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

KANAKAPUR-2 (4D3A9C3a) MICRO WATERSHED

Koppal Hobli, 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 Kanakapura-2 microwatershed in Koppal Taluk, and District, Karnataka" for integrated development was taken up in collaboration with the State Agricutural Universities, IISC, KSRSAC, KSNDMC as Consortia partners. The project provides detailed land resource information at cadastral level (1:7920 scale) for all the plots and socio-economic status of farm households covering thirty per cent farmers randomely selected representing landed and landless class of farmers in the micro-watershed. The project report with the accompanying maps for the microwatershed will provide required detailed database for evolving effective land use plan, alternative land use options and conservation plans for the planners, administrators, agricutural extention personnel, KVK officials, developmental departments and other land users to manage the land resources in a sustainable manner.

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

Nagpur
Date: 01-08-2019

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PART-A

LAND RESOURCE INVENTORY

Contents

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The land resource inventory of Kanakapura-2 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 515 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 71 per cent is covered by soil, 12 per cent by mining/industrial, <1 per cent by railway, 1 per cent by rock outcrops and 16 per cent by habitation and water body. The salient findings from the land resource inventory are summarized briefly below

- *The soils belong to 11 soil series and 21 soil phases (management units) and 6 land management units.*
- *The length of crop growing period is <90 days and starts from 2nd week of August to 2nd week of November.*
- *From the master soil map, several interpretative and thematic maps like land capability, soil depth, surface soil texture, soil gravelliness, available water capacity, soil slope and soil erosion were generated.*
- *Soil fertility status maps for macro and micronutrients were generated based on the surface soil samples collected at every 320 m grid interval.*
- *Land suitability for growing 31 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area is suitable for agriculture.*
- *About 22 per cent of the soils are shallow (25-50 cm), 2 per cent of the soils are moderately shallow (50-75 cm), 25 per cent moderately deep (75- 100 cm) and 22 per cent is deep to very deep (100->150cm) soils.*
- *About 5 per cent sandy, 49 per cent loamy (sandy loam and sandy clay loam) and 17 per cent has clayey (sandy clay and clay) soils at the surface.*
- *About 28 per cent of the area has non-gravelly (<15%) soils, 32 per cent has gravelly soils (15-35 % gravel) and 11 per cent very gravelly (35-60 %) soils.*
- *With respect to available water capacity 42 per cent of the area has very low (<50mm/m), 10 per cent of the area has low (51-100 mm/m), 1 per cent medium (101-*

150 mm/m), 2 per cent high (151-200 mm/m) and 16 per cent very high (>200 mm/m) in available water capacity.

- *An area of about 12 per cent is nearly level (0-1%) and 59 per cent is very gently sloping (1-3%) lands.*
- *An area of about 29 per cent is slightly eroded (e1) and 42 per cent is moderately eroded (e2) lands.*
- *An area of about 13 per cent is neutral (pH 6.5-7.3), 23 per cent is slightly alkaline (pH 7.3-7.8), 22 per cent is moderately alkaline (pH 7.8-8.4) and 13 per cent is strongly to very strongly alkaline (pH 8.4 to 9.0 & >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 6 per cent, medium (0.5-0.75%) in 10 per cent and high (>0.75%) in 55 per cent area of the soils.*
- *Available phosphorus is low (<23 kg/ha) in <1 per cent, medium (23-57 kg/ha) in 21 per cent and high (>57 kg/ha) in 50 per cent area of the microwatershed.*
- *Available potassium is low (<145 kg/ha) in 10 per cent, medium (145-337 kg/ha) in 32 per cent and high (>337 kg/ha) in 29 per cent of the soils.*
- *Available sulphur is medium (10-20 ppm) in 29 per cent and high (>20 ppm) in 42 per cent area of the microwatershed.*
- *Available boron is low (<0.5 ppm) in 60 per cent, medium (0.5-1.0) in 11 per cent and high (>1.0) in <1 per cent area of the microwatershed.*
- *Available iron is deficient (<4.5 ppm) in 2 per cent and sufficient (>4.5 ppm) in 69 per cent area of the microwatershed.*
- *Available zinc is deficient (<0.6 ppm) in 14 per cent and sufficient (>0.6 ppm) in 57 per cent area of the microwatershed.*
- *Available manganese and copper are sufficient in the entire area of the microwatershed.*
- *The land suitability for 31 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	*15(3)*	*83(16)*		*Sapota*	*15(3)*	*130(25)*
Maize	*6(1)*	*91(18)*		*Pomegranate*	*15(3)*	*212 (41)*
Bajra	*15(3)*	*221(43)*		*Musambi*	*15(3)*	*212 (41)*
Groundnut	-	*151(29)*		*Lime*	*15(3)*	*212 (41)*
Sunflower	*15(3)*	*83(16)*		*Amla*	*15(3)*	*238(46)*
Redgram	*15(3)*	*83(16)*		*Cashew*	*6(1)*	*139(27)*
Bengal gram	*82(16)*	*25(5)*		*Jackfruit*	*15(3)*	*130(25)*
Cotton	*9(2)*	*89(17)*		*Jamun*	*9(2)*	*218(42)*
Chilli	*6(1)*	*10(2)*		*Custard apple*	*15(3)*	*238(46)*
Tomato	*6(1)*	*10(2)*		*Tamarind*	*9(2)*	*100(19)*
Brinjal	*7(1)*	*108(21)*		*Mulberry*	*6(1)*	*238(46)*
Onion	*7(1)*	*108(21)*		*Marigold*	*6(1)*	*92(18)*
Bhendi	*7(1)*	*108(21)*		*Chrysanthemum*	*6(1)*	*92(18)*
Drumstick	*15(3)*	*100(19)*		*Jasmine*	*6(1)*	*10(2)*
Mango	*9(2)*	*7(1)*		*Crossandra*	*15(3)*	*1(<1)*
Guava	*15(3)*	*130(25)*				

Apart from the individual crop suitability, a proposed crop plan has been prepared for the 6 identified LMUs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and other horticulture crops.

- *Maintaining soil-health is vital for crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested to these problematic soils like saline/alkali, highly eroded, sandy soils etc.,*
- *Soil and water conservation and drainage line treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. That would help in supplementing the farm income, provide fodder and fuel, and generate lot of biomass which in turn would help in maintaining the ecological balance and contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

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 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 Kanakapura-2 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 Kanakapura-2 micro-watershed is located in the central part of Karnataka in Koppal taluk and district (Fig 2.1). It lies between $15^0$20' and $15^0$22' North latitudes and $76^0$13' and $76^0$15' East longitudes and covers an area of about 515 ha. It is about 12 km from Koppal town. It comprises and bounded by Kutakanahalli and Gabbura on the north, Ginagera on the west, east and south and Kanakapura on south side of the microwatershed.

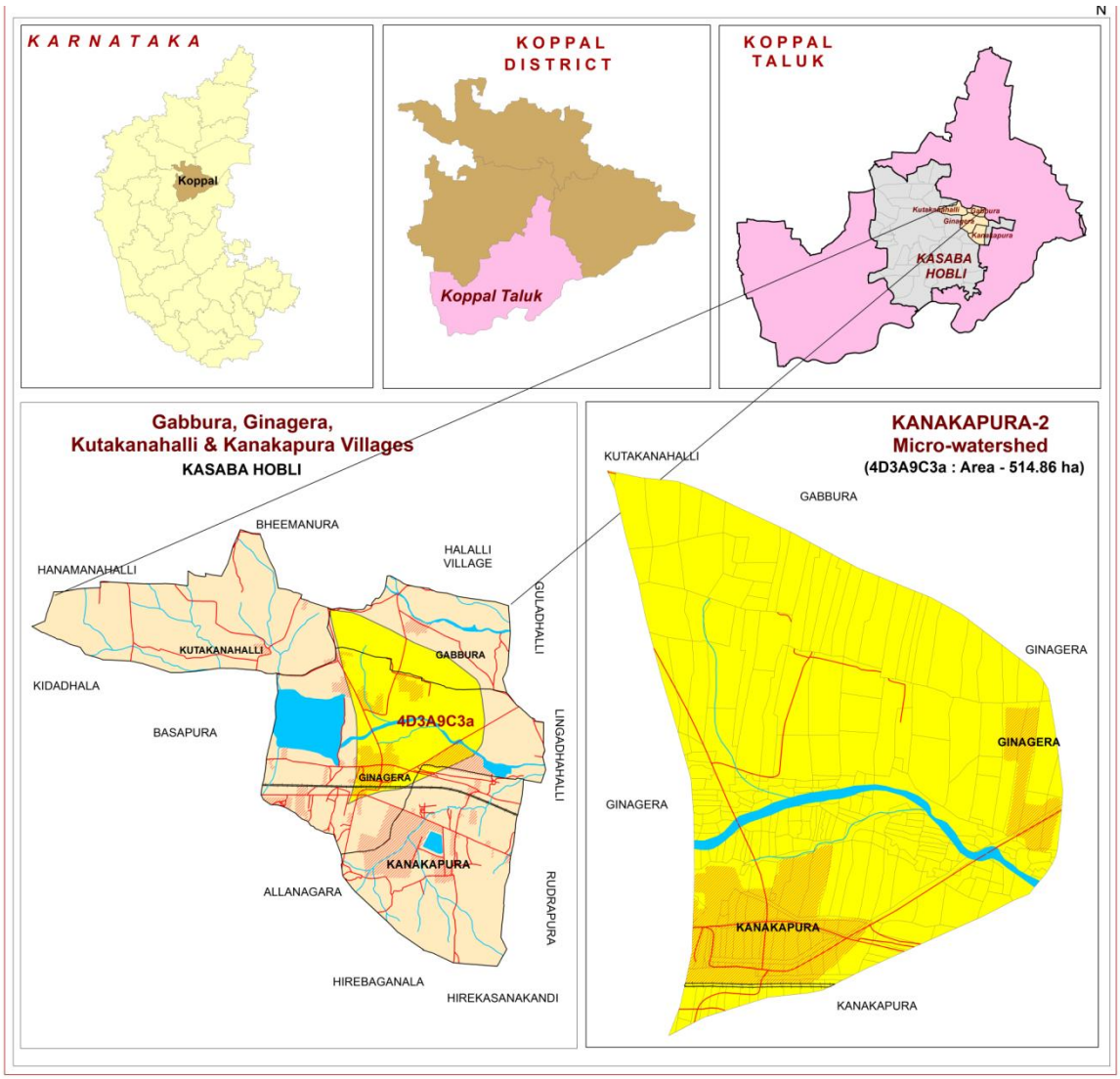


Fig.2.1 Location map of Kanakapura-2 Microwatershed

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 Bikkanahalli 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 484 to 514 m in the gently sloping uplands. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

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

2.5 Climate

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

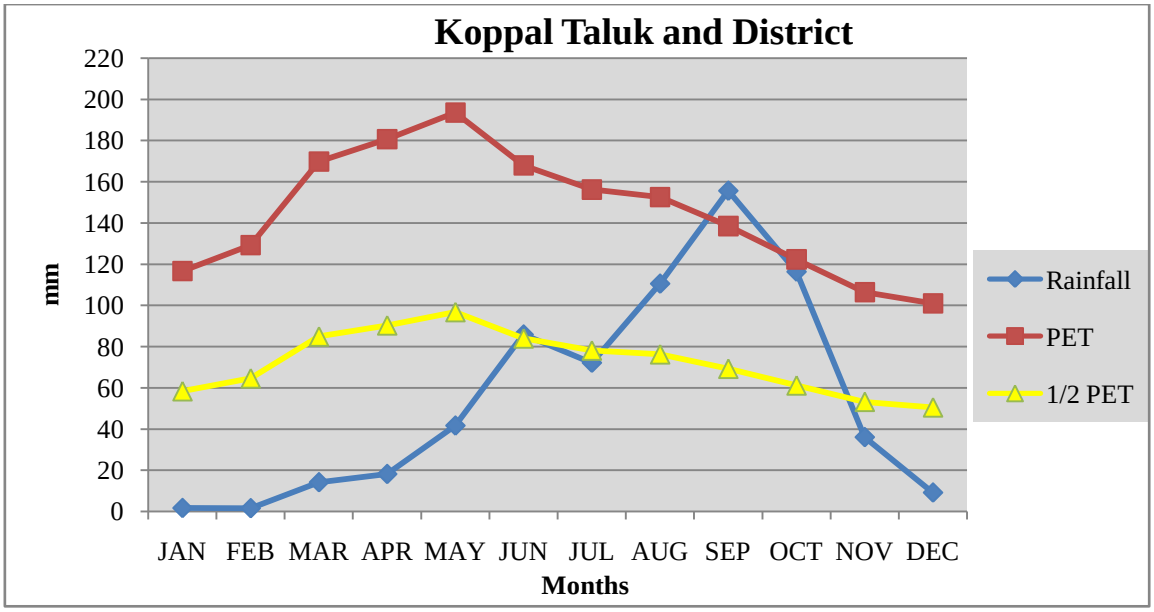


Fig. 2.3 Rainfall distribution in Koppal Taluk and District

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 Kanakapura-2 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, bengalgram 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 Kanakapura-2 microwatershed is presented in Fig.2.6. Simultaneously, enumeration of existing wells (bore wells) is made and their location in different survey numbers is marked on the cadastral map. Map showing the location of wells in Kanakapura-2 microwatershed is given in Fig 2.7.

Table 2.2 Land Utilization in Koppal District

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

Fig.2.5 (a) Different crops and cropping systems in Kanakapura-2 Microwatershed.

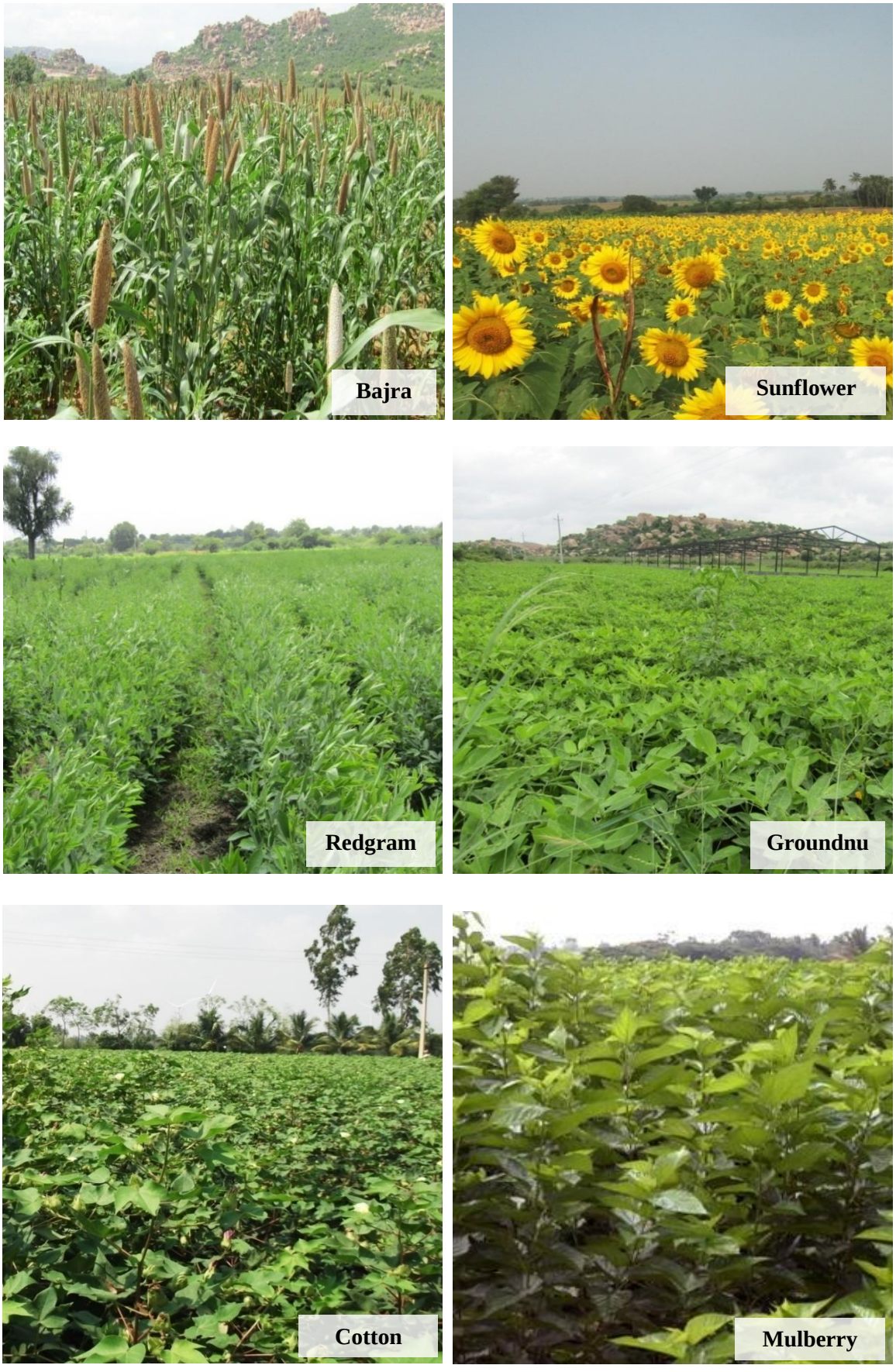


Fig.2.5 (b) Different crops and cropping systems in Kanakapura-2 Microwatershed.

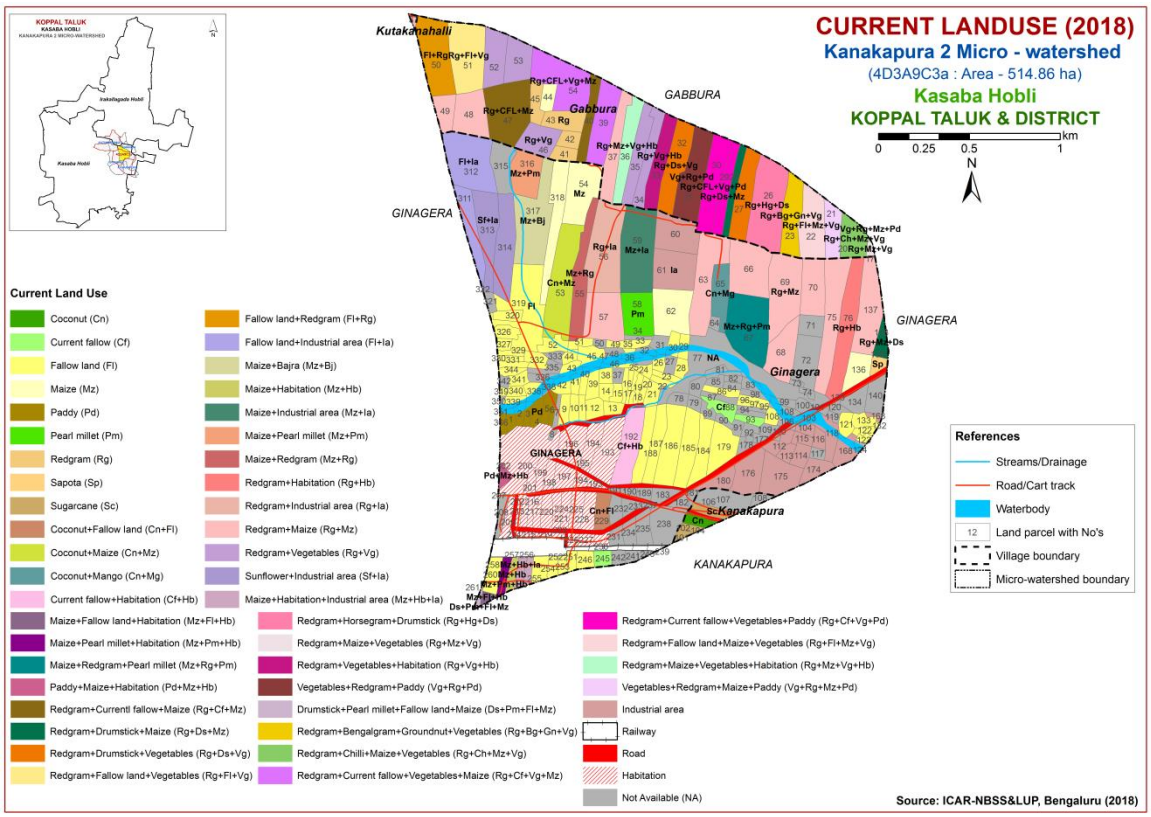


Fig.2.6 Current Land Use map of Kanakapura-2 Microwatershed

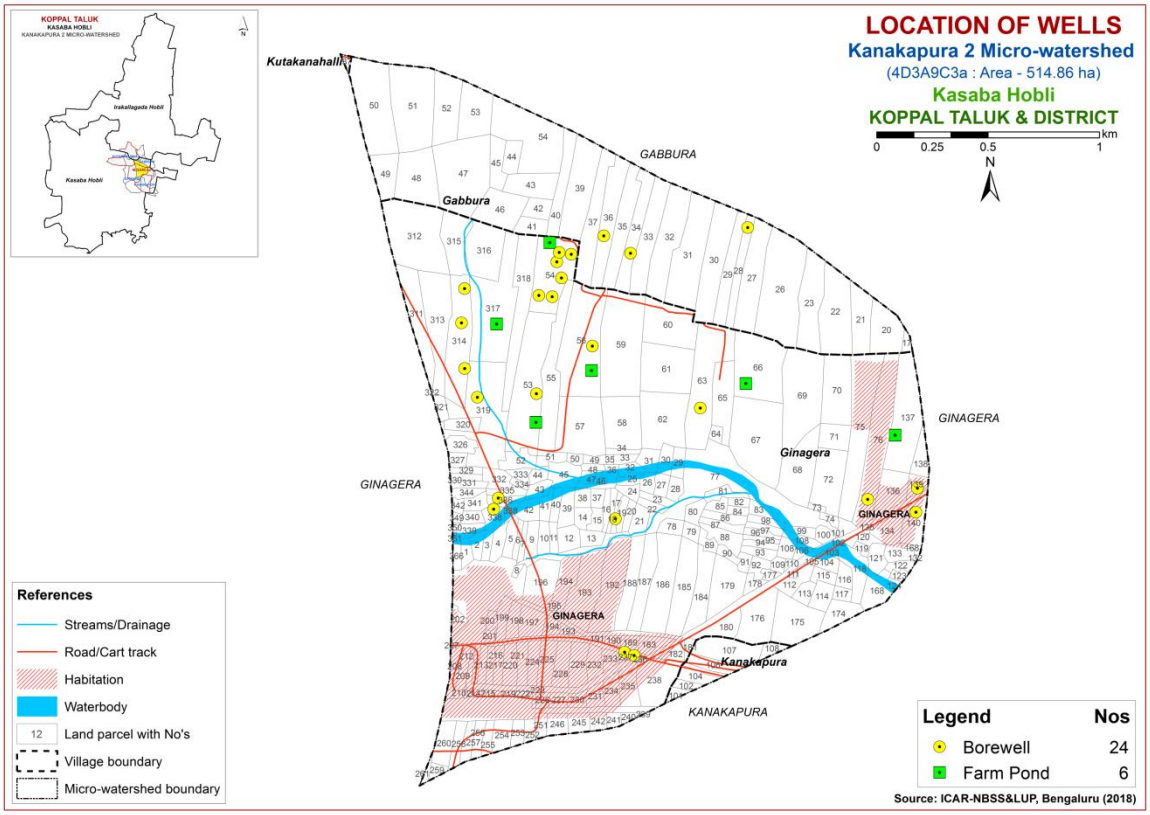


Fig.2.7 Location of wells map of Kanakapura-2 Microwatershed

Chapter 3

SURVEY METHODOLOGY

The purpose of land resource inventory is to delineate similar areas (soil series and phases), which respond or expected to respond similarly for a given level of management. This was achieved in Kanakapura-2 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 515 ha area. The methodology followed for carrying out land resource inventory was as per the guidelines given in Soil Survey Manual (IARI, 1971; Soil Survey Staff, 2006; Natarajan *et al.,* 2015) which is briefly described below.

