit cost ratio was found to be 1:1.51. The results indicate that, the total cost of cultivation for chilly was Rs. 46771.49. The gross income realized by the farmers was Rs. 49400. The net income from chilly cultivation was Rs. 2628.51. Thus the benefit cost ratio was found to be 1:1.06. The results indicate that, the total cost of cultivation for brinjal was Rs. 60217.54. The gross income realized by the farmers was Rs. 135751.98. The net income from brinjal cultivation was Rs. 75534.44. Thus the benefit cost ratio was found to be 1:2.25.

The results indicate that, 32.43 per cent of the households opined that dry fodder was adequate, 13.51 per cent of the households opined that dry fodder was inadequate and 2.70 per cent of the households opined that green fodder was adequate. The results indicate that in landless farmers, the average annual gross income from business was Rs.12000, wage was Rs.23000 and dairy farm was Rs. 1000. In marginal farmers the average gross income from service/salary was Rs.13333.33, wage was Rs.24333.33 and agriculture was Rs.42711.11. In small farmers the average annual income from business

was Rs. 44000, wage was Rs.17600 and agriculture was Rs.58700. In semi medium farmers the average annual income from service/salary was Rs.3846.15, wage was Rs.12538.46 and agriculture was Rs.54461.54. In case of medium farmers the average annual gross income from service/salary was Rs.12000, wage was Rs.4000, agriculture was Rs.112000 and dairy farm was Rs.600.

The results indicate that, in the land less farmers, the average annual expenditure from business and wage was Rs.10000 and from dairy farm was Rs.2000. In marginal farmers, the average annual expenditure from wage was Rs.5714.29 and agriculture was Rs.22888.89. In small farmers, the annual expenditure from business was Rs.52500, wage was Rs.5250 and agriculture was Rs.32000. In semi medium farmers, the average annual expenditure from service/salary was Rs.20000, wage was Rs.4272.73 and agriculture was Rs.20153.85. In case of medium farmers, the average annual expenditure from service/salary was Rs.30000, wage was Rs.5000 and agriculture was Rs.42000.

The results indicate that, sampled households have grown 14 coconut, 1 jack fruit and 11 mango trees in their field. Farmers have also grown 1 coconut trees in their backyard. The results indicate that, households have planted 2 teak, 60 neem trees and 9 tamrind trees in the field and also planted 1 neem tree in their back yard. The results indicate that, households have an average investment capacity of Rs. 4,486.71 for land development, Rs. 1,729.95 in irrigation facility, Rs. 2,513.51 for improved crop production and Rs.81.08 for improved livestock management. The data showed that, marginal households have an average investment capacity of Rs. 1334.0 for land development, Rs. 760 for irrigation facility, Rs.1000 for improved crop production and Rs.333.33 for improved livestock management. Small farmers have an average investment capacity of Rs. 4000 for land development and Rs.3400 for improved crop production. Semi medium farmers have an average investment capacity of Rs. 6,461.64 for land development, Rs. 2,307.80 in irrigation facility and Rs. 3,538.46 for improved crop production. Medium farmers have an average investment capacity of Rs. 10000 for land development, Rs. 6800 for irrigation facility and Rs.4200 for improved crop production.

The results indicated that, for land development 64.86 per cent of the households, 40.54 per cent of the households for irrigation facility, 43.24 per cent of the households were for improved crop production and 2.70 per cent of the households for improved livestock management were dependent on government subsidy. The results indicated that, brinjal, chilly, cotton, groundnut, maize, sunflower and tomato were sold to the extent of 100 per cent. Bajra and paddy were sold to the extent of 96.86 per cent and 50 per cent. The results indicated that, about 100 per cent of farmers sold their produce to regulated market and 2.70 per cent have sold their produce in cooperative marketing society. The results indicated that 18.92 per cent have used cart and 86.49 per cent have used tractor.

The results indicated that, 64.86 per cent of the households have experienced the soil and water erosion problems i.e. 44.44 percent of marginal farmers, 60 per cent of small farmers, 92.31 per cent of semi medium farmers and 100 percent of medium farmers. The results indicated that, 86.49 per cent of the households have shown interest in soil testing including 100 per cent of marginal farmers, small farmers, semi medium farmers and medium farmers respectively. The results indicated that, 2.70 per cent of the households have adopted field bunding which includes 11.11 per cent of marginal farmers. The results indicated that, 100 per cent of the households who adopted field bunding opined that bunds required full replacement.

The results indicated that 2.70 per cent of soil conservation structure is constructed by government. The results indicated that, piped supply was the source of drinking water for 21.62 per cent of the households and bore well was the source of drinking water for 81.08 per cent of the households. The results indicated that 100 per cent of the households have used fire wood as fuel. The results indicated that, Electricity was the major source of light for 100 per cent of the households in micro watershed. The results indicated that, 67.57 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, 100 per cent of marginal, 100 per cent of small, 7.69 per cent of semi medium and 100 per cent of medium farmers had sanitary toilet facility. The results indicated that, 97.30 per cent of the sampled households possessed BPL card. The results indicated that, 43.24 per cent of the households participated in NREGA programme which includes 40 per cent of the land less, 11.11 per cent of marginal, 40 per cent of the small, 46.15 per cent of the semi medium and 100 per cent of the medium farmers.

The results indicated that, cereals, pulses, oilseed, vegetables, fruits and meat were adequate for 97.30 per cent, 37.84 per cent, 24.32 per cent, 29.73 per cent, 40.54 per cent and 5.41per cent of the households respectively. Milk and egg were adequate for 21.62 per cent of the households. The results indicated that, cereals were inadequate for 2.70 per cent of the households, pulses were inadequate for 62.16 per cent, oilseeds were inadequate for 70.27 per cent, vegetables were inadequate for 56.76 per cent, fruits were inadequate for 35.14 per cent, milk was inadequate for 48.65 per cent, egg was inadequate for 56.76 per cent and meat was inadequate for 2.70 per cent of the households.

The results indicated that, lower fertility status of the soil was the constraint experienced by 83.78 per cent of the households, wild animal menace on farm field (37.84%), frequent incidence of pest and diseases (27.03%), inadequacy of irrigation water (18.92%), high cost of fertilizers and plant protection chemicals (27.03%), high rate of interest on credit (18.92%), low price for the agricultural commodities (18.92%), lack of marketing facilities in the area (27.03%), inadequate extension services (27.03%) lack of transport for safe transport of the agricultural produce to the market (32.43%), less rainfall (59.46%) and source of agri technology information (18.92%).