3.1 Base Maps

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

3.2 Image Interpretation for Physiography

False Colour Composites (FCC) of Cartosat-I and LISS-IV merged satellite data covering the microwatershed area was visually interpreted using image interpretation elements and all the available collateral data with local knowledge. The delineated physiographic boundaries were transferred on to a cadastral map overlaid on satellite imagery. Physiographically, the area has been identified as granite gneiss landscape and is divided into landforms such as ridges, mounds and uplands 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

DSe 1 Summit

DSe 11 Nearly level Summit with dark grey tone

DSe 12 Nearly level Summit with medium grey tone

DSe 13 Nearly level Summit with whitish grey tone

DSe 14 Nearly level Summit with whitish tone (Calcareousness)

DSe 15 Nearly level Summit with pinkish grey tone

DSe 16 Nearly level Summit with medium pink tone

DSe 17 Nearly level Summit with bluish white tone

DSe 18 Nearly level Summit with greenish grey tone

DSe 2 Very genetly sloping

DSe 21 Very gently sloping, whitish tone

DSe 22 Very gently sloping, greyish pink tone

DSe 23 Very gently sloping, whitish grey tone

DSe 24 Very gently sloping, medium grey tone

DSe 25 Very gently sloping, medium pink tone

DSe 26 Very gently sloping, dark grey tone

DSe 27 Very gently sloping, bluish grey tone

DSe 28 Very gently sloping, greenish grey tone

DSe 29 Very gently sloping, Pinkish grey

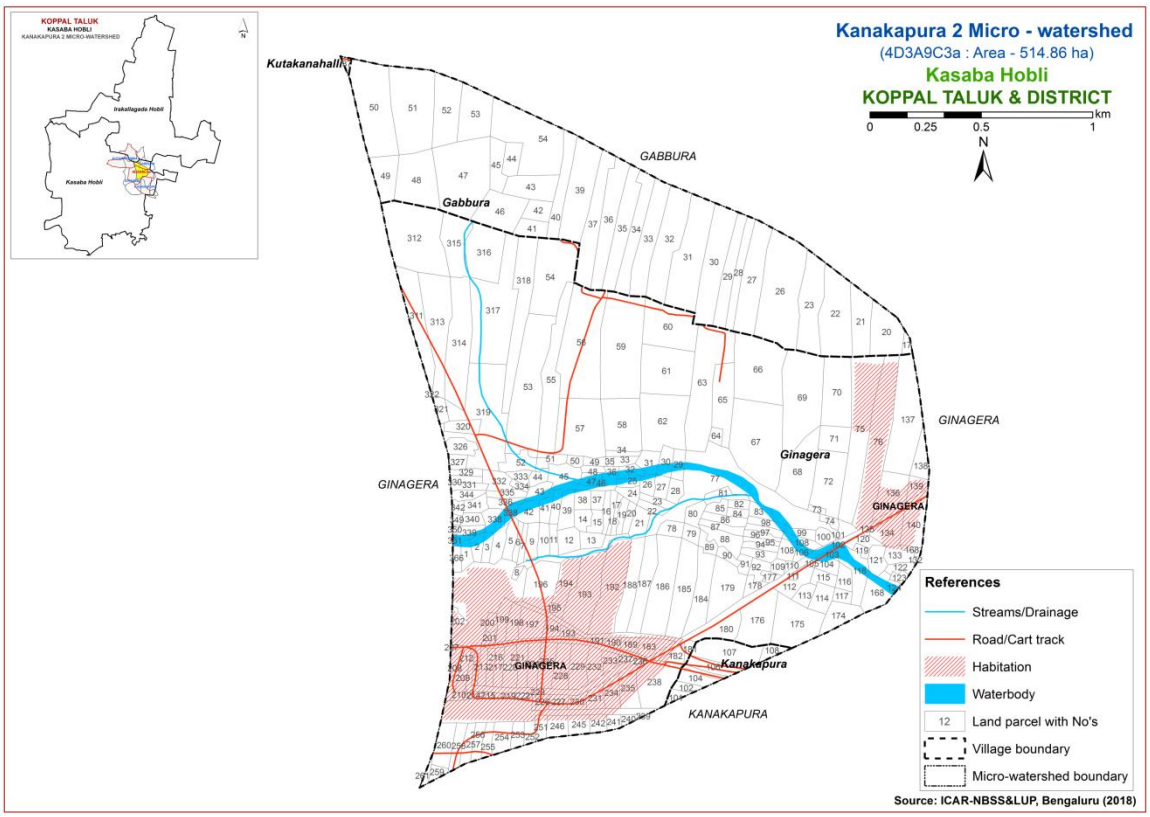


Fig 3.1 Scanned and Digitized Cadastral map of Kanakapura-2 Microwatershed

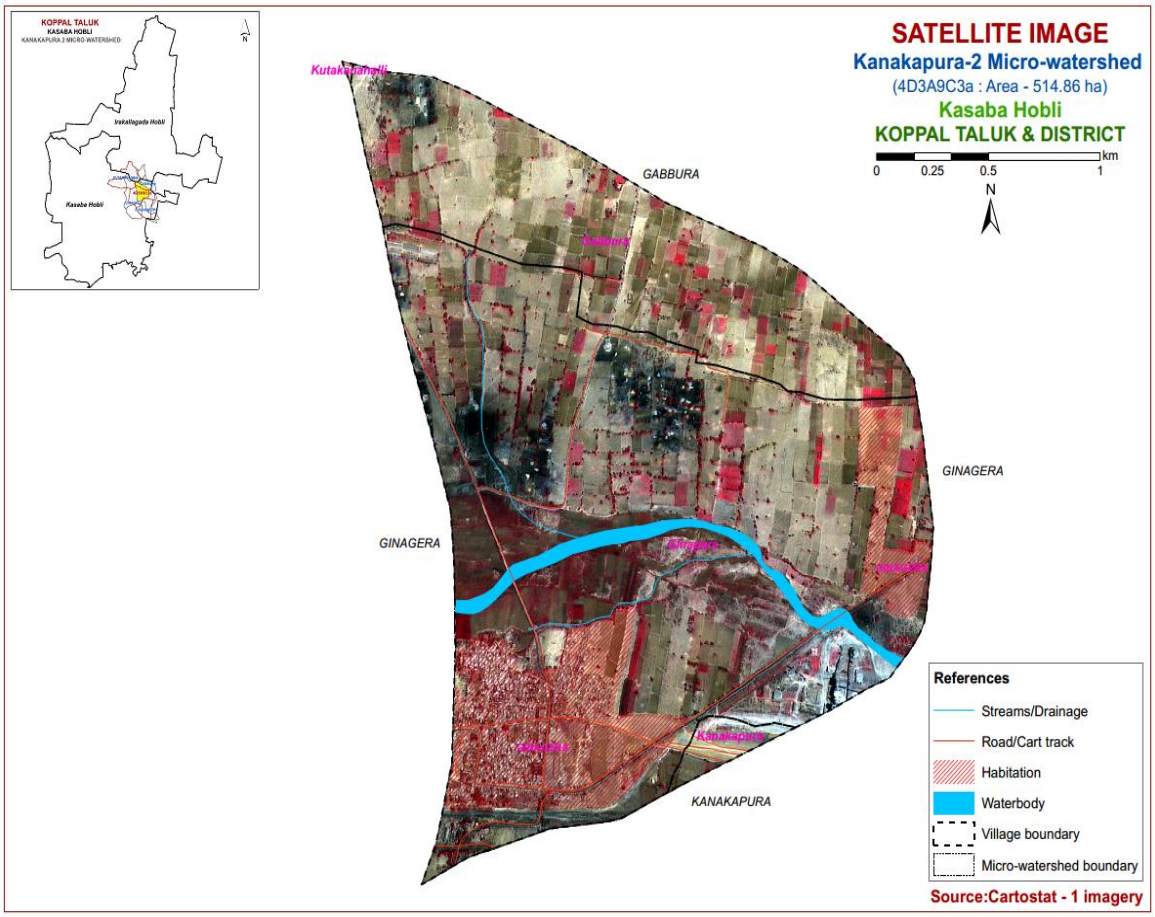


Fig.3.2 Satellite Image of Kanakapura-2 Microwatershed

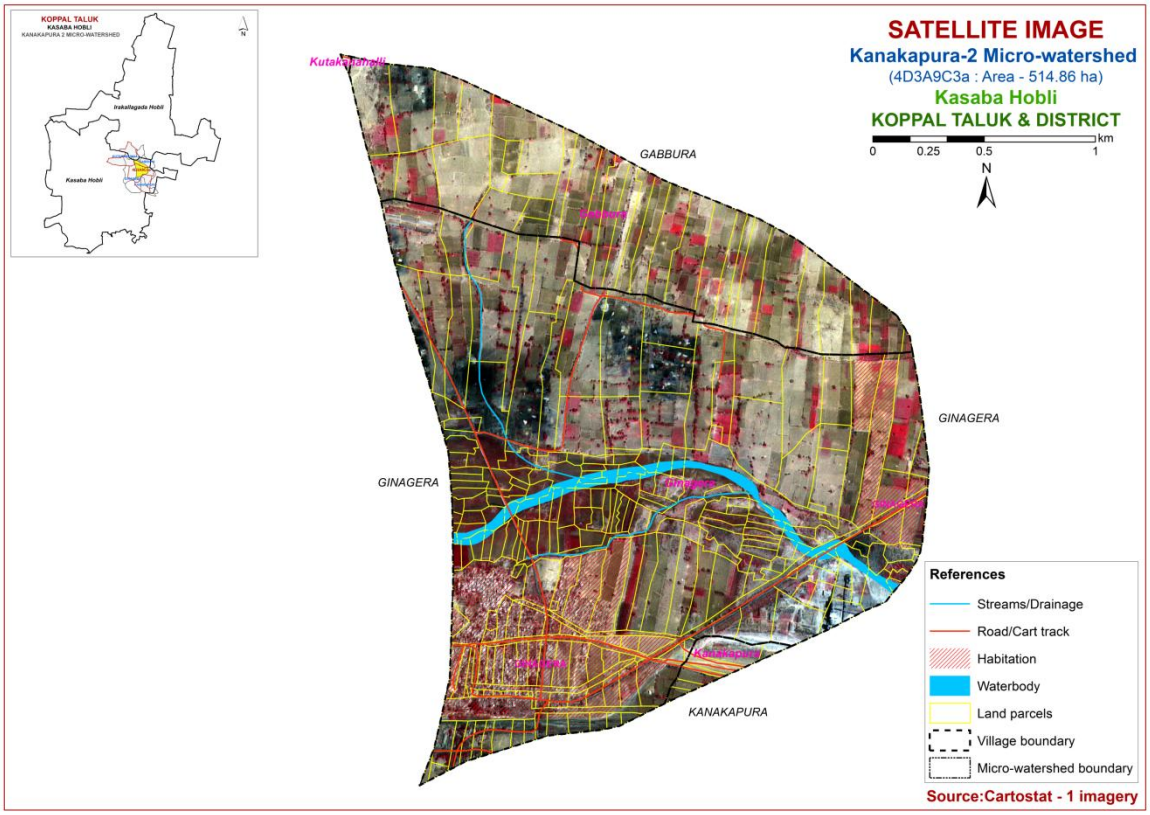


Fig.3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Kanakapura-2 Microwatershed

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).

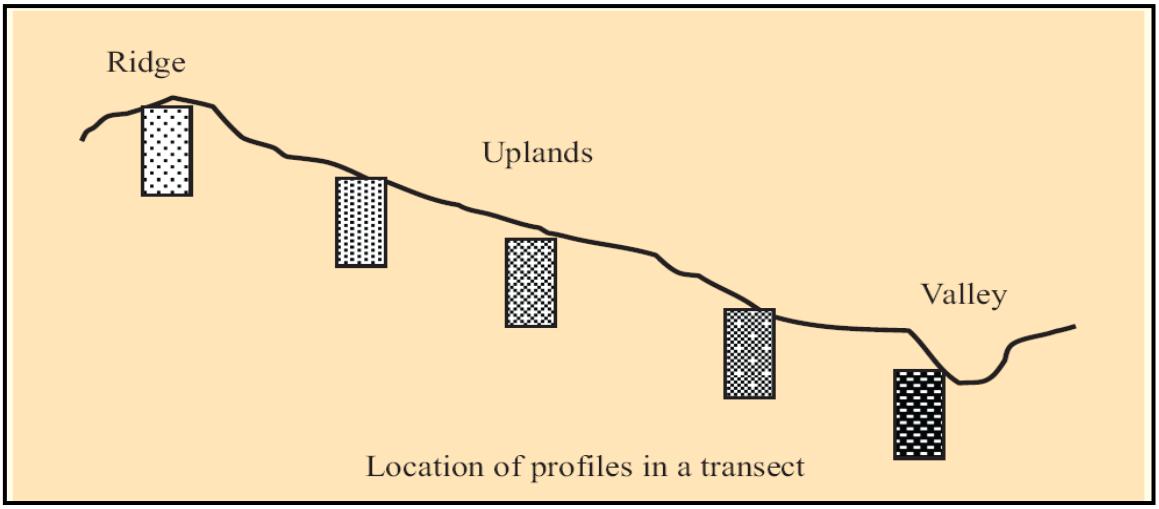


Fig: 3.4. Location of profiles in a transect

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, 11 soil series were identified in Kanakapura-2 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	Chikkasavanur (CSR)	25-50	7.5YR3/2,3/3,3/4	scl	<15	Ap-Bw-Cr	-
3	Mukhadahalli (MKH)	50-75	5YR3/3,3/4,4/3, 5/4,6/6 2.5YR3/4	gsc	>35	Ap-Bt-Cr	-
4	Hooradhahalli (HDH)	75-100	2.5YR2.5/4,3/4,3/6	gsc-gc	>35	Ap-Bt-Cr	-
5	Kumchahalli (KMH)	100-150	2.5YR3/4,3/6	sc	<15	Bt-Cr	-
6	Balapur (BPR)	100-150	2.5YR2.5/4,3/4	gsc-gc	>35	Ap-Bt-Cr	-
7	Nagalapur (NGP)	100-150	5YR2.5/2,3/2, 2.5YR3/6,4/6	gsc	>35	Ap-Bt-Cr	-
8	Hallikere (HLK)	>150	5YR3/3,3/4 7.5YR3/3,3/4	c	<15	Ap-Bt	-
9	Niduvalalu (NDL)	>150	2.5YR2.5/3,2.5/4, 3/3,4/6	gsc	>35	Ap-Bt	-
10	Thimmasandra (TSD)	>150	10YR2/12/2,3/1, 3/2,4/1, 4/2,4/3	c	-	Ap-Bw	-
Soils of Alluvial landscape							
11	Muttal (MTL)	25-50	10YR3/2,3/3,4/2 7.5YR3/2,3/3,6/4	gc	15-35	Ap-Bw-Ck	e-ev

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 21 mapping units representing 11 soil series occurring in the microwatershed. The soil map unit (soil legend) description is presented in Table 3.2. The soil phase map (management units) shows the distribution of 21 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 21 soil phases identified and mapped in the microwatershed were regrouped into 6 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 LMU's. For Kanakapura-2 microwatershed, five soil and site characteristics, namely the soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The land use classes 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 Kanakapura-2 microwatershed (51samples) 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 Kanakapura-2 Microwatershed

Soil map unit No*	Soil Series	Soil Phase	Mapping Unit Description	Area in ha (%)
Soils of Granite and Granite gneiss Landscape				
	HRV	Harve soils are shallow (25-50 cm), well drained, dark red to dark reddish brown, red gravelly loamy soils occurring on nearly level to gently sloping uplands under cultivation		**53 (10.24)**
465		HRVcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	14 (2.73)
26		HRVhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	19 (3.59)
27		HRVhB2g2	Sandy clay loam surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	20 (3.92)
	CSR	Chikkasavanur soils are shallow (25-50 cm), well drained, have dark brown to light yellowish brown, red sandy clay loam soils occurring on nearly level to very gently sloping uplands under cultivation		**24 (4.69)**
36		CSRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	24 (4.69)
	MKH	Mukhadahalli soils are moderately shallow (50-75 cm), well drained, have dark brown to reddish brown gravelly		**9 (1.83)**

		red sandy clay soils occurring on gently very gently to gently sloping uplands under cultivation		
78		MKHcB2g2	Sandy loam surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	9 (1.83)
	HDH	Hooradhahalli soils are moderately deep (75-100 cm), well drained, dark red to dark reddish brown, red gravelly sandy clay to clay soils occurring on nearly level to moderately sloping uplands under cultivation		**129 (25.03)**
109		HDHcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	24 (4.68)
111		HDHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	59 (11.44)
112		HDHcB2g2	Sandy loam surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	4 (0.81)
119		HDHhB1	Sandy clay loam surface, slope 1-3%, slight erosion	42 (8.1)
	KMH	Kumchahalli soils are deep (100-150cm), well drained, have dark reddish brown to dark red sandy clay soils occurring on nearly level to very gently sloping uplands under cultivation		**6 (1.18)**
201		KMHiB2	Sandy clay surface, slope 1-3%, moderate erosion	6 (1.18)
	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		**15 (2.94)**
224		BPRcB2	Sandy loam surface, slope 1-3%, moderate erosion	1 (0.21)
230		BPRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	3 (0.51)
231		BPRhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	11 (2.22)
	NGP	Nagalapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red gravelly sandy clay soils occurring on nearly level to gently sloping uplands under cultivation		**1 (0.29)**
257		NGPhB1	Sandy clay loam surface, slope 1-3%, slight erosion	1 (0.29)
	HLK	Hallikere soils are very deep (>150 cm), well drained, have dark brown to dark reddish brown clayey soils occurring on nearly level to very gently sloping uplands under cultivation		**9 (1.69)**
270		HLKhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	9 (1.69)
	NDL	Niduvalalu soils are very deep (>150 cm), well drained, have red to dark reddish brown red gravelly sandy clay soils occurring on nearly level to very gently sloping		**1 (0.23)**

		uplands under cultivation		
298		NDLiB1	Sandy clay surface, slope 1-3%, slight erosion	1 (0.23)
	TSD	Thimmasandra soils are very deep (>150 cm), moderately well drained, have very dark brown to very dark grayish brown, black clay soils occurring on nearly level to very gently sloping lowlands under cultivation		**82 (15.85)**
444		TSDiA1	Sandy clay surface, slope 0-1%, slight erosion,	29 (5.61)
445		TSDiB1	Sandy clay surface, slope 1-3%, slight erosion	19 (3.72)
446		TSDmA1	Clay surface, slope 0-1%, slight erosion	34 (6.52)
Soils of Alluvial landscape				
	MTL	Muttal soils are shallow (25-50 cm), well drained, have very dark grayish brown to dark brown, calcareous gravelly clay soils occurring on nearly level to gently sloping plains under cultivation		**38 (7.23)**
301		MTLbB2g2	Loamy sand surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	24 (4.6)
302		MTLcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	14 (2.63)
992	Railway			**2 (0.3)**
994	Mining/Industrial			**62 (12.12)**
999	Rock outcrops			**4 (0.69)**
1000	Others	Habitation and waterbody		**81 (15.72)**

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

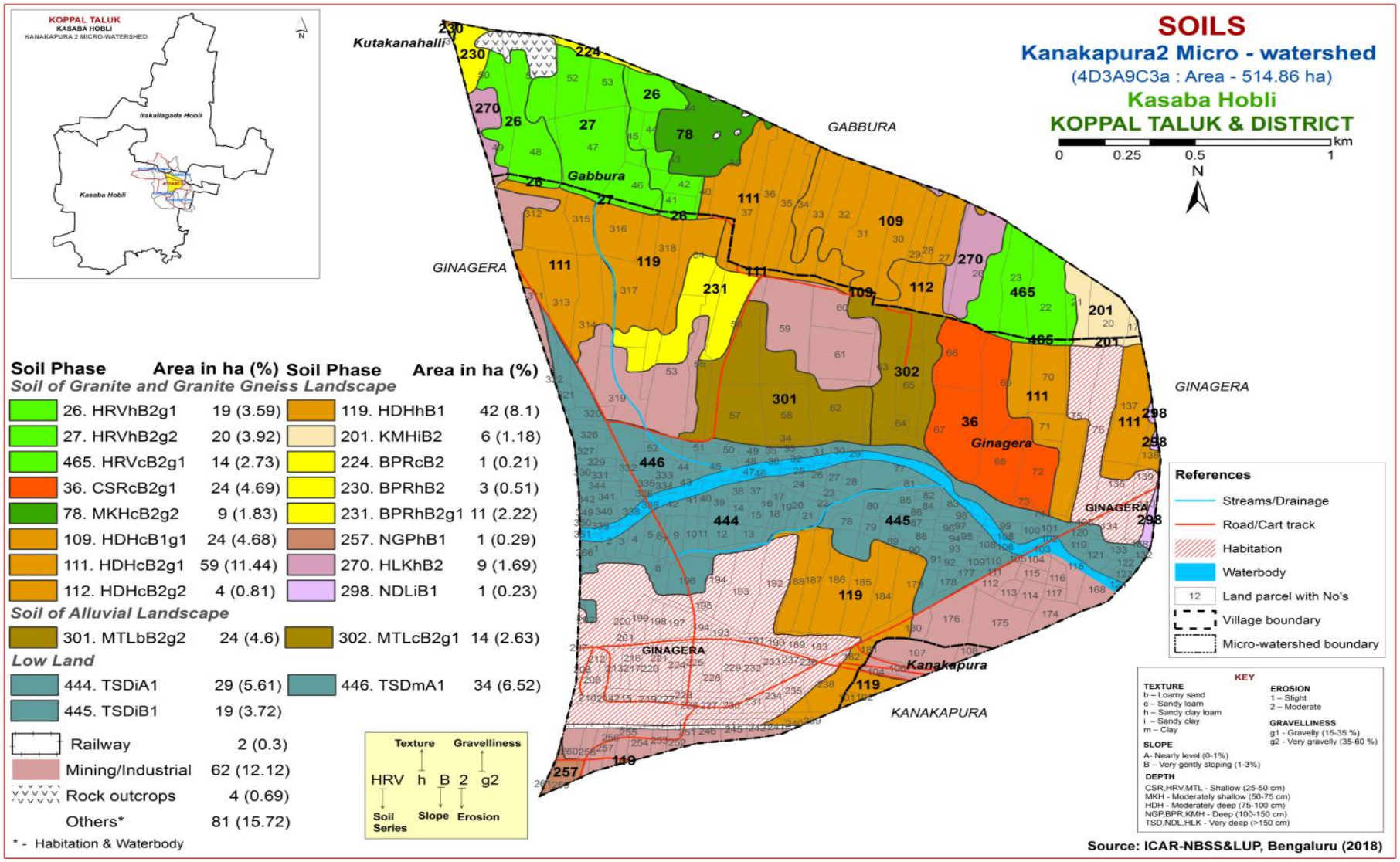


Fig 3.5 Soil Phase or Management Units of Kanakapura-2 Microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Kanakapura-2 microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscape based on geology. In all, 11 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 11 soil series identified followed by 21 soil phases (management units) mapped (Fig. 3.5) are furnished below. The physical and chemical characteristics of soil series identified in Kanakapura-2 microwatershed are given in Table 4.1 along with soil classification. The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

4.1 Soils of Granite and Granite gneiss Landscape

In this landscape, 10 soil series were identified and mapped. Of these series, HDH series occupies maximum area of 129 ha (25%) followed by TSD 82 ha (16%), HRV 53 ha (10%), CSR 24 ha (5%), BPR 15 ha (3%), MKH 9 ha (2%), HLK 9 ha (2%), KMH 6 ha (1%), NGP 1 ha (<1%) and NDL 1 ha (<1%). 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 from weathered granite gneiss and occur on very gently to moderately sloping uplands. The Harve series has been classified as a member of the loamy-skeletal, mixed, isohyperthermic family of (Paralithic) Rhodustalfs.

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 (<50 mm/m). Three soil phases were identified and mapped.

Landscape and soil profile characteristics of Harve (HRV) Series

4.1.2 Chikkasavanur (CSR) Series: Chikkasavanur soils are shallow (25-50 cm), well drained, have dark brown to light yellowish brown sandy clay loam soils. They have developed from granite gneiss and occur on very gently sloping uplands. The Chikkasavanur series has been classified as a member of the loamy, mixed, isohyperthermic family of (Paralithic)Haplustepts.

The thickness of the solum ranges from 32 to 49 cm. The thickness of A horizon ranges from 12 to 23 cm. Its colour is in 7.5 YR and 10 YR hue with value 2.5 to 4 and chroma 3 to 6. The texture varies from sandy loam to clay with 10 to 20 per cent gravel. The thickness of B horizon ranges from 16 to 32 cm. Its colour is in 7.5 YR and 5 YR hue with value 3 and chroma 2 to 4. Its texture is sandy clay loam with gravel content of < 15 per cent. The available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Chikkasavanur (CSR) Series

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

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

Landscape and soil profile characteristics of Mukhadahalli (MKH) Series

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

The thickness of the solum ranges from 76 to 100 cm. The thickness of A horizon ranges from 11 to 19 cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 4 and chroma 3 to 6. The texture varies from loamy sand to sandy clay with 15 to 50 per cent gravel. The thickness of B horizon varies from 65 to 83 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 4 to 6. Texture is sandy clay to clay with 35 to 50 per cent gravel. The available water capacity is low (51-100 mm/m). Four soil phases were identified and mapped.

Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

4.1.5 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 surface 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 medium (101-150 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Kumchahalli (KMH) Series

4.1.6 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). Three soil phases were identified and mapped.

Landscape Soil Profile Characteristics of Balapur (BPR) Series

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

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). Only one soil phase was identified and mapped.

Landscape and soil Profile Characteristics of Nagalapur (NGP) Series

4.1.8 Hallikere (HLK) Series: Hallikere soils are very deep (>150 cm), well drained, have dark brown and dark reddish brown clayey soils. They have developed from granite gneiss and occur on nearly level to very gently sloping uplands. The Hallikere series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Paleustalfs.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 11 to 14 cm. Its colour is in 7.5 YR and 5 YR hue with value 3 to 4 and chroma 3 to 4. The texture varies from sandy loam to sandy clay loam. The thickness of B horizon is more than 150 cm. Its colour is in 7.5 YR and 5 YR hue with value and chroma 3 to 4. Its texture is clay. The available water capacity is high (151-200 mm/m). Only one soil phase was identified and mapped.

Landscape and soil Profile Characteristics of Hallikere (HLK) Series

4.1.9 Niduvalalu (NDL) Series: Niduvalalu soils are very deep (>150 cm), well drained, have dark red and dark reddish brown gravelly sandy clay soils. They have developed from granite gneiss and occur on nearly level to very gently sloping uplands under cultivation. The Niduvalalu series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Rhodic Paleustalfs.

The thickness of the solum is more than 150 cm. The thickness of A-horizon ranges from 11 to 15 cm. Its colour is in 5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from sandy loam to sandy clay loam with 10 to 30 per cent gravel. The thickness of B-horizon ranges from 150 to 160 cm. Its colour is in 2.5 YR hue with value 2.5 to 4 and chroma 4 to 6. Its texture is sandy clay and ranges from gravelly sandy clay with 20 to 75 per cent gravel. The available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.

Landscape and soil Profile Characteristics of Niduvalalu (NDL) Series

4.1.10 Thimmasandra (TSD) Series: Thimmasandra soils are very deep (>150 cm), moderately well drained, have very dark brown to very dark grayish brown clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently sloping lowlands under cultivation. The Thimmasandra series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Haplustepts.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 11 to 17 cm. Its colour is in 10 YR hue with value 3 and chroma 3. The texture is sandy clay. The thickness of B horizon is more than 150 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 3. Its texture is sandy clay to clay. The available water capacity is very high (>200 mm/m). Three soil phases were identified and mapped.

Landscape and soil profile characteristics of Thimmasandra (TSD) Series

4.2 Soils of Alluvial Landscape

In this landscape, two one soil series were identified and mapped. MTL series occupies an area of 38 ha (7%). The brief description of this soil series along with the soil phase identified and mapped is given below.

4.2.1 Muttal (MTL) Series: Muttal soils are shallow (25-50 cm), well drained, have dark brown to very dark grayish brown, calcareous gravelly clay soils. They have developed from alluvium and occur on nearly level to very gently sloping plains. The Muttal series has been classified as a member of the clayey, mixed, isohyperthermic (calc) family of (Paralithic) Haplustepts.

The thickness of the solum ranges from 30 to 50 cm. The thickness of A horizon ranges from 15 to 18 cm. Its colour is in 7.5 YR and 10 YR hue with value 2 to 3 and chroma 2.5 to 4. The texture varies from sandy clay to clay with 10 to 15 per cent gravel. The thickness of B horizon ranges from 18 to 32 cm. Its colour is in 10 YR and 7.5 YR hue with value 2 to 6 and chroma 2 to 4. Its texture is sandy clay to clay. The available water capacity is low (51-100 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Muttal (MTL) Series

Table: 4.1 Physical and Chemical Characteristics of Soil Series identified in Kanakapura-2 microwatershed

Series Name: Harve (HRV), **Pedon:** R-10
Location: $15^0$25'11.63"N, $76^0$22'03.65"E Jabbaragudda village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Loamy-skeletal, mixed, isohyperthermic (Paralithic) 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
0-15	Ap	65.64	9.07	25.28	29.04	12.99	9.00	3.48	11.15	50	scl	12.87	4.81
15-29	Bt1	56.13	7.75	36.12	27.81	11.43	7.21	1.44	8.24	60	sc	15.69	6.24
29-47	Bt2	63.42	6.53	30.05	32.38	13.93	7.48	5.74	3.89	60	scl	15.41	9.29

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-15	6.05	-	-	0.21	0.93	-	8.89	1.96	0.50	0.08	11.43	11.24	0.44	100.00	0.73
15-29	5.99	-	-	0.15	0.29	-	9.72	2.75	0.51	0.09	13.07	12.71	0.35	100.00	0.74
29-47	6.07	-	-	0.11	0.38	-	9.35	2.47	0.49	0.06	12.36	12.71	0.42	97.29	0.44

Contd…

Series Name: Mukahadahalli (MKH), **Pedon:** R-11
Location: $15^0$22'05.4"N, $76^0$04'10.3"E, Halageri village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey-skeletal, mixed, isohyperthermic Typic Haplustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-19	Ap	65.71	8.83	25.46	9.27	9.06	14.42	21.52	11.43	70	scl	16.54	8.60
19-32	Bt	55.89	11.13	32.98	6.47	9.18	11.89	19.19	9.18	50	scl	19.24	12.78
32-58	Bt	47.95	10.41	41.63	17.52	3.78	9.13	9.55	7.97	50	sc	24.03	16.02

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-19	7.38	-	-	0.09	0.2	0.00	8.97	4.32	0.26	0.22	13.77	14.84	0.58	93	1.49
19-32	7.5	-	-	0.106	0.41	0.00	15.98	3.27	0.16	0.50	19.91	20.88	0.63	95	2.38
32-58	7.46	-	-	0.173	0.49	0.00	19.71	4.53	0.23	1.32	25.79	25.76	0.62	100	5.11

Contd…

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…

S**eries 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	A21	53.50	8.12	38.38	7.00	11.05	15.21	14.33	5.91	-	sc	17.05	12.32
27-43	A22	63.60	5.01	31.40	3.85	11.56	24.52	18.52	5.14	-	scl	11.76	9.09
43-64	Bt1	48.74	5.91	45.35	8.87	9.31	12.49	12.27	5.81	10	sc	16.68	13.35
64-84	Bt2	45.13	8.90	45.97	9.86	7.12	10.95	10.62	6.57	20	sc	17.45	13.42
84-114	BC	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…

Series Name: Nagalapur (NGP), **Pedon :** R-10
Location: $15^0$26'38.0"N, $76^0$10'27.0" E Budashettynala village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey- skeletal, mixed, isohyperthermic Typic Paleustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-16	Ap	78.43	6.36	15.21	25.23	18.82	14.04	13.22	7.12	30	sl	9.32	5.56
16-38	Bt1	46.97	8.53	44.51	14.33	12.34	7.43	6.80	6.07	30	sc	18.70	13.79
38-58	Bt2	51.92	7.48	40.60	20.98	10.07	7.37	7.48	6.02	40	sc	17.93	13.75
58-81	Bt3	54.05	7.18	38.77	27.07	10.58	5.91	5.81	4.67	50	sc	17.92	11.87
81-104	Bt4	59.03	8.93	32.04	21.88	13.11	8.88	8.05	7.12	50	scl	16.63	10.55
104-126	BC	62.35	9.26	28.40	21.19	14.51	9.88	8.13	8.64	60	scl	15.03	10.06

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-16	6.77	-	-	0.09	0.82	-	3.52	2.14	0.18	0.03	5.87	7.10	0.47	82.70	0.46
16-38	6.89	-	-	0.06	0.57	-	9.35	3.85	0.10	0.21	13.50	14.70	0.33	91.87	1.40
38-58	6.80	-	-	0.06	0.52	-	8.76	3.42	0.10	0.26	12.55	14.20	0.35	88.35	1.85
58-81	6.84	-	-	0.06	0.32	-	7.67	2.77	0.10	0.58	11.12	12.90	0.33	86.18	4.48
81-104	6.86	-	-	0.05	0.20	-	6.97	2.07	0.09	0.95	10.07	11.90	0.37	84.59	7.95
104-126	6.70	-	-	0.07	0.10	-	5.53	1.77	0.07	0.73	8.09	9.40	0.33	86.09	7.77

Contd…

Series Name: Niduvalalu (NDL), **Pedon:** R-20
Location: $15^0$12'78.8"N, $75^0$57'44.0" E Raghunathanahalli village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **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
0-16	Ap	79.83	7.02	13.15	9.36	11.02	19.54	28.59	11.33	35-40	sl	14.30	5.17
16-31	Bt1	54.75	10.89	34.36	12.81	7.47	12.17	11.95	10.35	55-60	scl	24.67	14.17
31-44	Bt2	44.64	2.31	53.06	17.06	8.48	7.19	8.05	3.86	65-70	c	30.02	17.19
44-79	Bt3	47.28	2.50	50.21	24.17	8.20	6.07	5.96	2.88	65-70	sc	27.19	14.87
79-107	Bt4	47.79	8.17	44.04	13.38	5.72	11.11	11.87	5.72	60-65	sc	25.96	14.23
107-140	Bt5	46.16	3.57	50.27	21.75	7.57	6.40	6.72	3.73	60-65	sc	27.28	15.13
140-180	Bt6	49.47	3.94	46.59	22.49	8.21	6.29	7.78	4.69	65-70	sc	27.56	14.76

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-16	7.46	-	-	0.08	0.76		6.26	4.05	0.12	0.09	10.52	11.45	0.87	91.88	0.32
16-31	7.84	-	-	0.28	1.05	2.86	-	-	0.18	1.41	-	27.36	0.80	100.00	2.06
31-44	7.69	-	-	0.46	0.81	2.99	-	-	0.24	2.63	-	32.59	0.61	100.00	3.23
44-79	7.92	-	-	0.11	0.35	1.69	16.29	3.51	0.14	2.63	22.57	22.56	0.45	100.03	4.66
79-107	7.86	-	-	0.09	0.23	1.43	12.98	2.83	0.10	1.82	17.73	17.88	0.41	99.19	4.07
107-140	8.20	-	-	0.07	0.23	1.17	16.26	3.41	0.13	1.85	21.65	20.82	0.41	104.01	3.56
140-180	8.11	-	-	0.20	0.15	1.82	-	-	0.11	1.29	-	20.71	0.44	100.00	2.49

Contd…

Soil Series: Thimmasandra (TSD), **Pedon:** R-14
Location: 11°55'64.2"N, 76°51'82.9" E, (4B3A5K3b), Somanapura village, Chamarajanagara taluk and district
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification**: Fine, mixed, isohyperthermic Typic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-19	Ap	12.27	25.92	61.81	0.98	0.98	1.52	3.91	4.89	-	c	-	-
19-33	Bw1	32.98	26.29	40.72	2.75	4.44	4.97	8.35	12.47	-	c	-	-
33-58	Bw2	10.21	27.99	61.81	0.98	1.30	1.19	2.17	4.56	-	c	-	-
58-83	Bw3	9.83	27.40	62.77	1.09	0.98	0.98	1.86	4.91	-	c	-	-
83-95	Bw4	6.17	26.07	67.76	0.99	0.77	0.55	0.99	2.86	-	c	-	-
95-116	Bw5	7.52	28.87	63.61	0.77	1.00	1.11	1.88	2.77	-	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}							%	%
0-19	8.46	-	-	0.175	1.01	4.45	-	-	1.91	0.18	-	36.61	0.59	100	0.19
19-33	8.65	-	-	0.16	0.81	6.41	-	-	0.77	0.39	-	23.98	0.59	100	0.64
33-58	8.94	-	-	0.26	0.56	6.90	-	-	0.82	2.24	-	33.59	0.54	100	2.67
58-83	9.13	-	-	0.335	0.4	8.01	-	-	0.30	1.01	-	36.72	0.58	100	1.10
83-95	9.05	-	-	0.412	0.36	4.58	-	-	0.76	4.17	-	38.88	0.57	100	4.30
95-116	8.96	-	-	0.4	0.28	4.21	-	-	0.96	4.02	-	43.63	0.69	100	3.68

Contd…

Series Name: Muttal (MTL), **Pedon:** RM-13
Location: $15^0$14'30.8"N, $75^0$56'50.6"E, Gatareddihalla village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey, mixed, isohyperthermic (Calc) (paralithic) 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
0-20	Ap	39.05	13.74	47.21	3.05	5.05	8.21	14.63	8.11	15-30	c	29.95	17.94
20-34	Bwk	28.77	19.57	51.66	4.81	4.71	4.92	9.09	5.24	10	c	33.44	21.56

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-20	8.27	-	-	0.202	0.79	6.10	-	-	0.62	0.25	-	36.64	0.78	-	0.69
20-34	8.36	-	-	0.177	0.99	23.04	-	-	0.29	0.38	-	39.60	0.77	-	0.96

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 21 soil map units identified in the Kanakapura-2 microwatershed are grouped under 2 land capability classes and 6 land capability subclasses (Fig. 5.1).

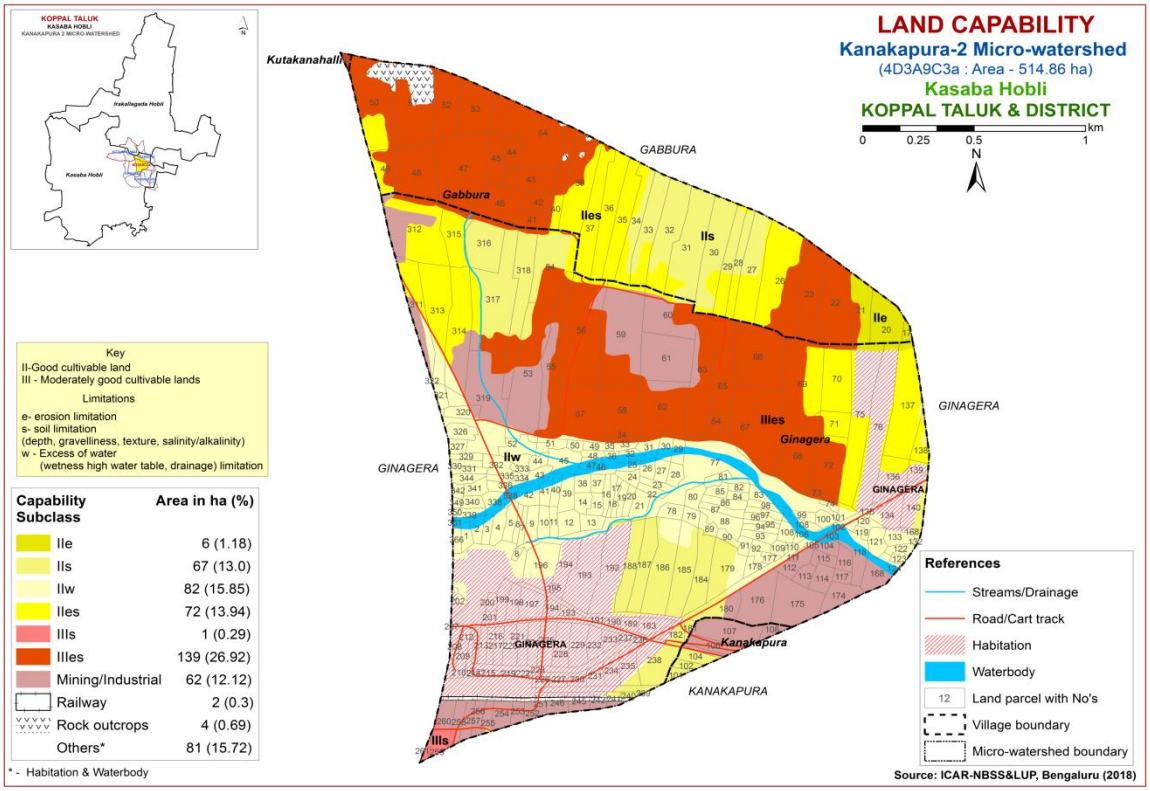


Fig. 5.1 Land Capability classification map of Kanakapura-2 Microwatershed

Entire area in the microwatershed is suitable for agriculture. Good lands (Class II) cover a maximum area of about 227 ha (44%) and are distributed in all part of the microwatershed with minor problems of soil, erosion and drainage. Moderately good cultivable (Class III) lands covers an area of about 140 ha (27%) and are distributed in the northern, central and eastern part of the microwatershed with minor problems of soil and erosion. An area of about 62 ha (12%) is covered by mining/industrial, 2 ha (<1%) is covered by railway, 4 ha (1%) covered by rock outcrops and 81 ha (16%) is covered by others (habitation and water body).

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.

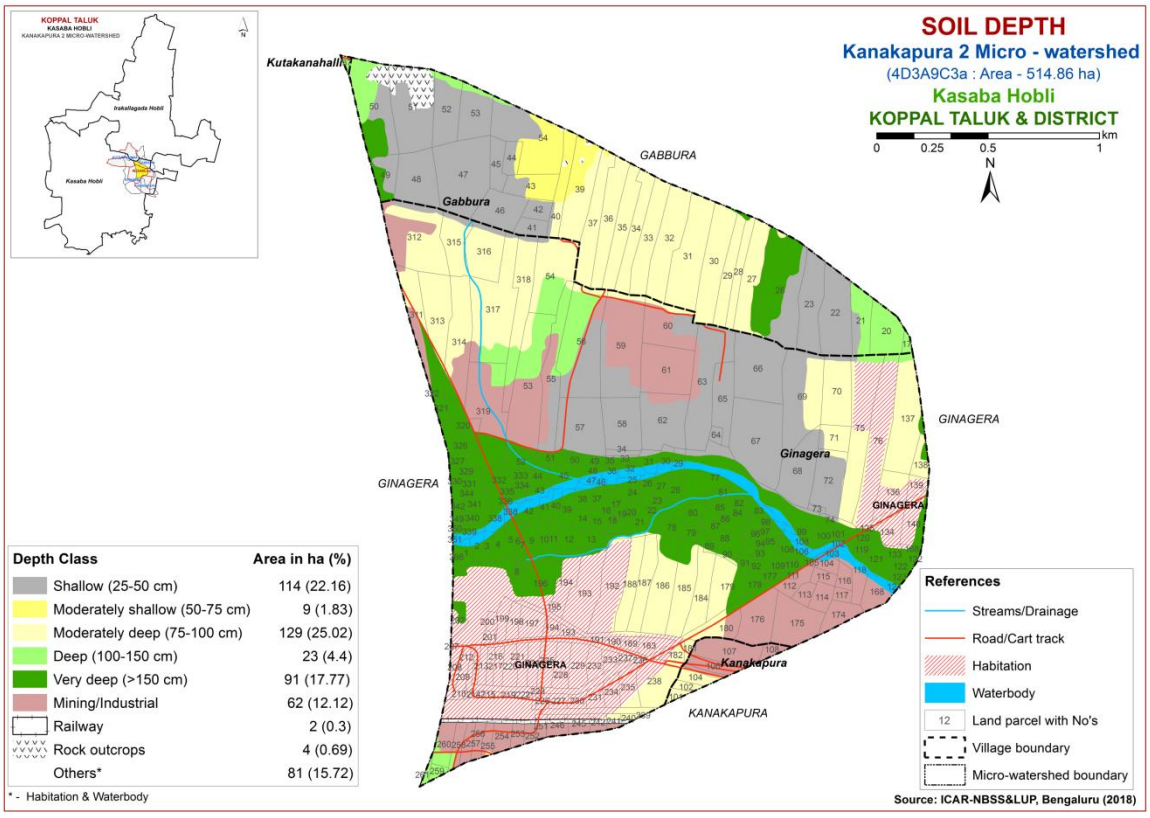


Fig. 5.2 Soil Depth map of Kanakapura-2 Microwatershed

Shallow (25-50 cm) soils cover an area of about 114 ha (22%) and are distributed in the northern, central and eastern part of the microwatershed. Moderately shallow (50-75 cm) soils cover an area of about 9 ha (2%) and distributed in the northern part of the microwatershed. Maximum area of about 129 ha (25%) is moderately deep soils (75-100 cm) and are distributed in all part of the microwatershed. Deep to very deep (100- >150 cm) soils occupy an area of about 114 ha (22%) and are distributed in the northern, western, eastern and southern part of the microwatershed.

The most productive lands cover about 114 ha (22%) where all climatically adopted long duration crops can be grown.

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.

An area of about 24 ha (5%) is sandy at the surface and distributed in central and southern part of the microwatershed. Maximum area of about 254 ha (49%) is loamy at the surface and are distributed in all part of the microwatershed. An area of about 89 ha (17%) is clayey at the surface and are distributed in the eastern, western and southern part of the microwatershed.

The most productive lands with respect to surface soil texture are clayey soils that (17%) have high potential for soil-water retention and availability and nutrient retention and availability, but have more problems of drainage, infiltration, workability and other physical problems. The other productive lands are loamy (49%) soils which also have high potential for soil- water retention and nutrient availability but have no drainage or other physical problems.

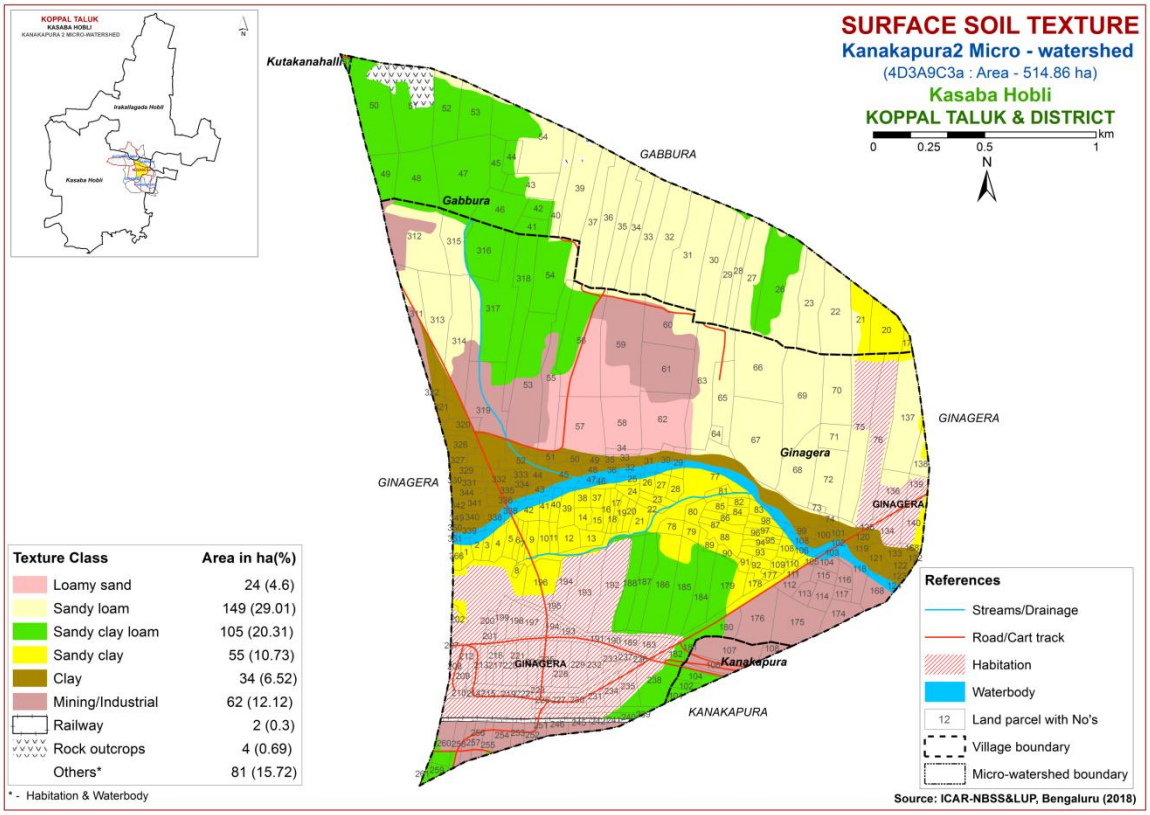


Fig. 5.3 Surface Soil Texture map of Kanakapura-2 Microwatershed

5.4 Soil Gravelliness

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

The soils that are non-gravelly (<15% gravel) cover an area of about 144 ha (28%) and distributed in the northern, eastern, western and southern part of the microwatershed. Maximum area of about 165 ha (32%) is covered by gravelly (15-35% gravel) soils and are distributed in all part of the microwatershed. Very gravelly (35-60%) soils cover an area of about 57 ha (11%) and are distributed in the northern, eastern and central part of the microwatershed (Fig. 5.4).

The most productive lands with respect to gravelliness are found to be 28 per cent that are non gravelly (<15%) soils. These are most productive soils and have potential for growing both annual and perennial crops. The problem soils that are very gravelly (35-60%) cover an area of about 11 per cent where only short duration crops can be grown.

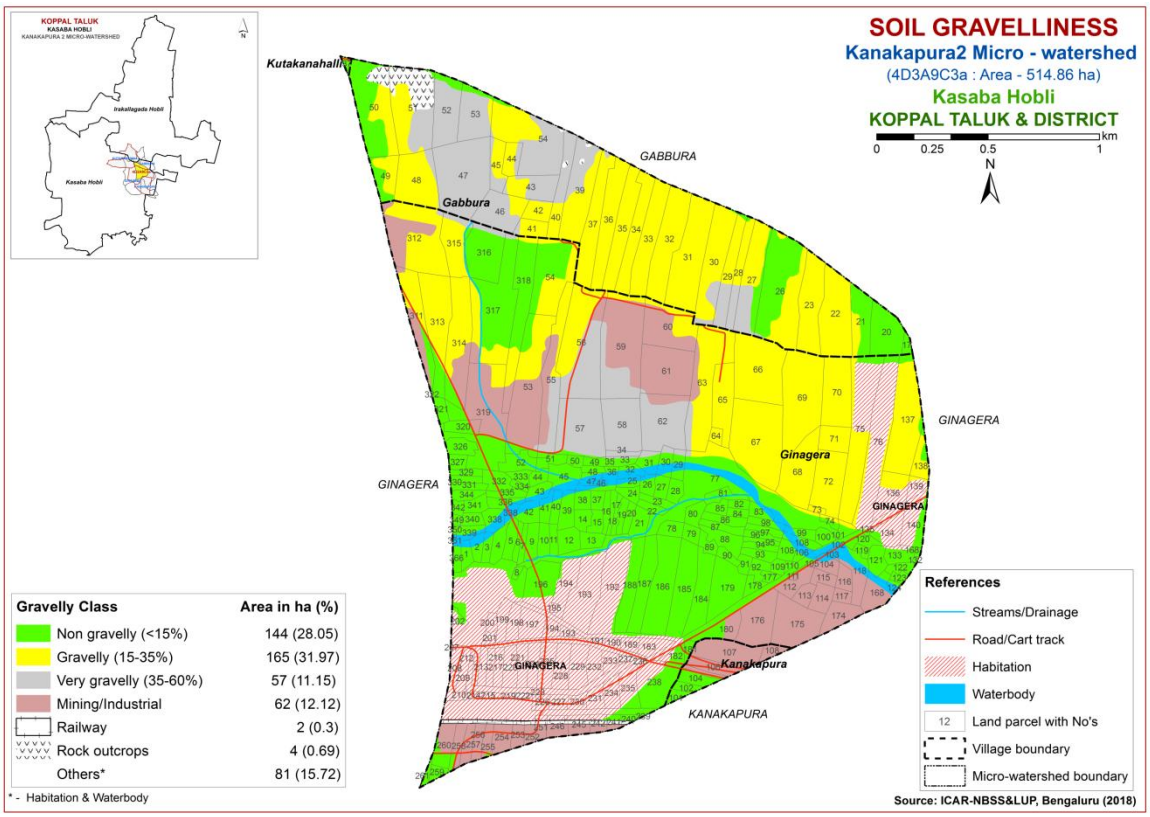


Fig. 5.4 Soil Gravelliness map of Kanakapura-2 Microwatershed

5.5 Available Water Capacity

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

Maximum area of about 215 ha (42%) in the microwatershed has soils that are very low (<50 mm/m) in available water capacity and are distributed in all part of the microwatershed. An area of about 55 ha (10%) has soils that are low (51 to 100 mm/m) in available water capacity and are distributed in the northern and central part of the microwatershed. An area of about 6 ha (1%) has soils that are medium (101-150 mm/m) in available water capacity and are distributed in the eastern part of the microwatershed. An area of about 9 ha (2%) is high (151-200mm/m) in available water capacity and are distributed in the northern and eastern part of the microwatershed. An area of about 82 ha (16%) is very high (>200 mm/m) in available water capacity and are distributed in the western and southern part of the microwatershed.

An area of about 270 ha (52%) 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 91 ha (18%) has soils that have high potential (>200 mm/m) with regard to available water capacity where all climatically adapted long du ration crops can be grown successfully.

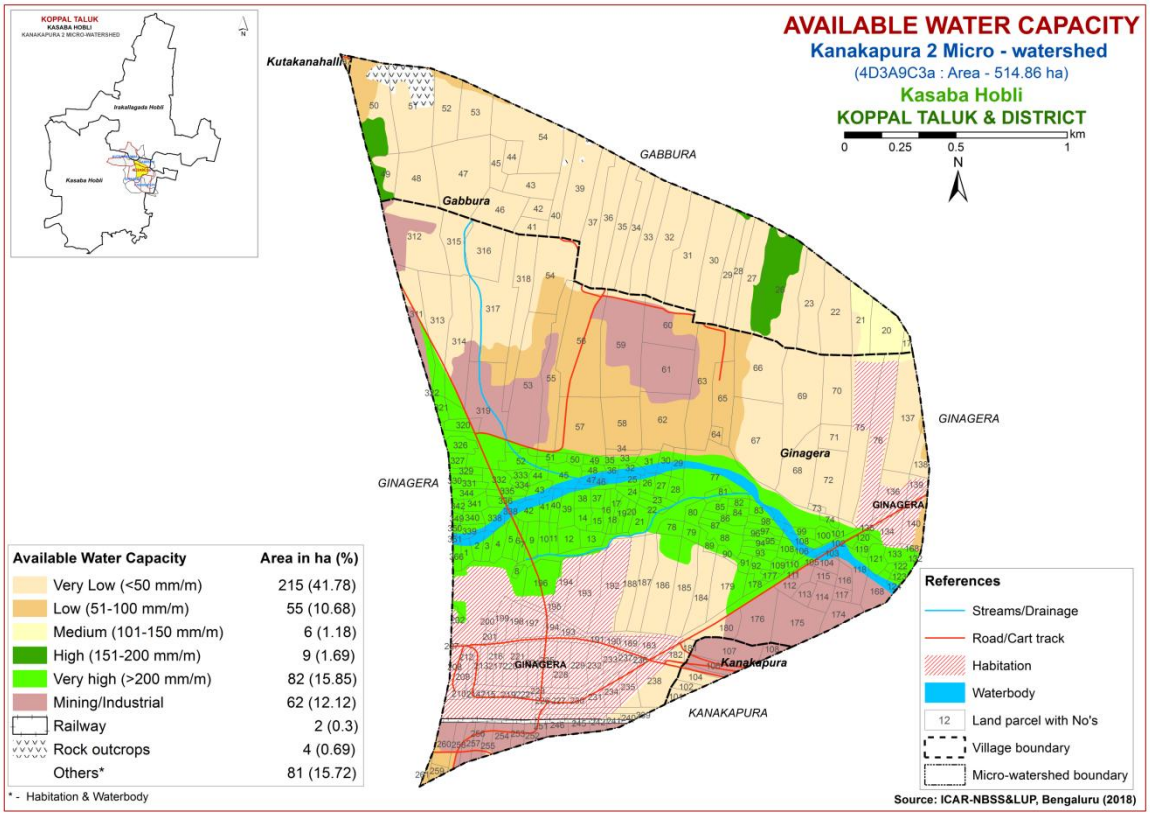


Fig. 5.5 Soil Available Water Capacity map of Kanakapura-2 Microwatershed

5.6 Soil Slope

Soil slope refers to the inclination of the surface of the land. It is defined by gradient, shape and length, and is an integral feature of any soil as a natural body. Slope is considered important in soil genesis, land use and land development. The length and gradient of slope influences the rate of runoff, infiltration, erosion and deposition. The soil map units were grouped into three 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 62 ha (12%) has soils falls under nearly level sloping (0-1%) lands and are distributed in the western and southern part of the microwatershed. Maximum area of about 304 ha (59%) in the microwatershed falls under very gently sloping (1-3%) lands and are distributed in all parts of the microwatershed. In these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

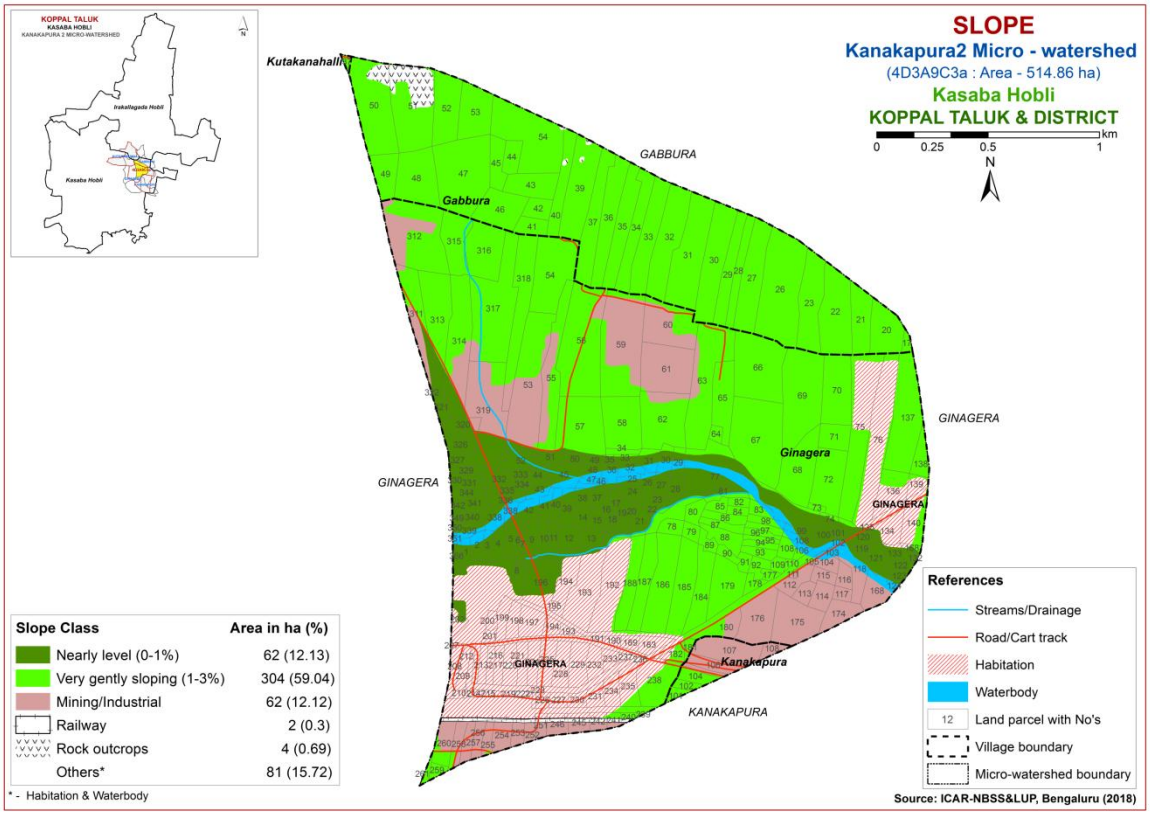


Fig. 5.6 Soil Slope map of Kanakapura-2 Microwatershed

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 150 ha (29%) and are distributed in the northern, eastern, western and southern part of the microwatershed. Maximum area of about 216 ha (42%) is moderately eroded (e2 class) and distributed in all part of the microwatershed. Moderately eroded lands are problematic and need appropriate soil and water conservation and other land development measures.

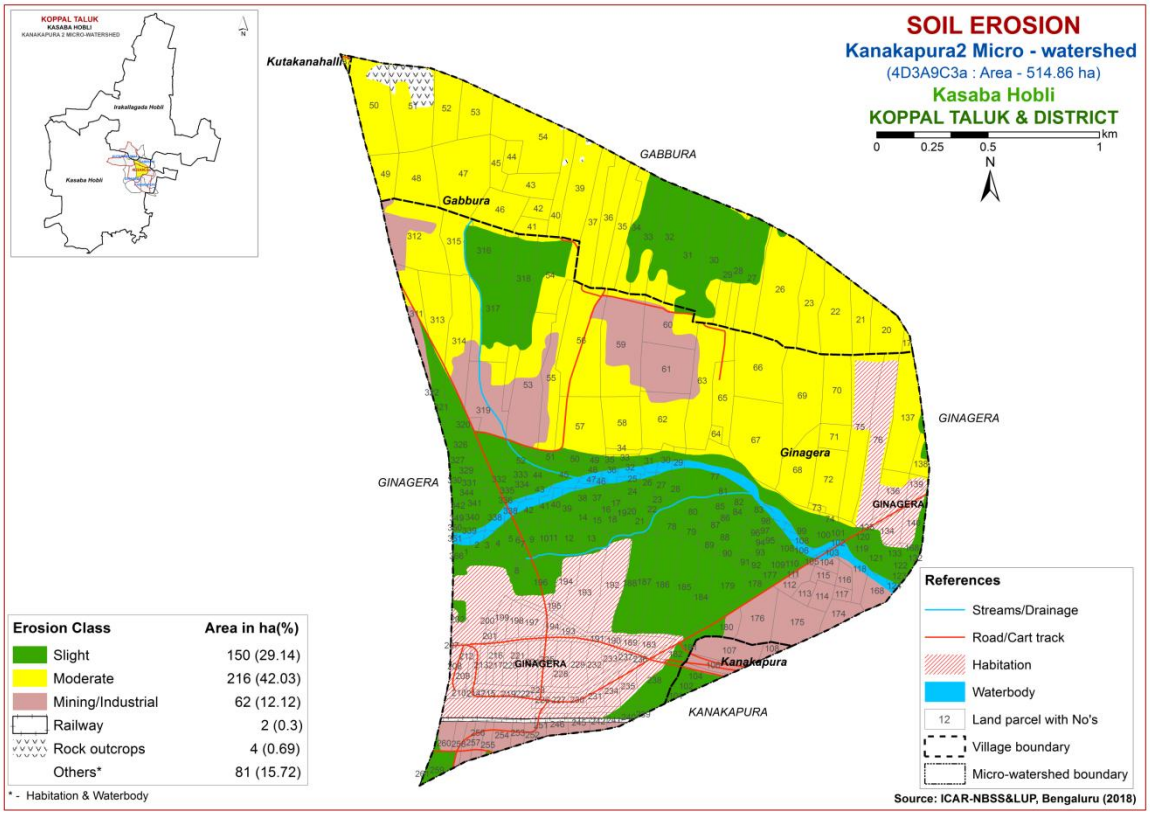


Fig. 5.7 Soil Erosion map of Kanakapura-2 Microwatershed

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 Kanakapura-2 microwatershed for soil reaction (pH) showed that an area of about 68 ha (13%) is neutral (pH 6.5-7.3) and are distributed in the northern and eastern part of the microwatershed. Maximum area of 118 ha (23%) is slightly alkaline (pH 7.3-7.8) and are distributed in all part of the microwatershed. An area of about 115 ha (22%) is moderately alkaline (pH 7.8-8.4) and are distributed in the northern, western, central, eastern and southern part of the microwatershed. An area of about 60 ha (12%) is strongly alkaline (pH 8.4-9.0) and are distributed in the western and southern part of the microwatershed. Very strongly alkaline (pH >9.0) soils cover an area of about 6 ha (1%) and are distributed in the southern part of the microwatershed. Thus, major soils in the microwatershed are alkaline in reaction (Fig.6.1).

6.2 Electrical Conductivity (EC)

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

6.3 Organic Carbon

An area of about 33 ha (6%) is low (<0.5%) in organic carbon and are distributed in the eastern and northern part of the microwatershed. An area of about 50 ha (10%) is medium (0.5-0.75%) in organic carbon content and distributed in the northern, eastern and southern part of the microwatershed. Maximum area of about 284 ha (55%) is high (>0.75%) in organic carbon and distributed in all part of the microwatershed (Fig.6.3).

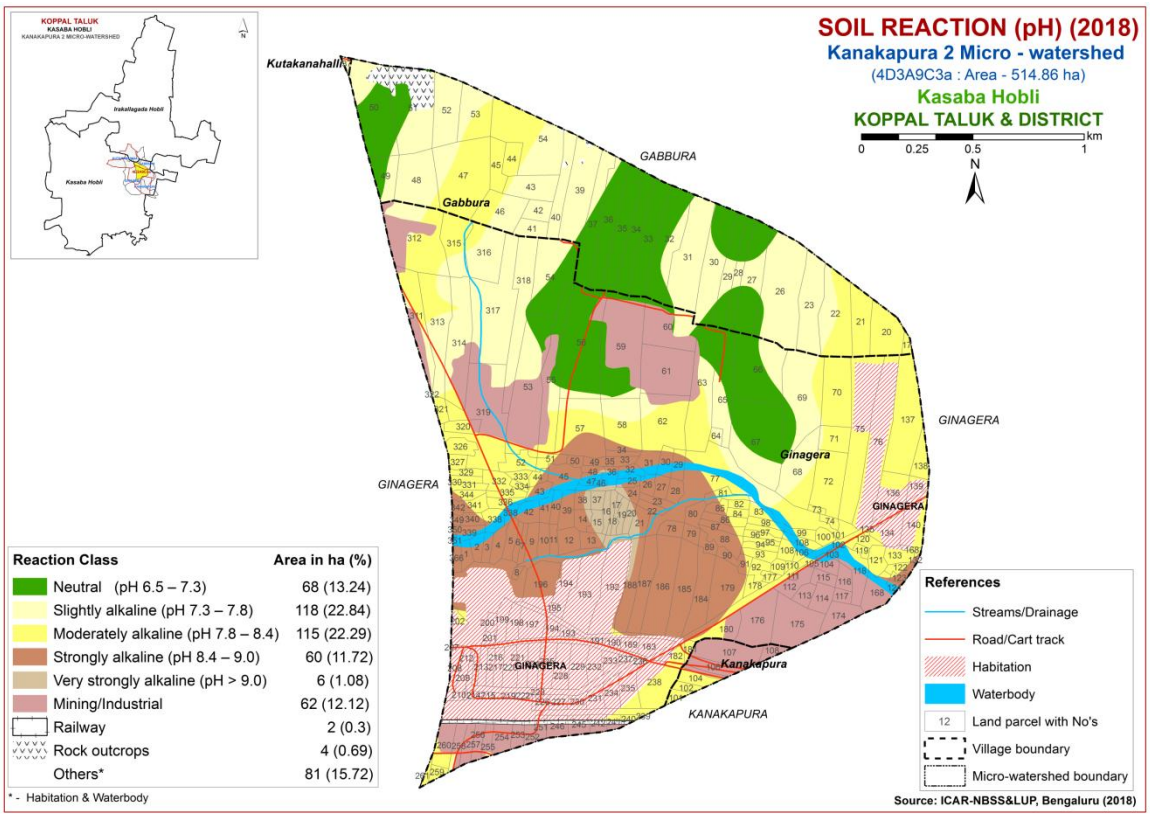


Fig.6.1 Soil Reaction (pH) map of Kanakapura-2 Microwatershed

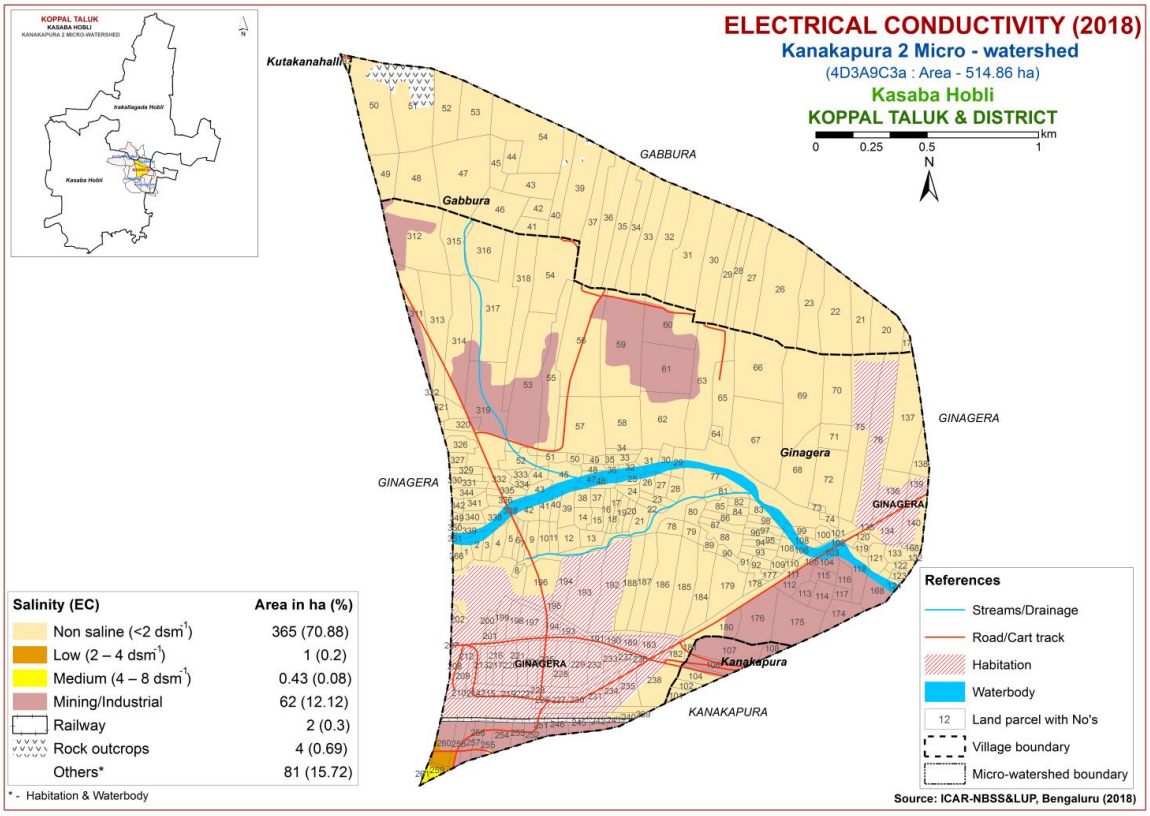


Fig.6.2 Electrical Conductivity (EC) map of Kanakapura-2 Microwatershed

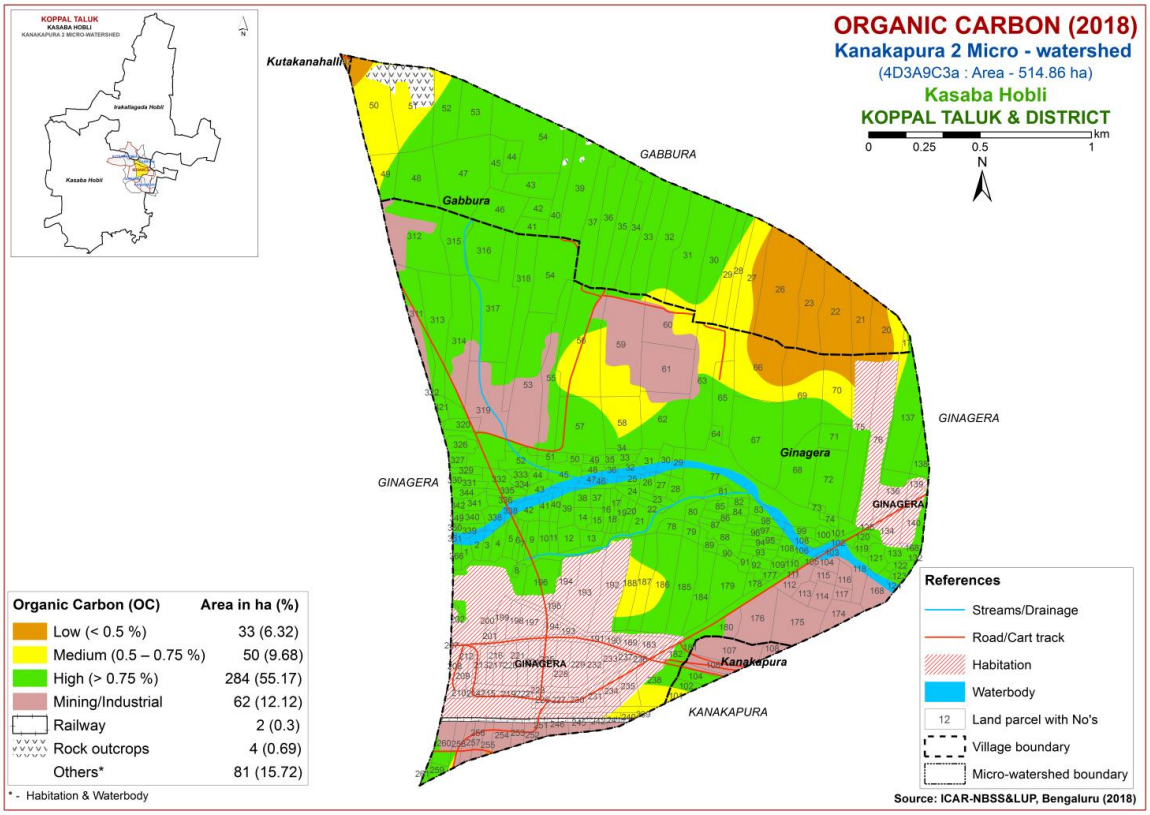


Fig.6.3 Soil Organic Carbon map of Kanakapura-2 Microwatershed

6.4 Available Phosphorus

Available phosphorus content is Medium (23-57 kg/ha) in an area of about 108 ha (21%) and are distributed in the western, eastern, central and southern part of the microwatershed. High (>57 kg/ha) in a maximum area of about 258 ha (50%) and are distributed in all part of the microwatershed. Apply additional 25% phosphorous in areas where it is low and medium in available phosphorous (Fig 6.4).

6.5 Available Potassium

Available potassium content is low (<145 kg/ha) in an area of about 52 ha (10%) and are distributed in the southern part of the microwatershed. Medium (145-337 kg/ha) in a maximum area of about 164 ha (32%) and are distributed in all part of the microwatershed (Fig. 6.5). High (>337 kg/ha) in an area of 150 ha (29%) and are distributed in the northern, western and southern part of the microwatershed. Apply additional 25% potassium in areas where it is low and medium in available potassium.

6.6 Available Sulphur

Available sulphur content is medium (10-20 ppm) in an area of about 150 ha (29%) and are distributed in the northern, northwestern and eastern part of the microwatershed (Fig.6.6). Maximum area of about 217 ha (42%) is high (>20 ppm) and are distributed in all part of the microwatershed. The areas that are medium in available

sulphur need to be applied with magnesium sulphate or gypsum or factomphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.

6.7 Available Boron

Available boron content in Kanakapura-2 microwatershed is low (< 0.5ppm) in a maximum area of about 308 ha (60%) and distributed in all part of the microwatershed. An area of about 58 ha (11%) is medium (0.5-1.0 ppm) and distributed in the western and southern part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content is deficient (<4.5 ppm) in an area of about 10 ha (2%) and are distributed in the eastern part of the microwatershed. Maximum area of about 357 ha (69%) is sufficient (>4.5 ppm) and are distributed in all 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 an area of about 70 ha (14%) and are distributed in the eastern, central and southern part of the microwatershed (Fig 6.11). Maximum area of about 296 ha (57%) is sufficient (>0.6 ppm) in available zinc and are distributed in all part of the microwatershed.

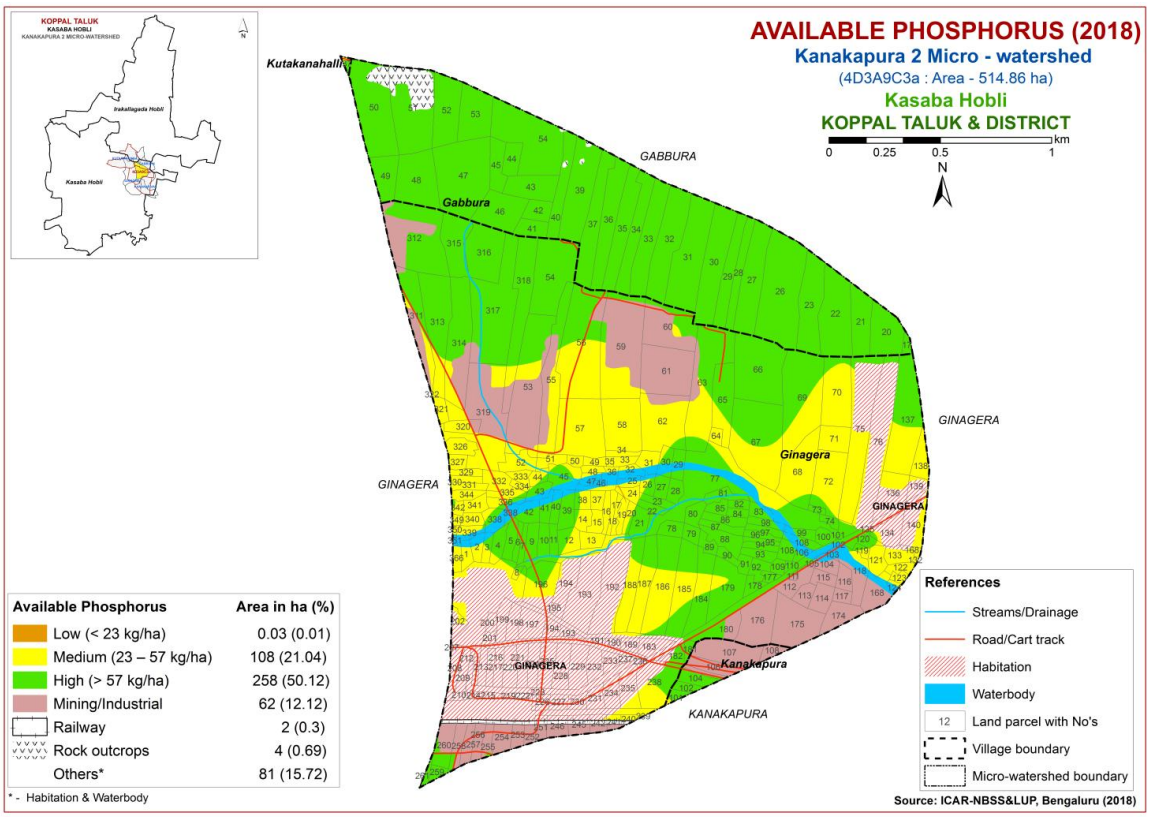


Fig.6.4 Soil Available Phosphorus map of Kanakapura-2 Microwatershed

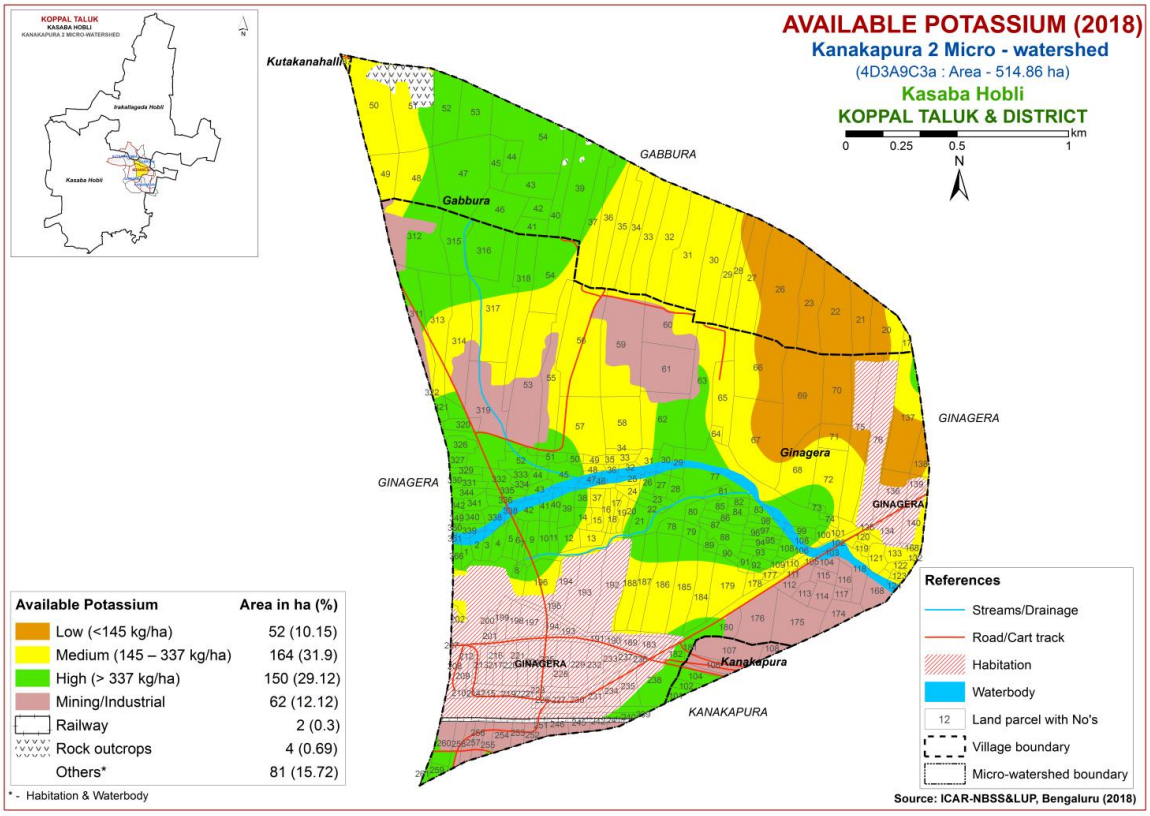


Fig.6.5 Soil Available Potassium map of Kanakapura-2 Microwatershed

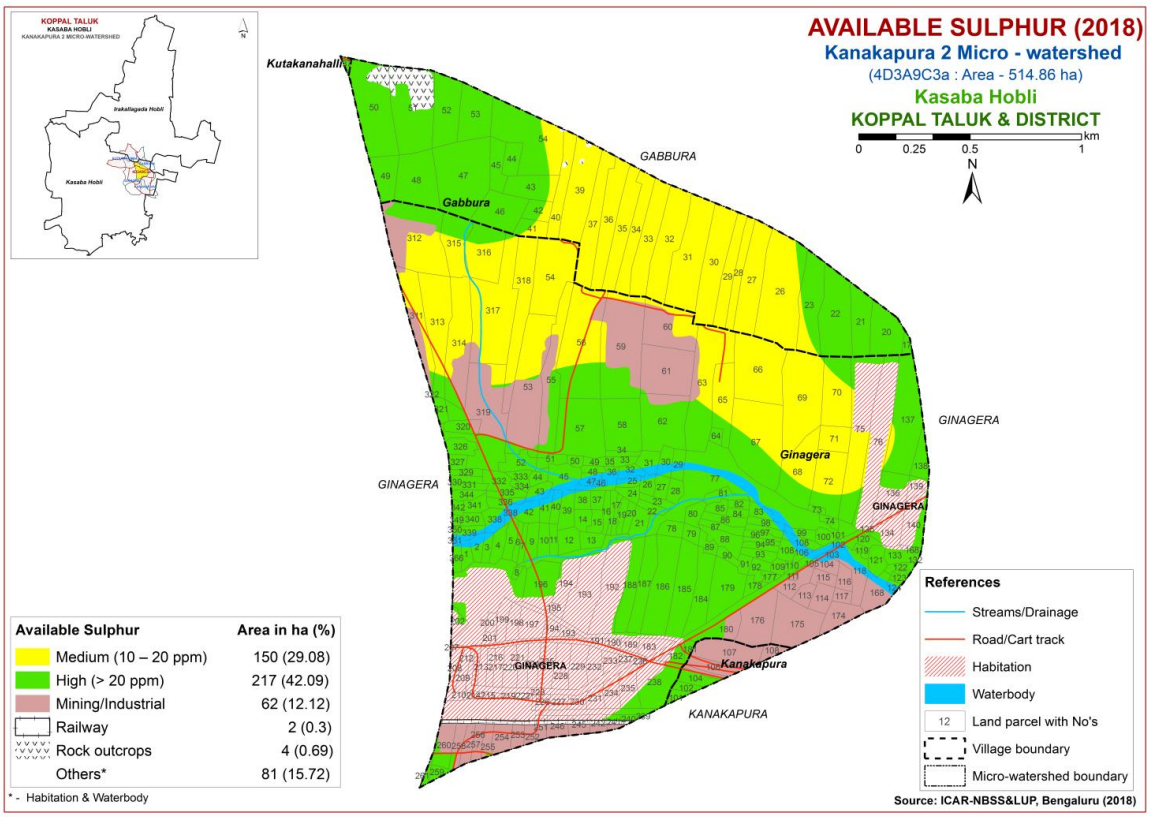


Fig.6.6 Soil Available Sulphur map of Kanakapura-2 Microwatershed

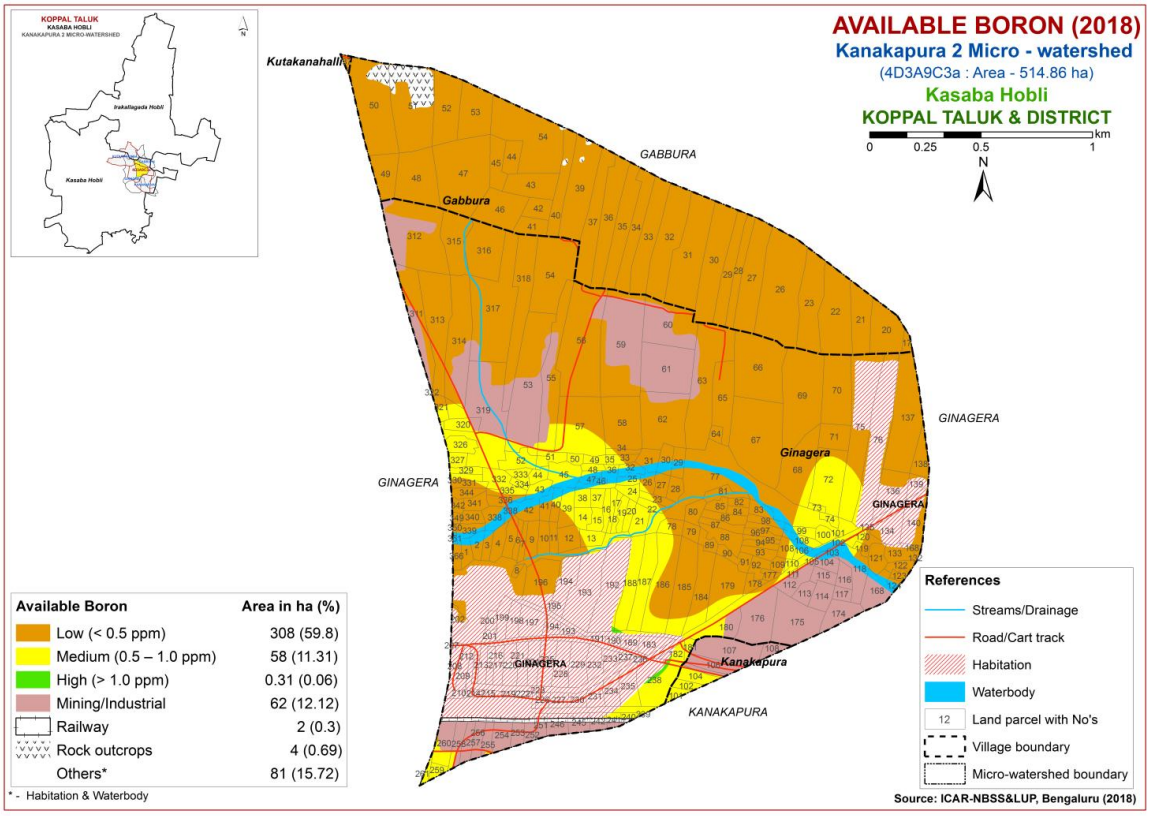


Fig.6.7 Soil Available Boron map of Kanakapura-2 Microwatershed

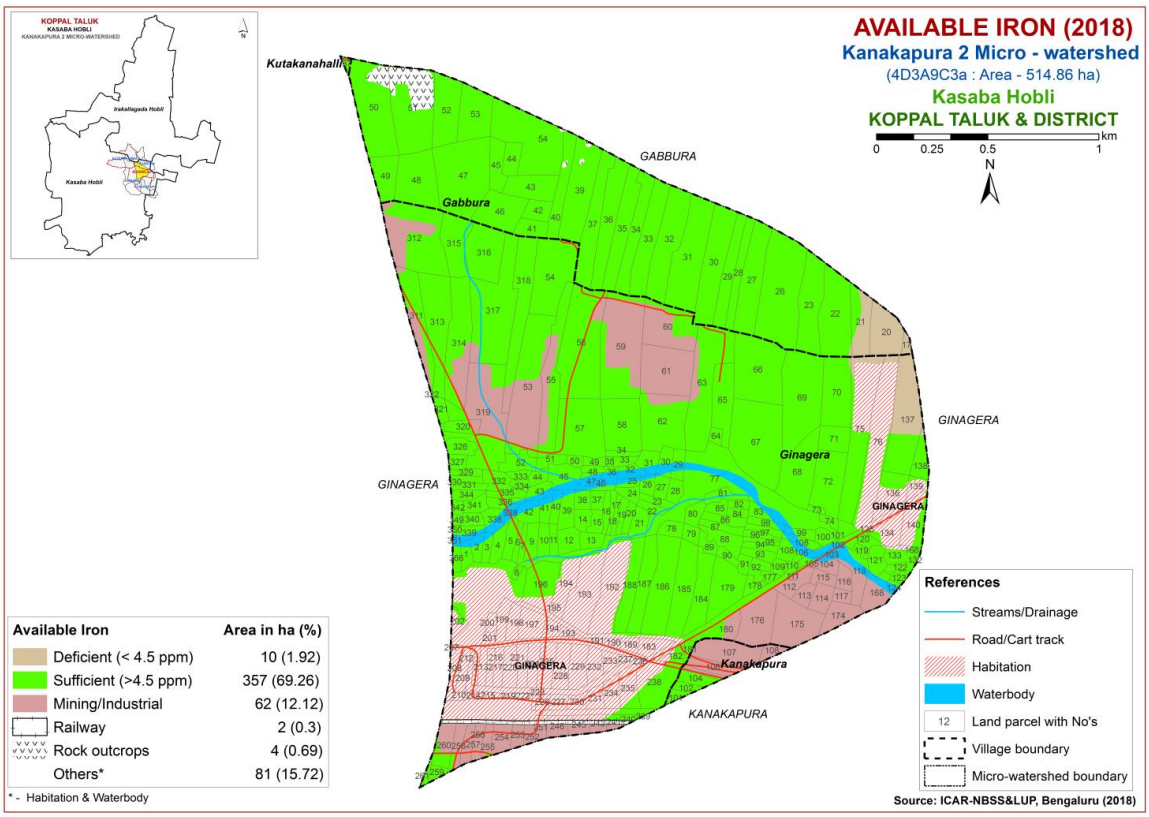


Fig.6.8 Soil Available Iron map of Kanakapura-2 Microwatershed

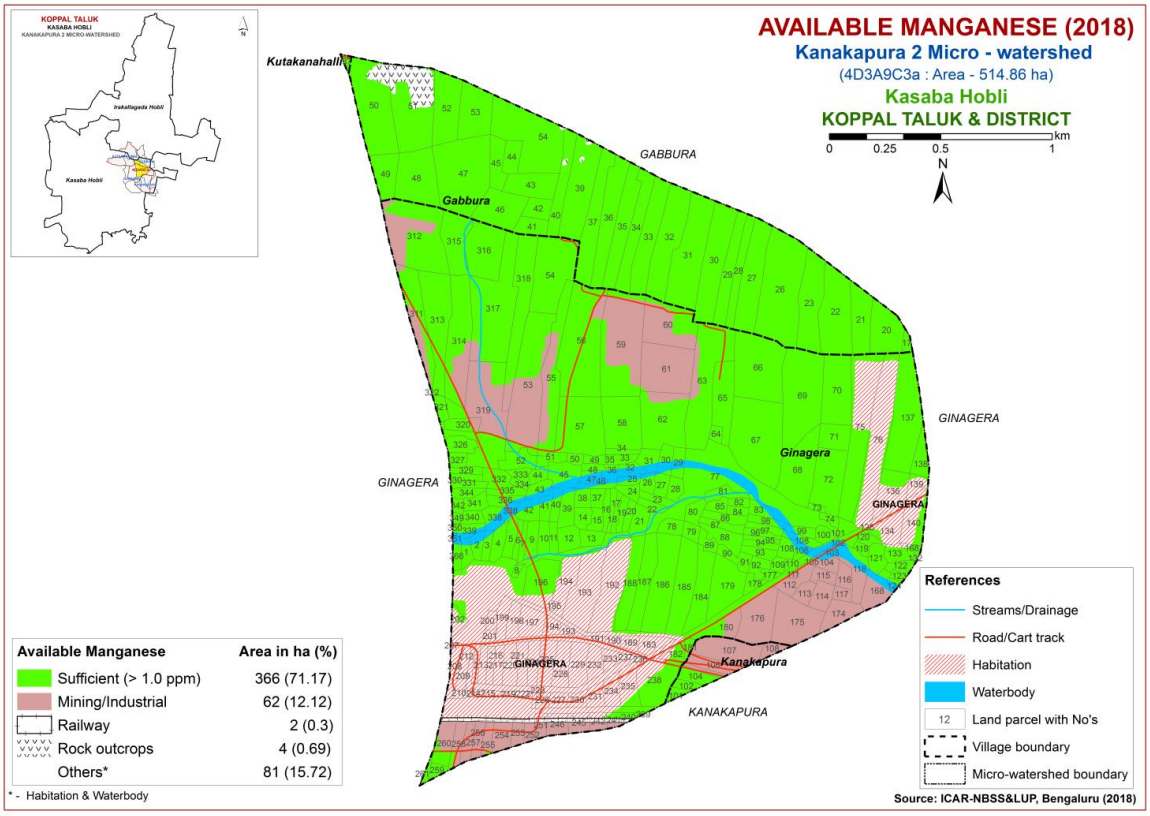


Fig.6.9 Soil Available Manganese map of Kanakapura-2 Microwatershed

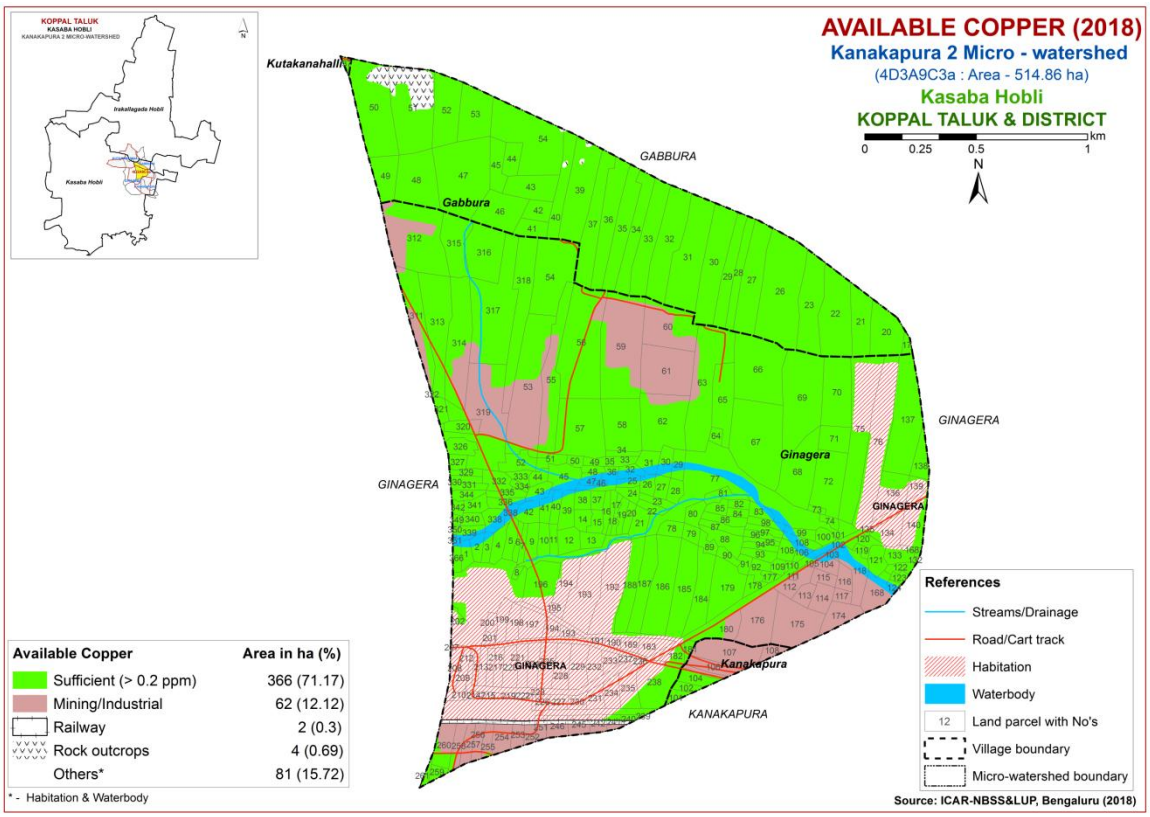


Fig.6.10 Soil Available Copper map of Kanakapura-2 Microwatershed

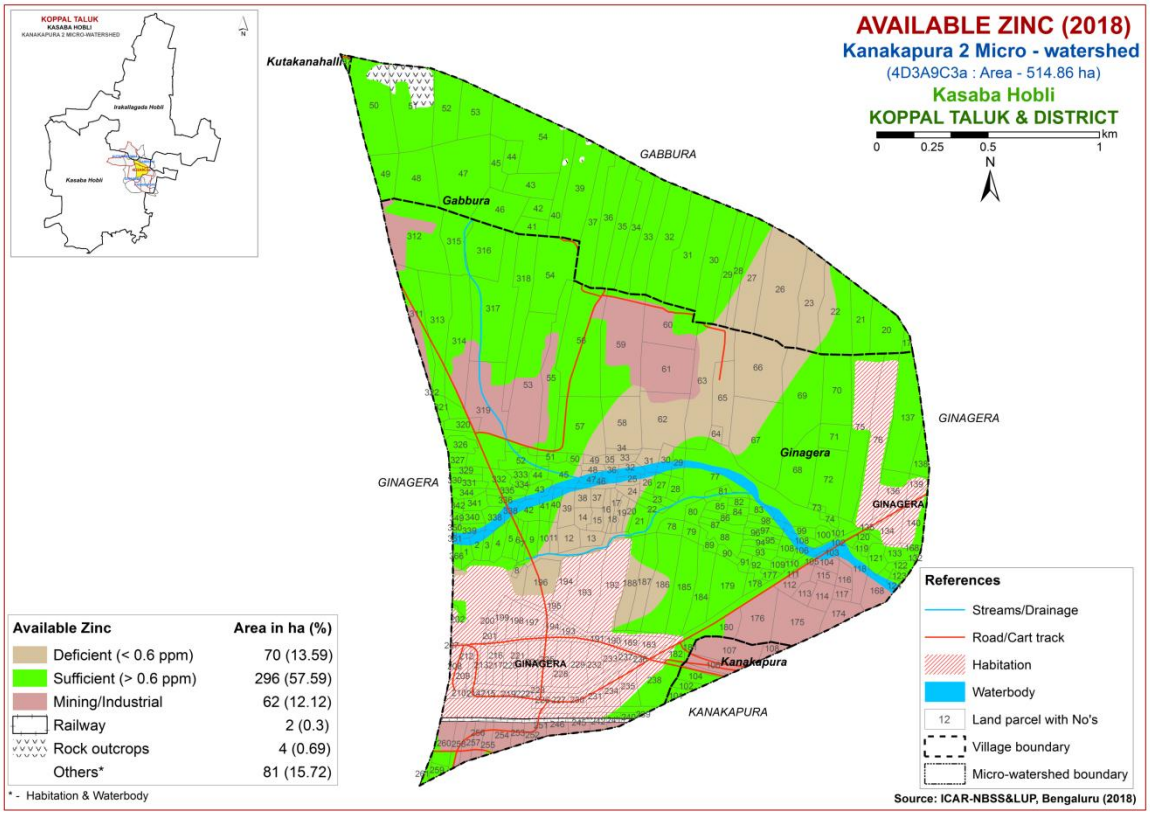


Fig.6.11 Soil Available Zinc map of Kanakapura-2 Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Kanakapura-2 microwatershed were assessed for their suitability for growing food, fodder, fibre and other horticulture crops by following the procedure as outlined in FAO, 1976 and 1983. Crop requirements were developed for each of the crop from the available research data and also by referring to Naidu *et. al.* (2006) and Natarajan *et. al* (2015). The soil and land characteristics were matched with the crop requirements to arrive at the crop suitability. The soil and land characteristics table (Table 7.1) were matched with the crop requirements (Tables 7.2-7.32) 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, 's' for sodium 'z' for calcareousness and 'w' for drainage. These limitations are indicated as lower case letters to the class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

Using the above criteria, the soil map units of the microwatershed were evaluated and land suitability maps for 31 major agricultural and horticultural crops were generated. The detailed information on the kind of suitability of each of the soil phase for the crops assessed are given village/ survey number wise for the microwatershed in Appendix-III.

7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

Sorghum is one of the major food crop grown in Karnataka in an area of 10.47 lakh ha in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad, Bellary, Chitradurga, Mysore and Chamarajnagar districts. The crop requirements for growing sorghum (Table 7.2) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and 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 15 ha (3%) for growing sorghum and occur in the northern and eastern part of the microwatershed. An area of about 83 ha (16%) is moderately suitable (Class S2) for growing sorghum and distributed

in the western, central and southern part of the microwatershed with minor limitations of drainage and gravelliness. Maximum area of about 268 ha (52%) is marginally suitable (Class S3) for growing sorghum and distributed in all part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth.

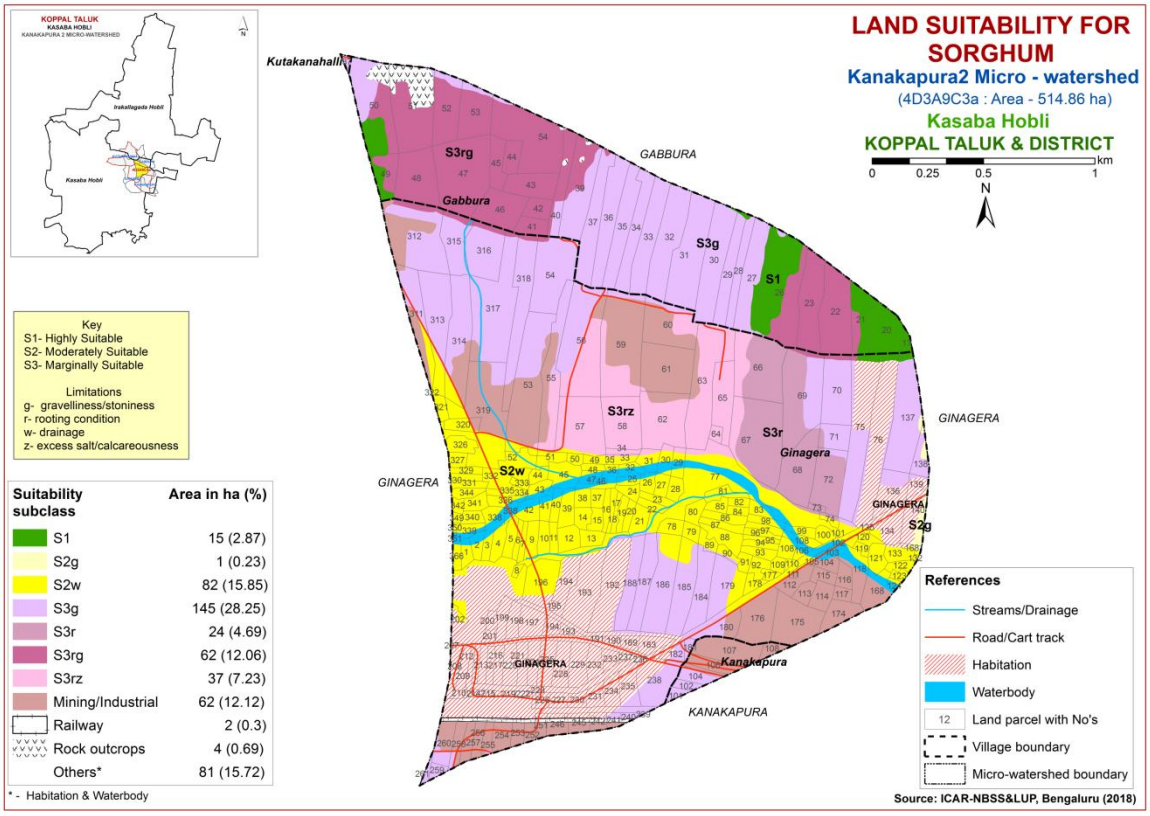


Fig. 7.1 Land Suitability map of Sorghum

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.

Highly suitable (Class S1) lands occupy an area of about 6 ha (1%) for growing maize and distributed in the eastern part of the microwatershed. An area of about 91 ha (18%) is moderately suitable (Class S2) and distributed in the northern, central, eastern, western and southern part of the microwatershed with minor limitations of texture and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 268 ha (52%) and distributed in all part of the microwatershed. They have moderate limitations of gravelliness, calacareousness, texture and rooting depth.

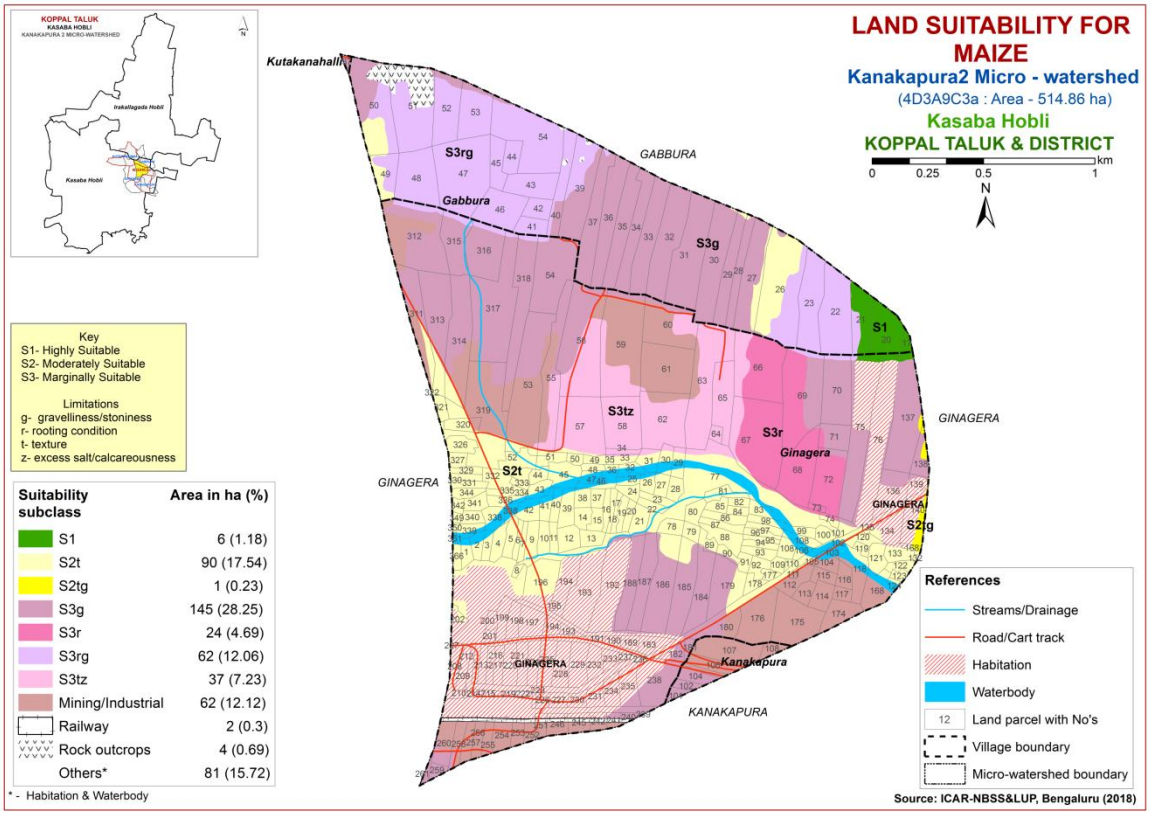


Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

Bajra is one of the major food crop grown in an area of 2.34 lakh ha in Karnataka in the northern districts. The crop requirements (Table 7.4) for growing bajra were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and 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 15 ha (3%) for growing Bajra and occur in the northern and western part of the microwatershed. Maximum area of about 221 ha (43%) is moderately suitable (Class S2) for growing Bajra and distributed in all part of the microwatershed with minor limitations of texture, rooting depth and gravelliness. Marginally suitable (Class S3) lands cover an area of about 131 ha (25%) and occur in the northern, western, central and eastern part of the microwatershed with major limitation s of gravelliness, rooting depth and calcareousness.

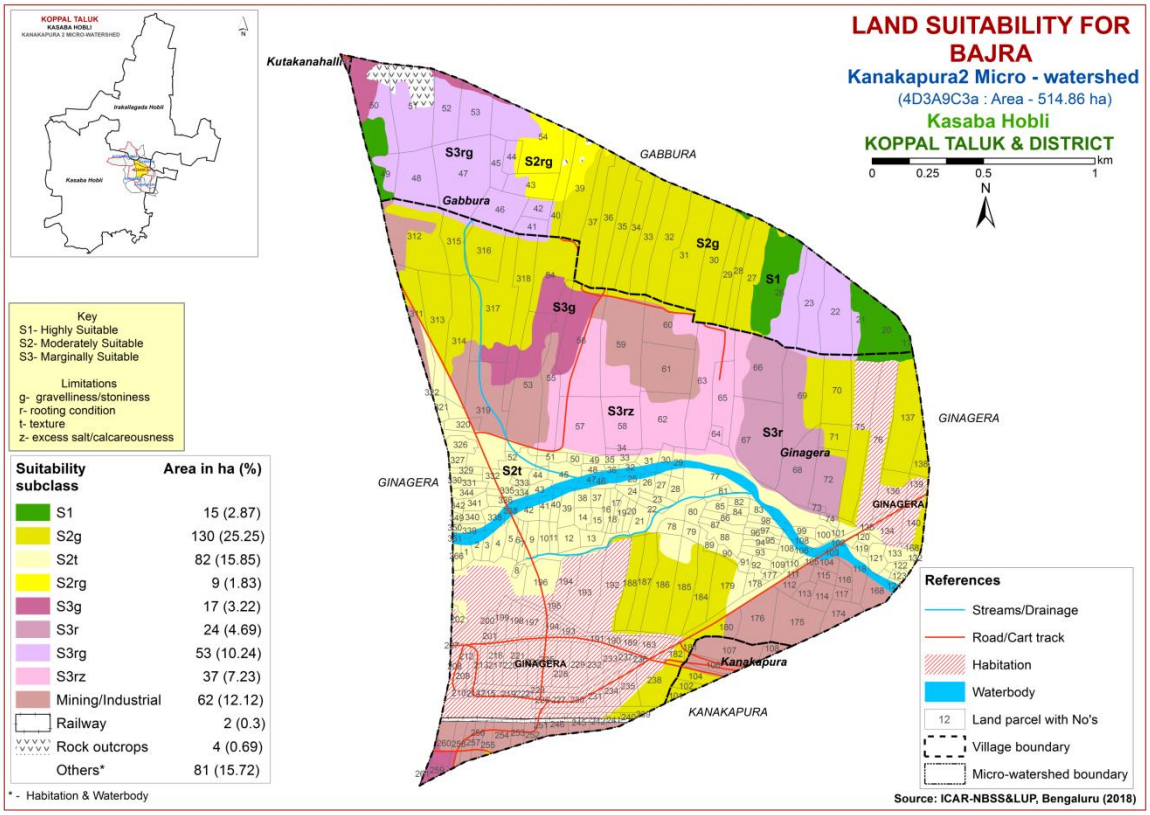


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

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

No highly suitable (Class S1) lands for growing groundnut in the microwatershed. An area of about 151 ha (29%) is moderately suitable (Class S2) for growing groundnut and distributed in the northern, western, eastern and southern part of the microwatershed. They have minor limitations of gravelliness and texture. Maximum area of about 215 ha (42%) is marginally suitable (Class S3) for growing groundnut and are distributed in all part of the microwatershed with moderate limitations of gravelliness, texture, calcareousness, drainage and rooting depth.

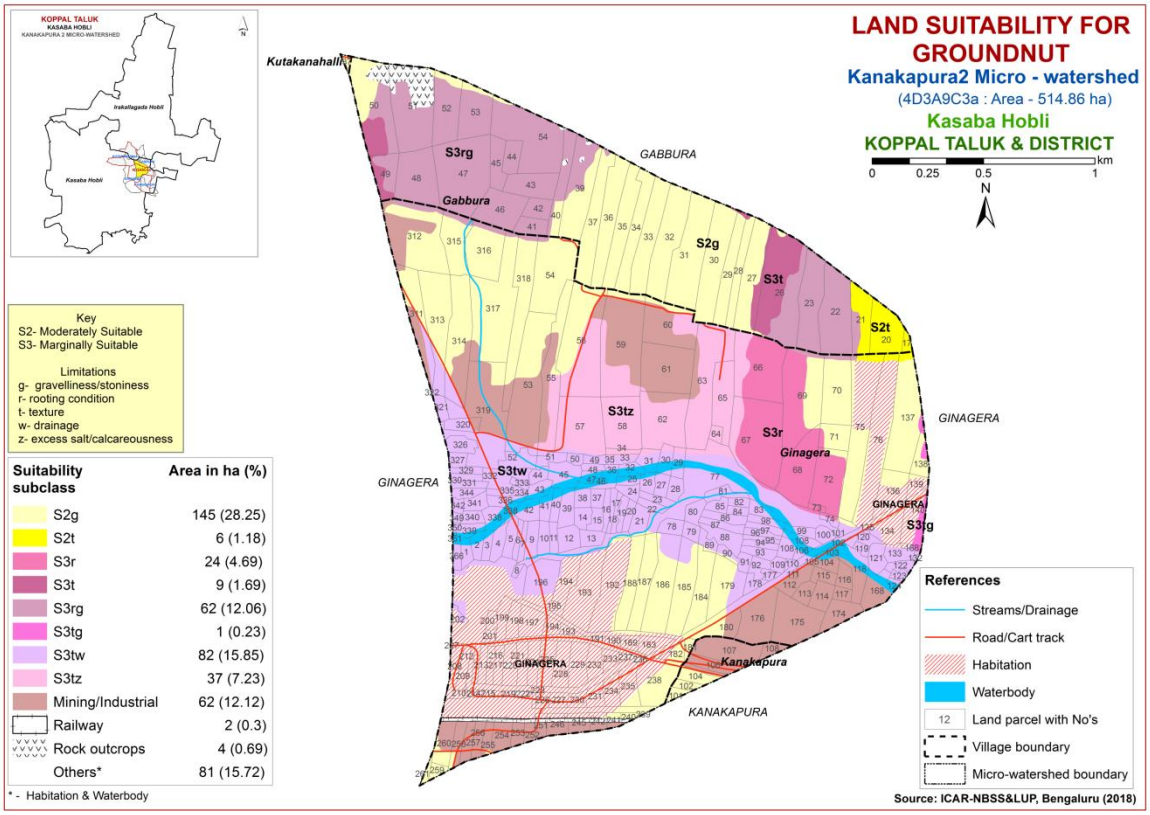


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annus*)

Sunflower is one of the most important oilseed crop grown in an area of 3.56 lakh ha in the State in all the districts. The crop requirements for growing sunflower (Table 7.6) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing sunflower was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.5.

An area of about 15 ha (3%) is highly suitable (Class S1) for growing sunflower and are distributed in the northern and eastern part of the microwatershed. An area of about 83 ha (16%) is moderately suitable (Class S2) and are distributed in the western, central and eastern part of the microwatershed. They have minor limitations of gravelliness and drainage. Marginally suitable (Class S3) lands occupy a maximum area of about 155 ha (30%) and are distributed in all part of the microwatershed with moderate limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing sunflower and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

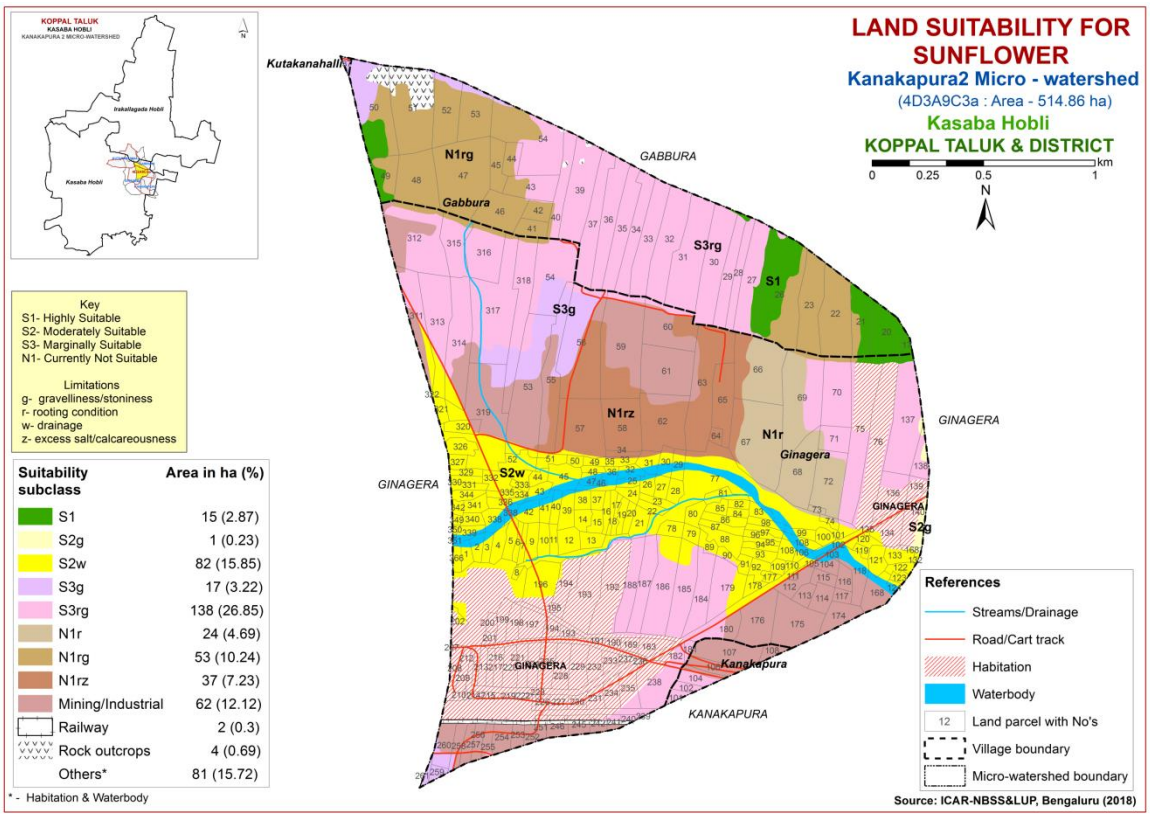


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land Suitability for Redgram (*Cajanus cajan*)

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

Highly suitable (Class S1) lands for growing Redgram occupy an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. An area of about 83 ha (16%) is moderately suitable (Class S2) for growing Redgram and are distributed in the western, central and eastern part of the microwatershed. They have minor limitations of texture, gravelliness and drainage. Maximum area of about 154 ha (30%) is marginally suitable lands (Class S3) for growing Redgram and are distributed in all part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Redgram and distributed in the northern, western, central, eastern and southern part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

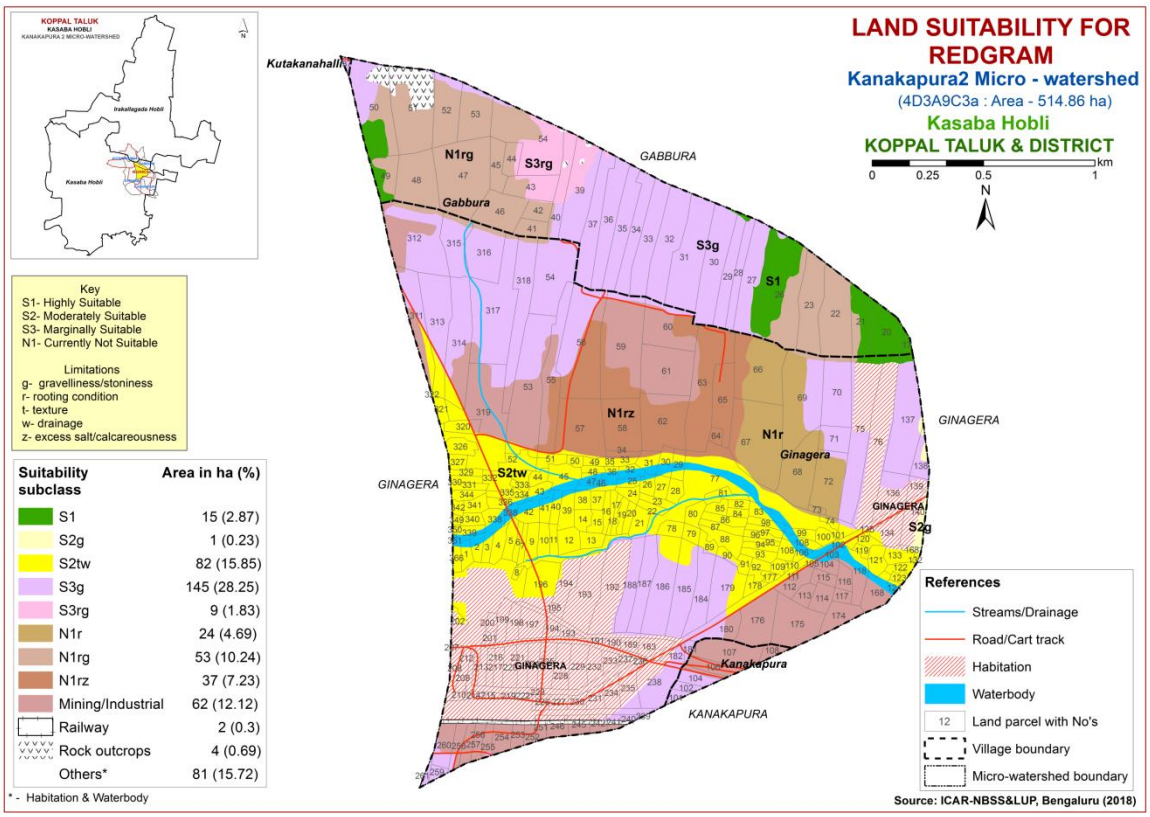


Fig. 7.6 Land Suitability map of Redgram

7.7 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 Bell ary districts. The crop requirements for growing Bengal gram (Table 7.8) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing Bengal gram was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.7.

An area of about 82 ha (16%) is highly suitable (Class S1) for growing Bengal gram and are distributed in the western, central and eastern part of the microwatershed. An area of about 25 ha (5%) is moderately suitable (Class S2) and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of rooting depth, gravelliness and texture. Marginally suitable (Class S3) lands occupy a maximum area of about 259 ha (50%) and are distributed in all part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness.

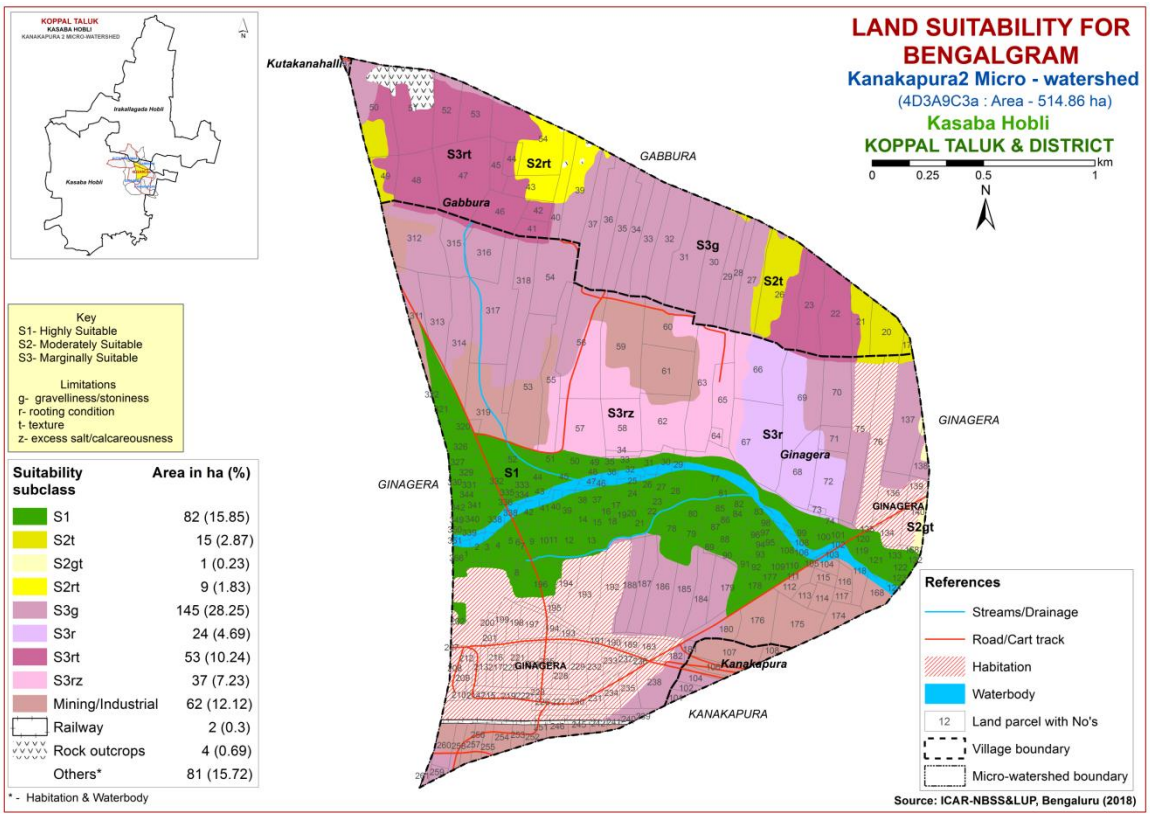


Fig. 7.7 Land Suitability map of Bengal gram

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 9 ha (2%) is highly suitable (Class S1) for growing cotton and are distributed in the northern and eastern part of the microwatershed. An area of about 89 ha (17%) is moderately suitable (Class S2) and are distributed in the western, central and eastern part of the microwatershed. They have minor limitations of gravelliness, texture and drainage. Marginally suitable (Class S3) lands occupy a maximum area of about 269 ha (52%) and are distributed in all part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness.

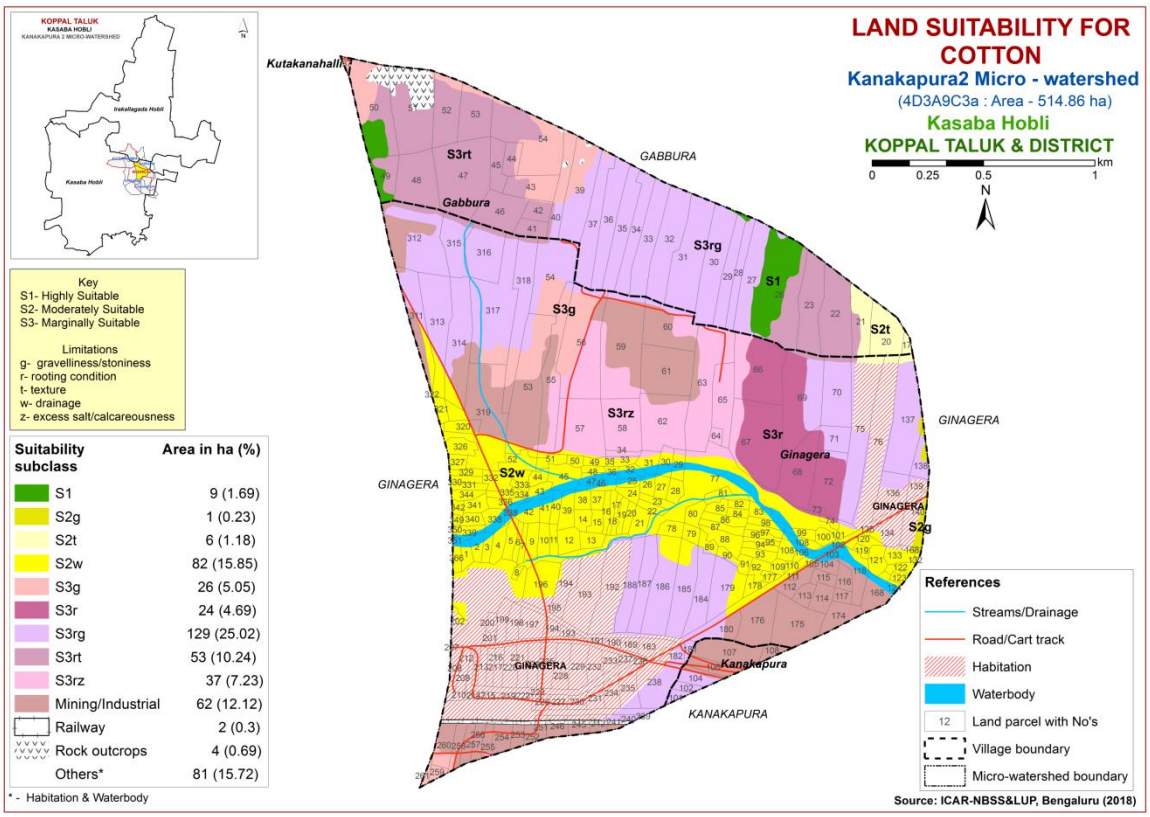


Fig. 7.8 Land Suitability map of Cotton

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

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

An area of about 6 ha (1%) is highly suitable (Class S1) for growing Chilli and are distributed in the eastern part of the microwatershed. An area of about 10 ha (2%) is moderately suitable (Class S2) and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness and texture. Marginally suitable (Class S3) lands occupy a maximum area of about 351 ha (68%) and are distributed in all part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness, drainage and gravelliness.

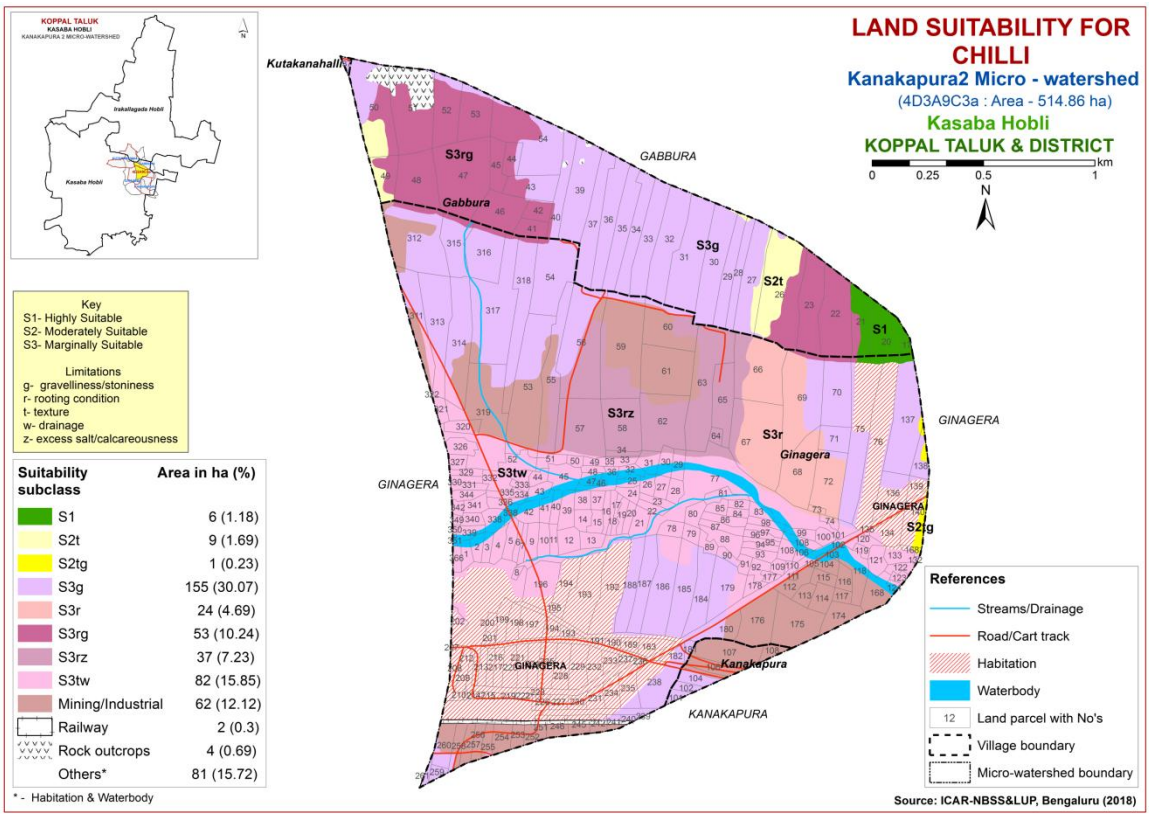


Fig. 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Solanum lycopersicum*)

Tomato is one of the most important vegetable crop grown in an area of 0.65 lakh ha in almost all the districts of the State. The crop requirements (Table 7.11) for growing tomato were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tomato was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.10.

An area of about 6 ha (1%) is highly suitable (Class S1) for growing Tomato and are distributed in the eastern part of the microwatershed. An area of about 10 ha (2%) is moderately suitable (Class S2) and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness and texture. Marginally suitable (Class S3) lands occupy a maximum area of about 351 ha (68%) and are distributed in all part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness, drainage and gravelliness.

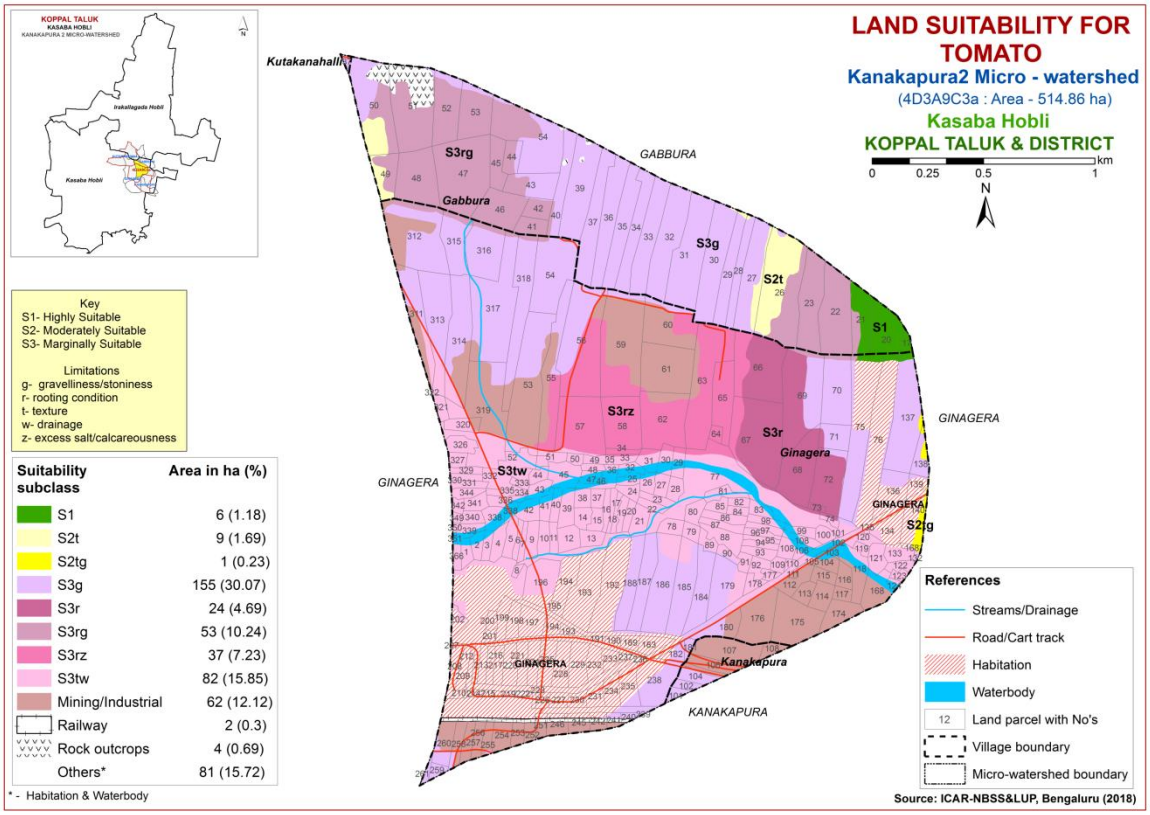


Fig. 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Brinjal (*Solanum melongena*)

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

Highly (Class S1) suitable lands for growing brinjal occur in an area of about 7 ha (1%) and are distributed in the eastern part of the microwatershed. An area of about 108 ha (21%) is moderately suitable (Class S2) for growing brinjal and are distributed in the northern, western, central and eastern part of the microwatershed. They have minor limitations of texture, gravelliness and drainage. Maximum area of 252 ha (49%) is marginally suitable for growing brinjal and are distributed in all part of the microwatershed with major limitations of rooting depth and gravelliness.

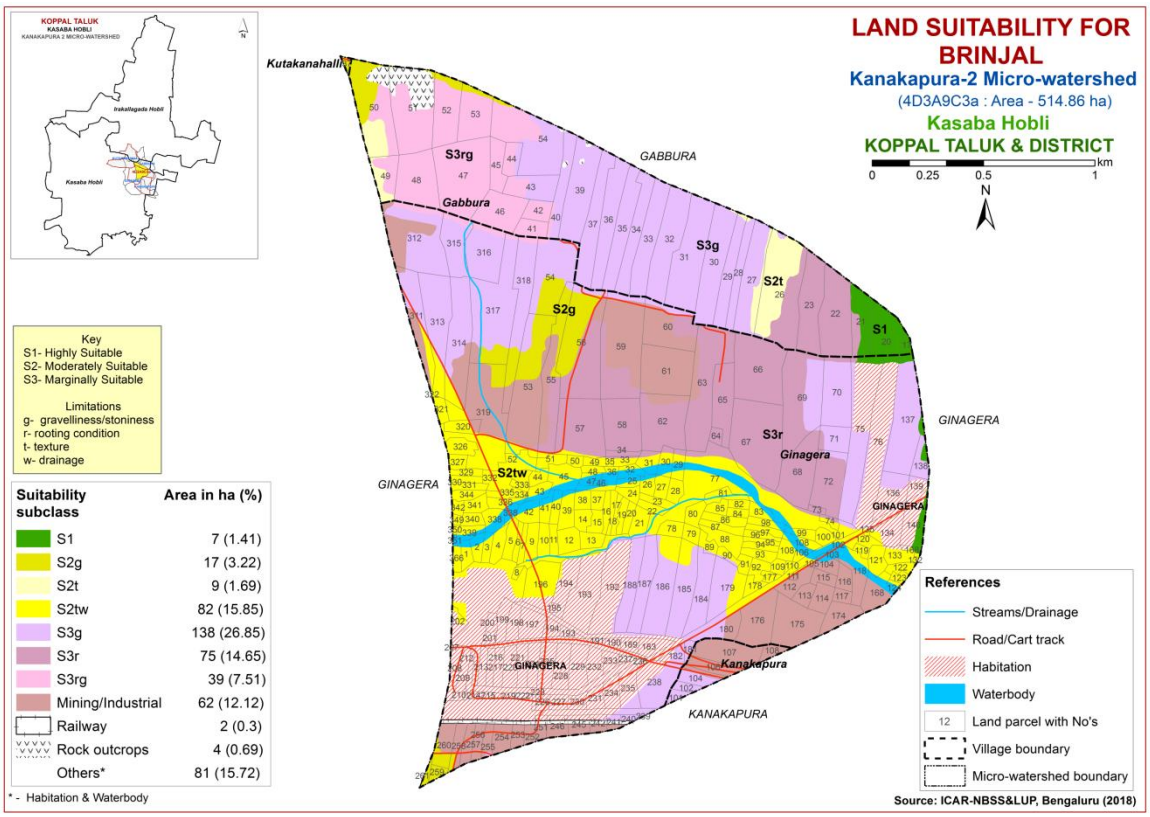


Fig 7.11 Land Suitability map of Brinjal

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

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

Highly (Class S1) suitable lands for growing Onion occur in an area of about 7 ha (1%) and are distributed in the eastern part of the microwatershed. An area of about 108 ha (21%) is moderately suitable (Class S2) for growing Onion and are distributed in the northern, western, central and eastern part of the microwatershed. They have minor limitations of texture, gravelliness and drainage. Maximum area of 252 ha (49%) is marginally suitable for growing Onion and are distributed in all part of the microwatershed with major limitations of rooting depth, texture and gravelliness.

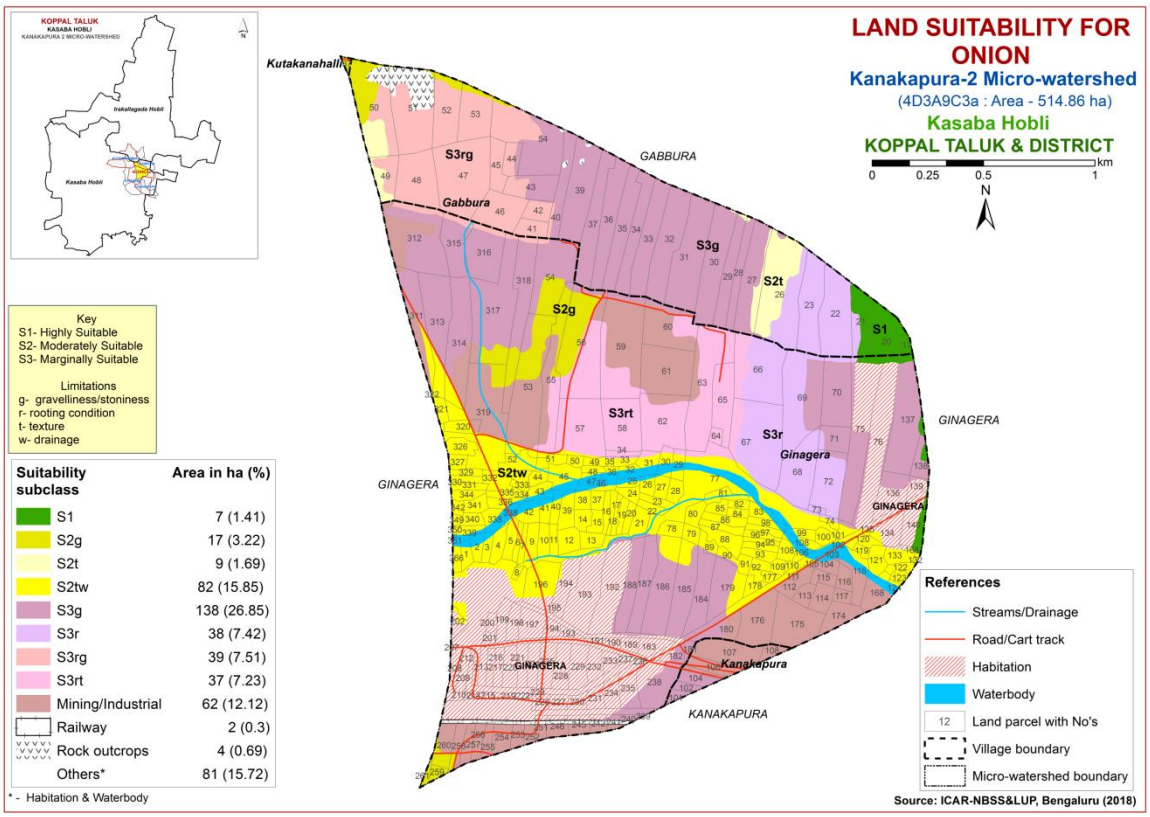


Fig 7.12 Land Suitability map of Onion

7.13 Land Suitability for Bhendi (*Abelmoschus esculentus*)

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

Highly (Class S1) suitable lands for growing Bhendi occur in an area of about 7 ha (1%) and are distributed in the eastern part of the microwatershed. An area of about 108 ha (21%) is moderately suitable (Class S2) for growing Bhendi and are distributed in the northern, western, central and eastern part of the microwatershed. They have minor limitations of texture, gravelliness and drainage. Maximum area of 252 ha (49%) is marginally suitable for growing Bhendi and are distributed in all part of the microwatershed with major limitations of rooting depth and gravelliness.

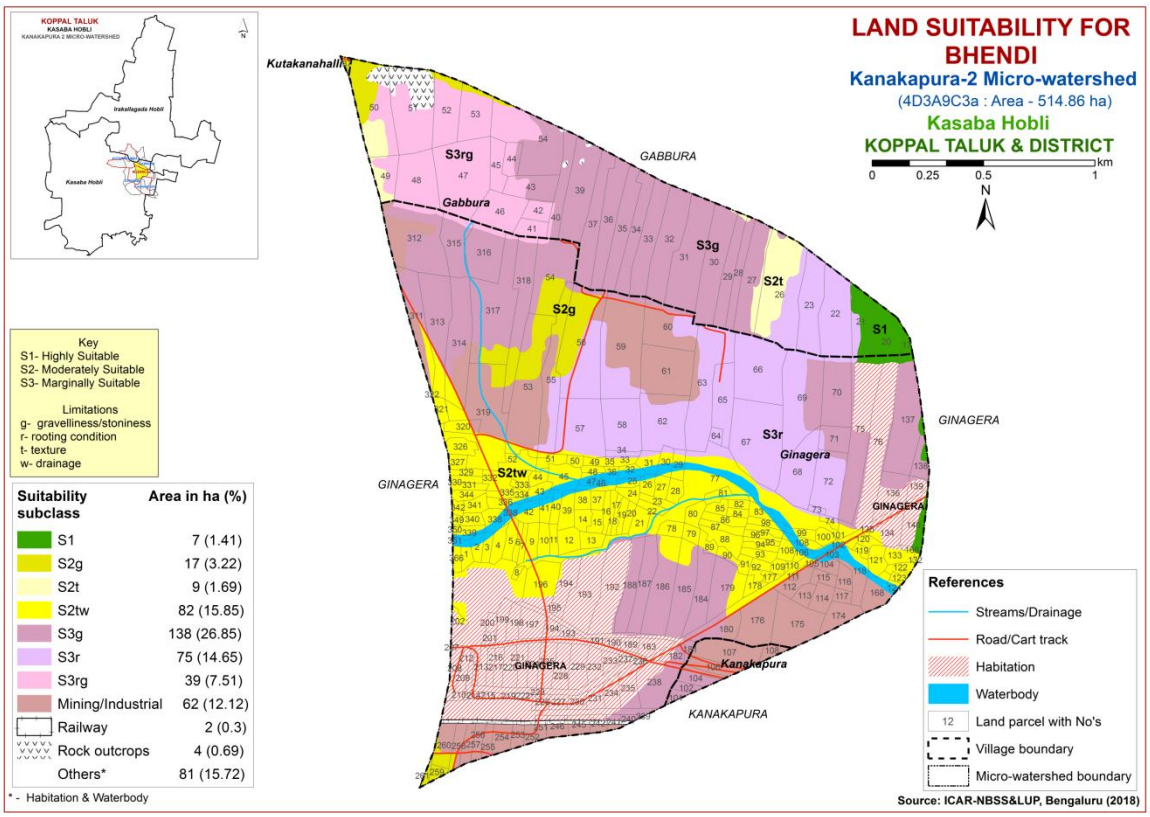


Fig 7.13 Land Suitability map of Bhendi

7.14 Land Suitability for Drumstick (*Moringa oleifera)*

Drumstick is one of the most important vegetable crop grown in 2403 ha area in the state. The crop requirements for growing drumstick (Table 7.15) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing drumstick was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.14.

Highly suitable (Class S1) lands for growing Drumstick occupy an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. An area of about 100 ha (19%) is moderately suitable (Class S2) for Drumstick and are distributed in the western, central and eastern part of the microwatershed. They have minor limitations of texture, gravelliness and drainage. Maximum area of about 138 ha (27%) is marginally suitable lands (Class S3) for growing Drumstick and are distributed in all part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Drumstick and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

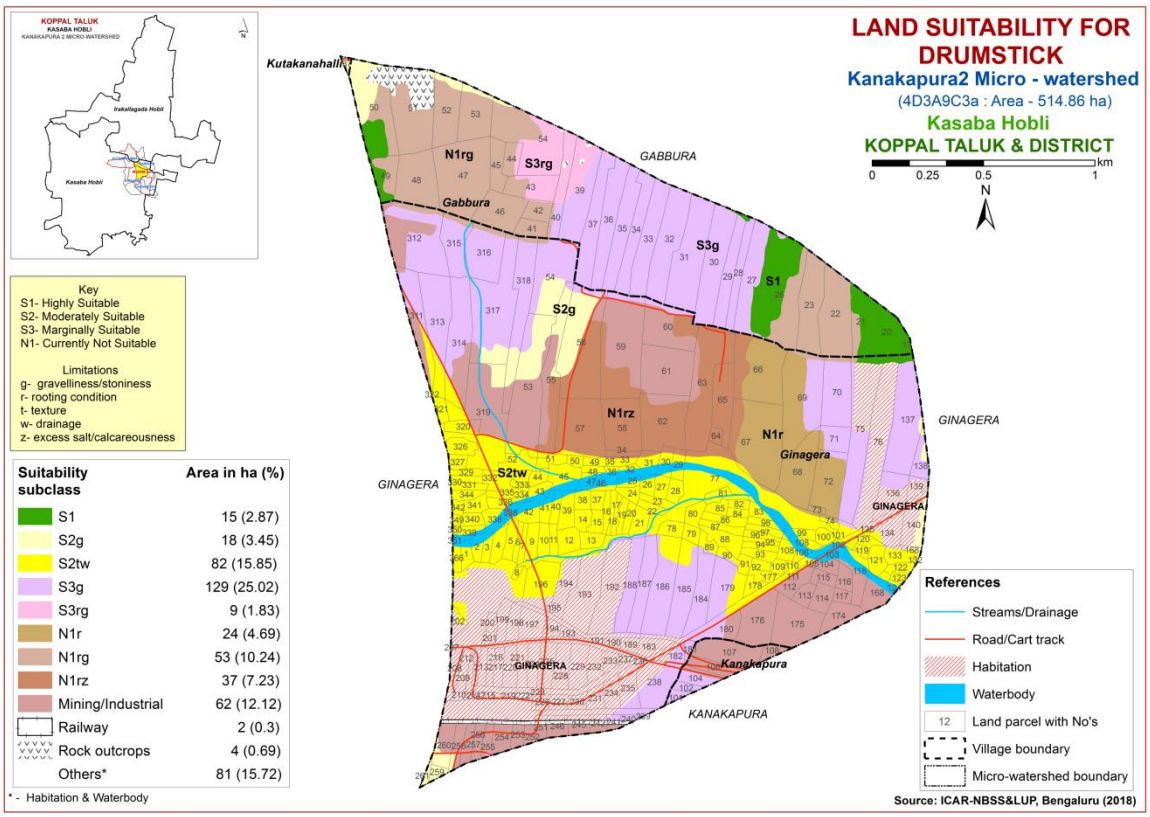


Fig. 7.14 Land Suitability map of Drumstick

7.15 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 7.16) for growing mango were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mango was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.15.

Highly suitable (Class S1) lands for growing Mango occupy an area of about 9 ha (2%) and are distributed in the northern and eastern part of the microwatershed. Moderately suitable (Class S2) lands occupy an area of about 7 ha (1%) and are distributed in the eastern part of the microwatershed with minor limitations of gravelliness and rooting depth. Maximum area of about 227 ha (44%) is marginally suitable lands (Class S3) for growing Mango and are distributed in all part of the microwatershed with major limitations of rooting depth, texture, drainage and gravelliness. An area of about 124 ha (24%) is currently not suitable (Class N1) for growing Mango and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, texture and gravelliness.

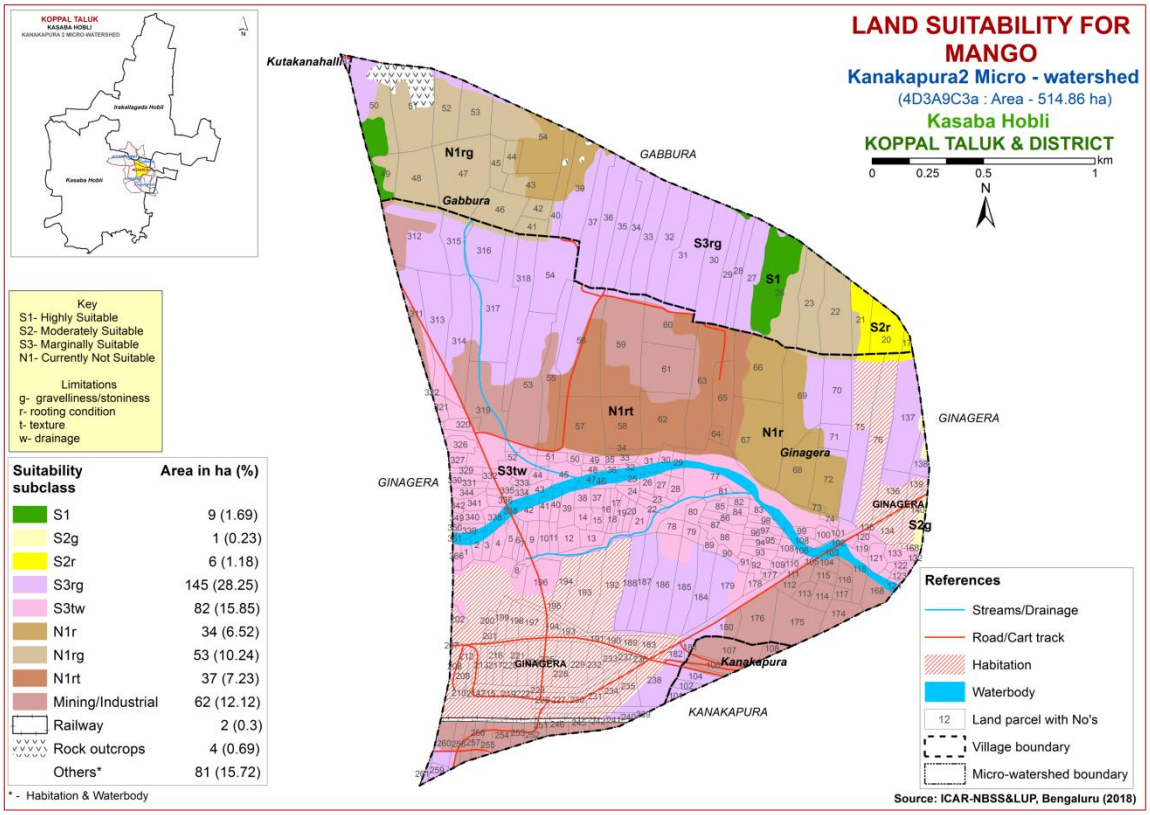


Fig. 7.15 Land Suitability map of Mango

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.

Highly suitable (Class S1) lands for growing guava in an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 130 ha (25%) is moderately suitable (Class S2) for guava and are distributed in all part of the microwatershed. They have minor limitations of rooting depth and gravelliness and texture. An area of about 108 ha (21%) is marginally suitable lands (Class S3) for growing guava and are distributed in the northern, western, central and eastern part of the microwatershed with major limitations of rooting depth, texture, drainage and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing guava and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, texture and gravelliness.

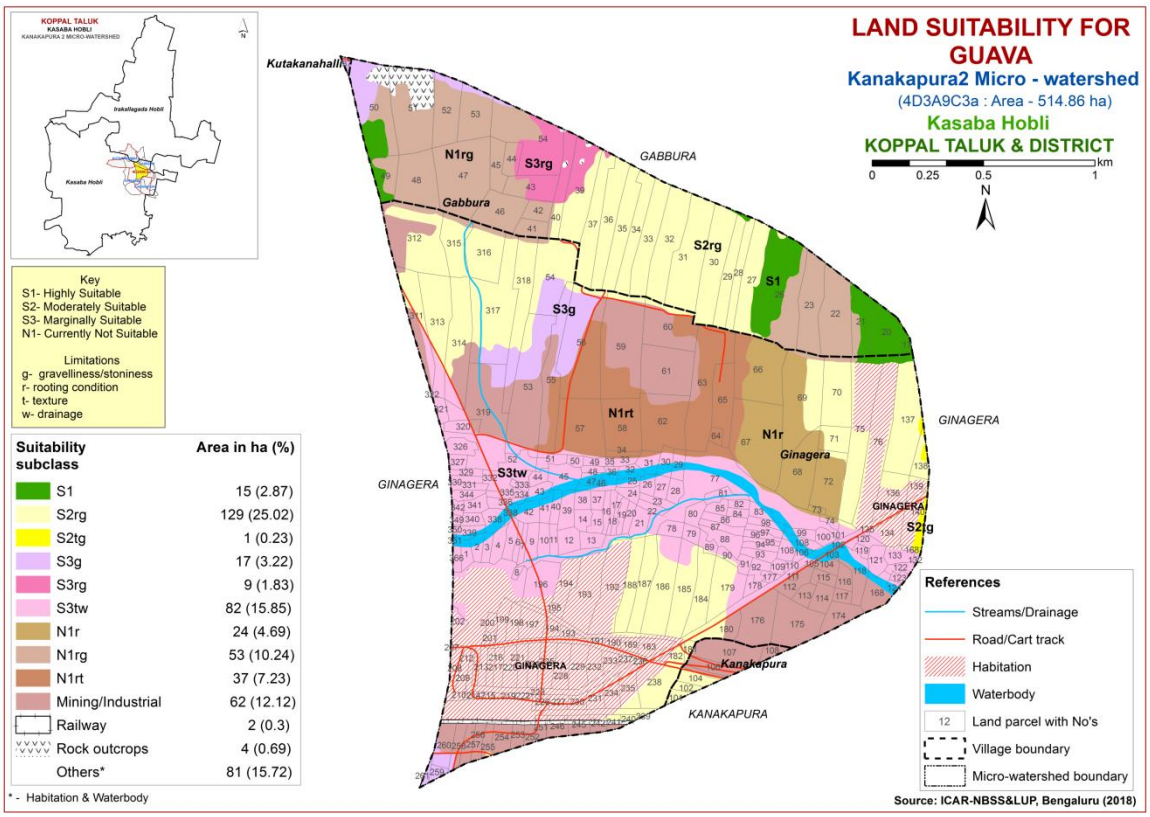


Fig. 7.16 Land Suitability map of Guava

7.17 Land Suitability for Sapota (*Manilkara zapota*)

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

Highly suitable (Class S1) lands for growing Sapota in an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 130 ha (25%) is moderately suitable (Class S2) for Sapota and are distributed in all part of the microwatershed. They have minor limitations of rooting depth and gravelliness. An area of about 108 ha (21%) is marginally suitable lands (Class S3) for growing Sapota and are distributed in the northern, western, central and eastern part of the microwatershed with major limitations of rooting depth, texture, drainage and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Sapota and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

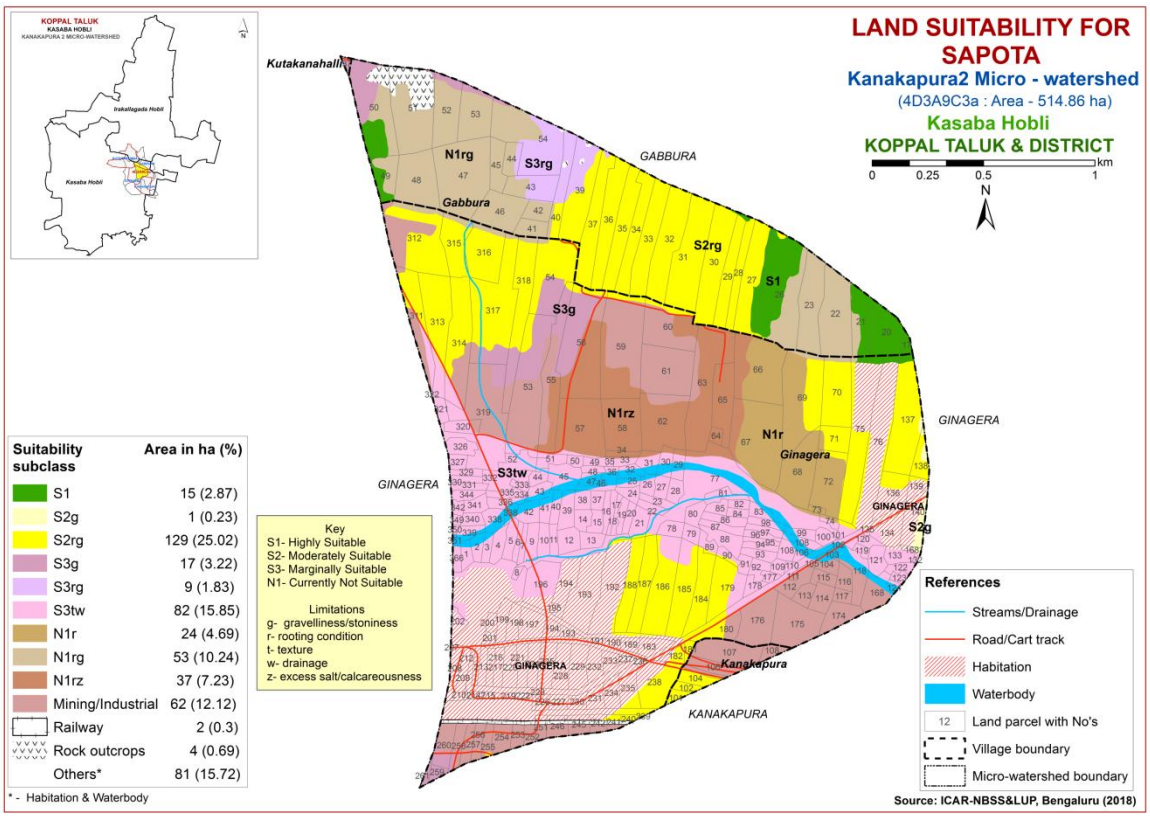


Fig. 7.17 Land Suitability map of Sapota

7.18 Land Suitability for Pomegranate (*Punica granatum*)

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

Highly suitable (Class S1) lands for growing Pomegranate occupy an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 212 ha (41%) is moderately suitable (Class S2) for Pomegranate and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness, texture and drainage. An area of about 26 ha (5%) is marginally suitable lands (Class S3) for growing Pomegranate and are distributed in the northern and western part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Pomegranate and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

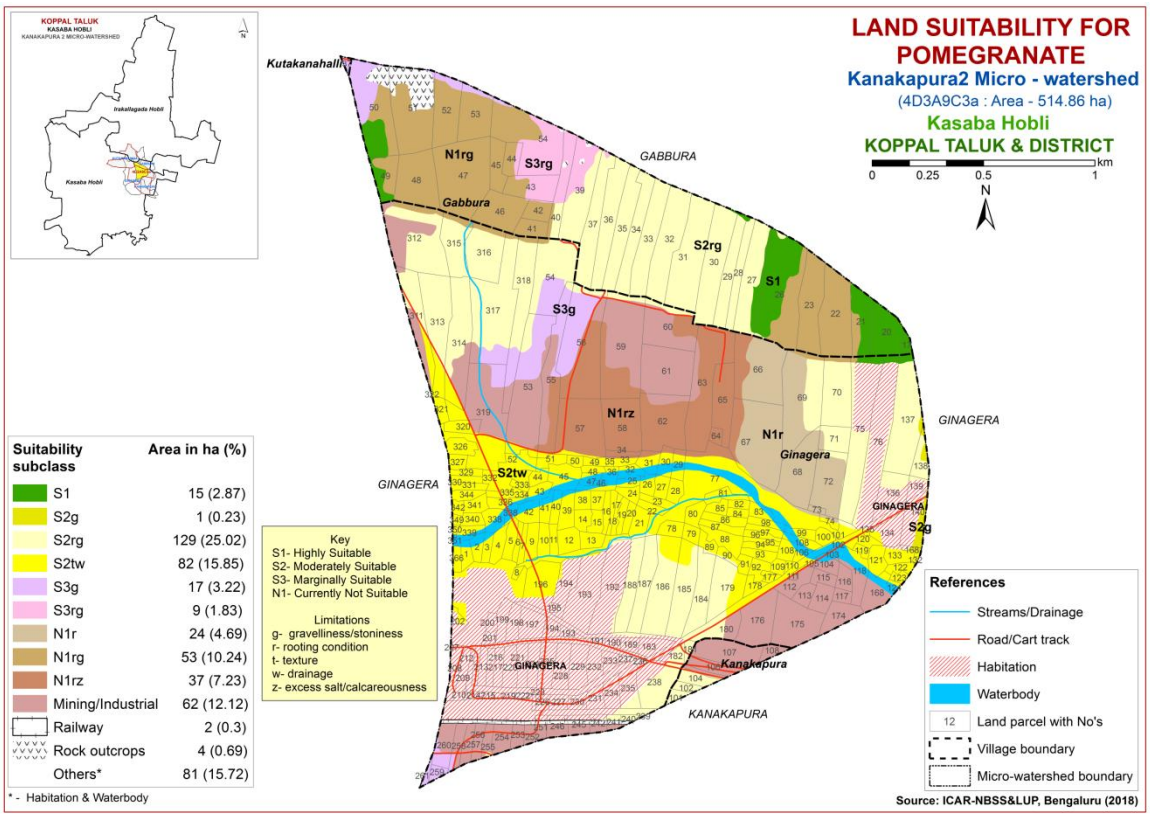


Fig. 7.18 Land Suitability map of Pomegranate

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.

Highly suitable (Class S1) lands for growing Musambi occur in an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 212 ha (41%) is moderately suitable (Class S2) for Musambi and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage An area of about 26 ha (5%) is marginally suitable lands (Class S3) for growing Musambi and are distributed in the northern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Musambi and are distributed in the northern, eastern, central and western part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

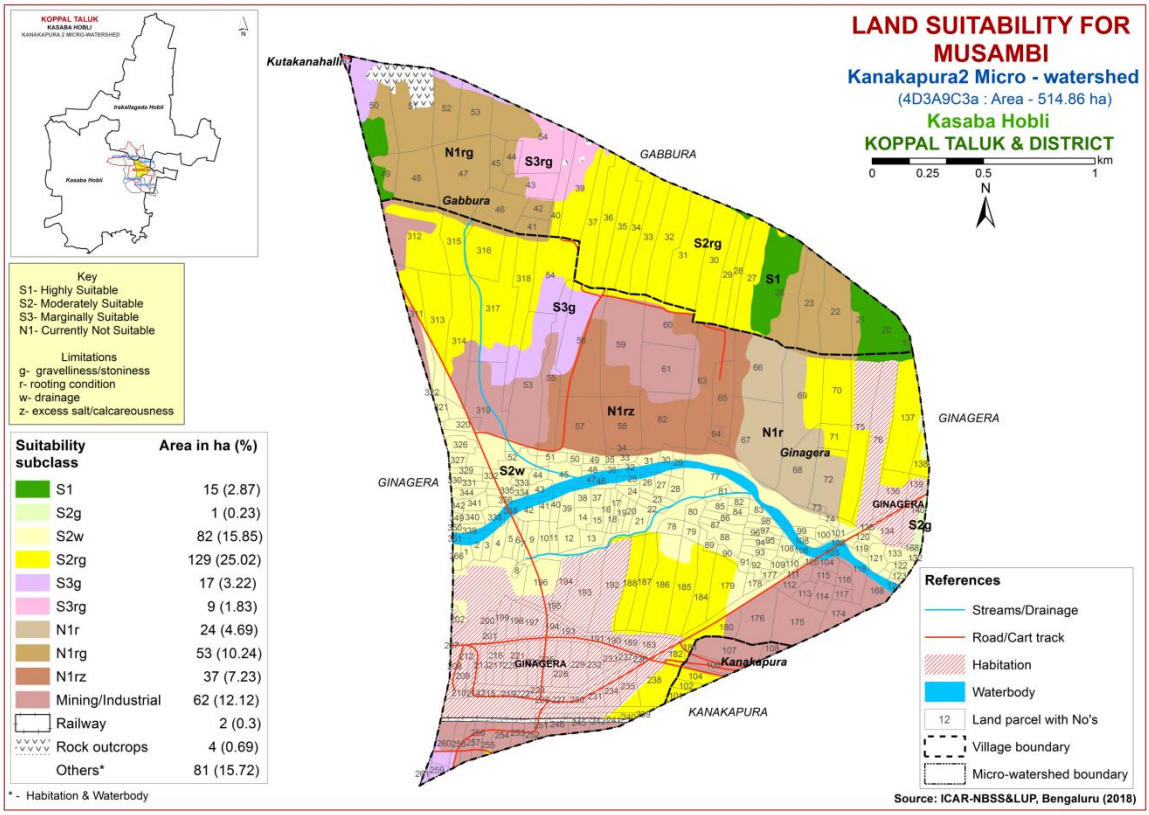


Fig. 7.19 Land Suitability map of Musambi

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.

Highly suitable (Class S1) lands for growing Lime occur in an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 212 ha (41%) is moderately suitable (Class S2) for Lime and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. An area of about 26 ha (5%) is marginally suitable lands (Class S3) for growing Lime and are distributed in the northern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Lime and are distributed in the northern, eastern, central and western part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

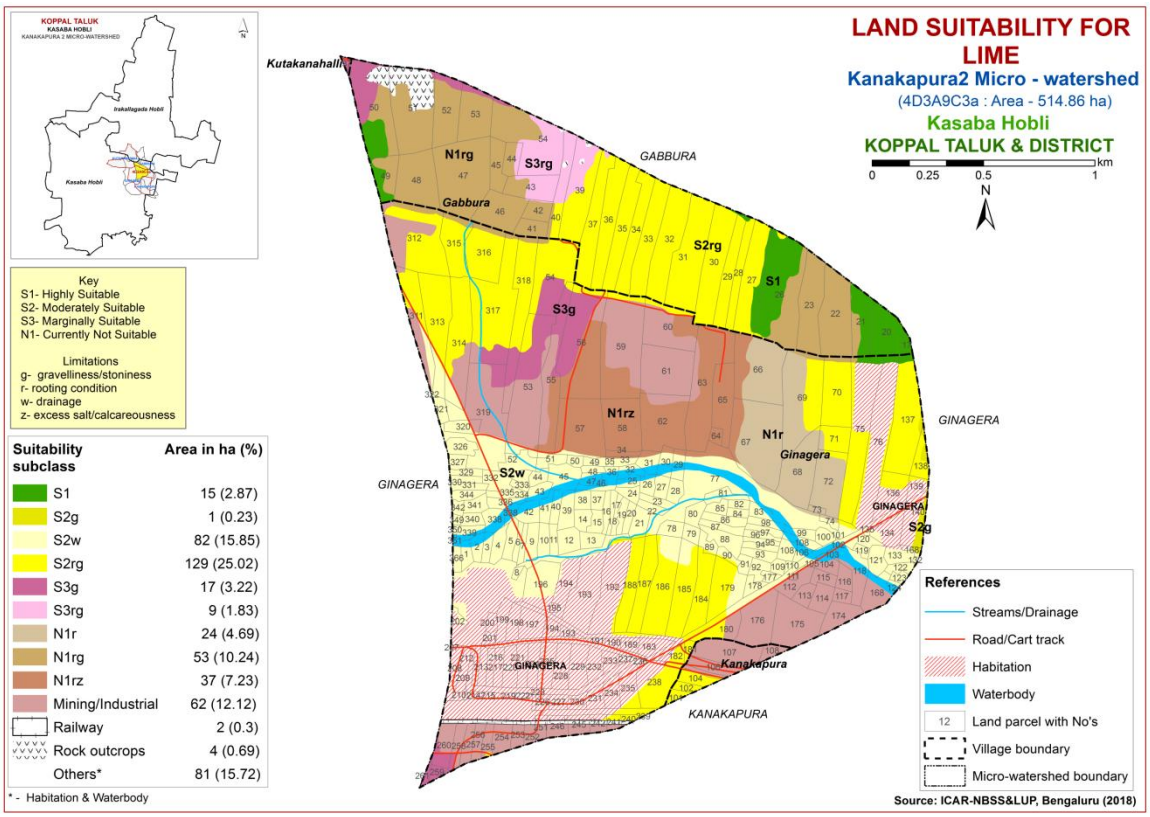


Fig. 7.20 Land Suitability map of Lime

7.21 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 7.22) 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 7.21.

An area of about 15 ha (3%) is highly suitable (Class S1) for growing Amla and are distributed in the northern and eastern part of the microwatershed. Moderately suitable (Class S2) lands cover a maximum area of about 238 ha (46%) and occur in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. An area of about 114 ha (22%) is marginally suitable lands (Class S3) for growing Amla and are distributed in the northern, western, central and eastern part of the microwatershed with major limitations of rooting depth, calcareousness and gravelliness.

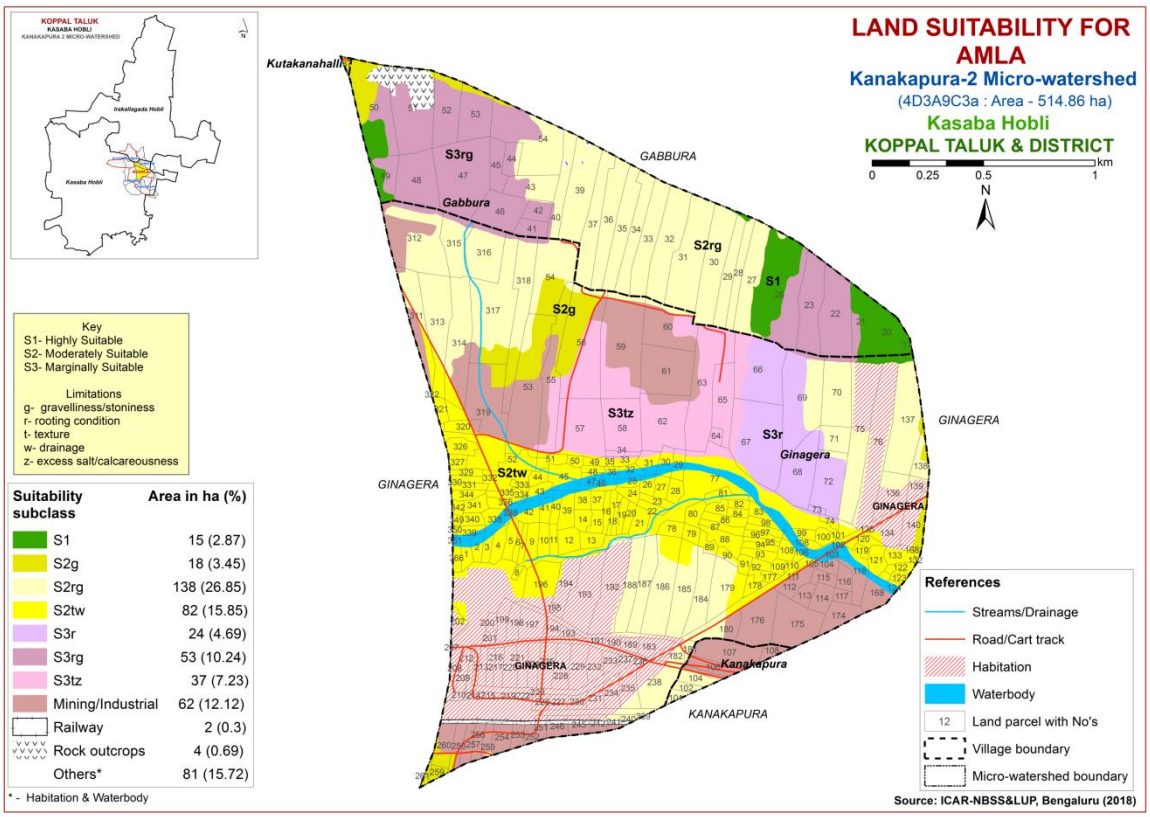


Fig. 7.21 Land Suitability map of Amla

7.22 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 7.23) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cashew was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.22.

Highly suitable (Class S1) lands occupy an area of about 6 ha (1%) and are distributed in the eastern part of the microwatershed. An area of about 139 ha (27%) is moderately suitable (Class S2) and occur in the northern, eastern and southern part of the microwatershed. They have minor limitations of gravelliness, texture and rooting depth. An area of about 26 ha (5%) is marginally suitable (Class S3) for growing cashew and are distributed in the northern part of the microwatershed with moderate limitations of gravelliness and rooting depth. Maximum area of about 196 ha (38%) is currently not suitable (Class N1) for growing cashew and distributed in all part of the microwatershed with severe limitations of texture, rooting depth, gravelliness and drainage.

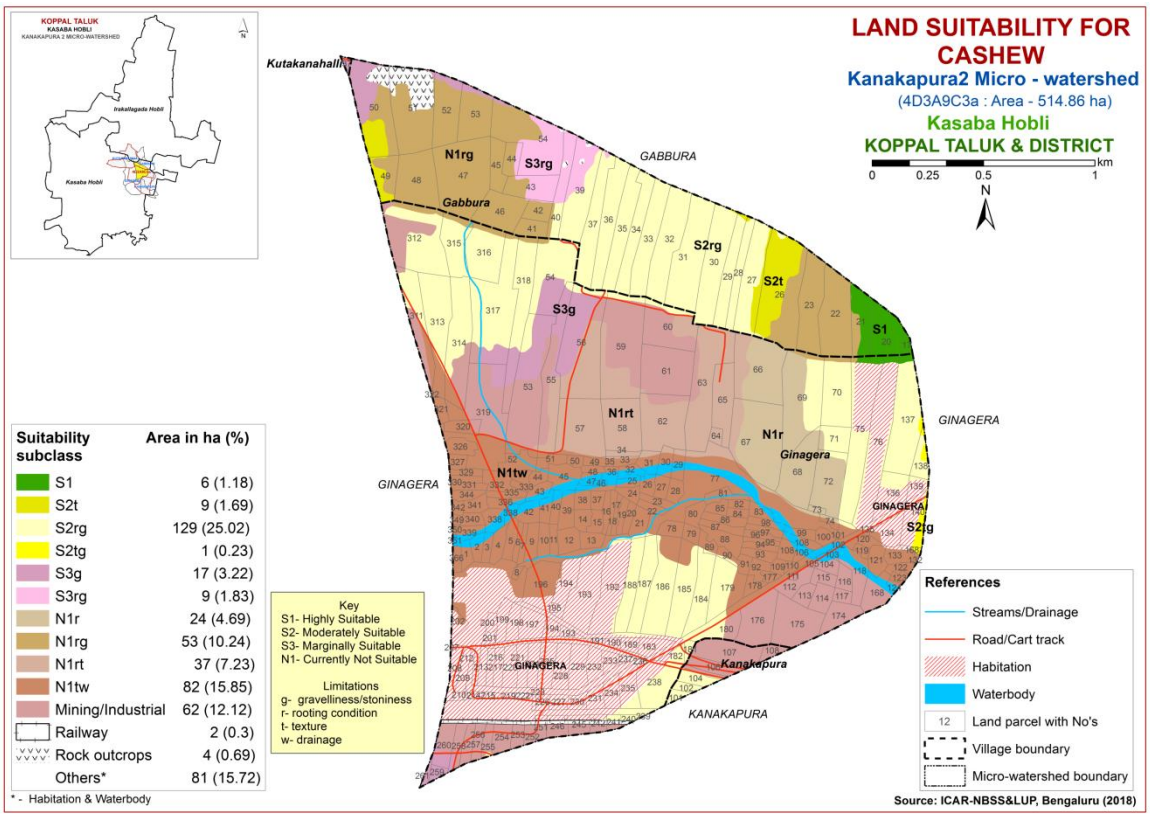


Fig. 7.22 Land Suitability map of Cashew

7.23 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.7.24) 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 7.23.

Highly suitable (Class S1) lands for growing Jackfruit in an area of about 15 ha (3%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 130 ha (25%) is moderately suitable (Class S2) for Jackfruit and are distributed in all part of the microwatershed. They have minor limitations of rooting depth and gravelliness. An area of about 108 ha (21%) is marginally suitable lands (Class S3) for growing Jackfruit and are distributed in the northern, western, central and eastern part of the microwatershed with major limitations of rooting depth, texture, drainage and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Jackfruit and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, texture and gravelliness.

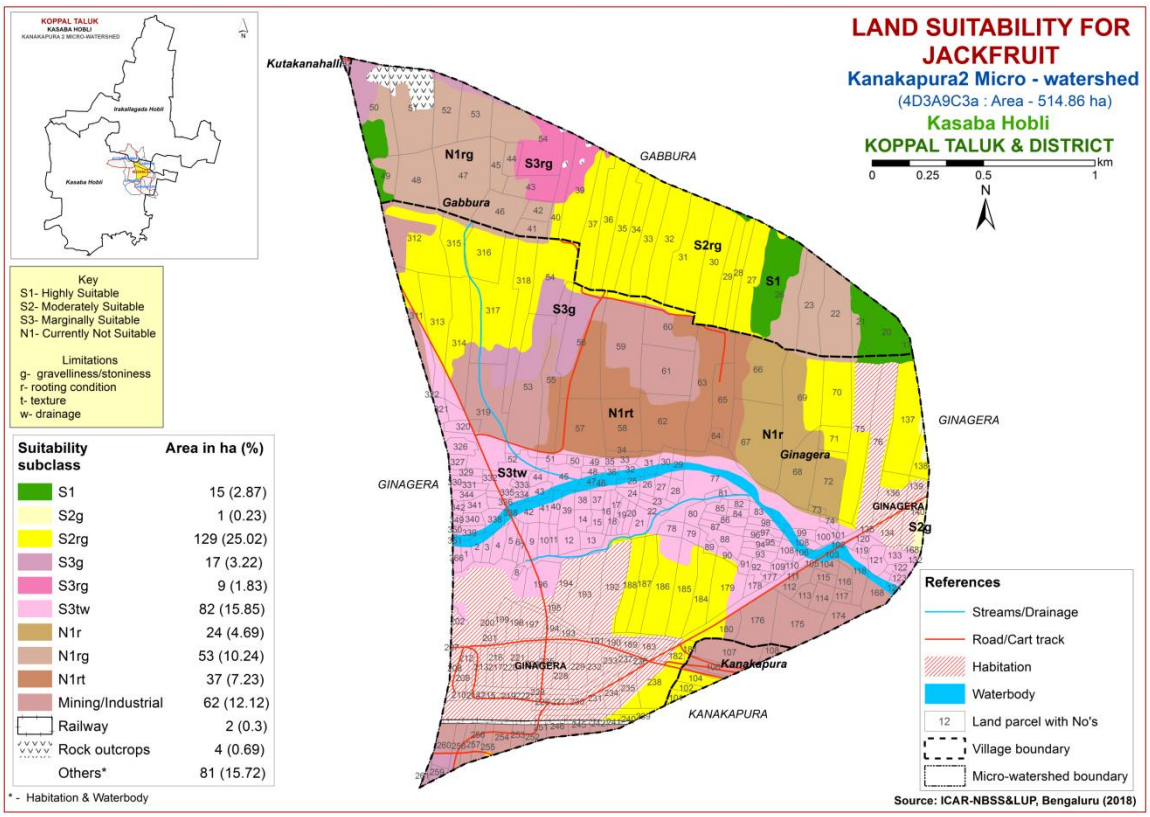


Fig. 7.23 Land Suitability map of Jackfruit

7.24 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the state. The crop requirements (Table 7.25) 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 7.24.

Highly suitable (Class S1) lands for growing Jamun occupy an area of about 9 ha (2%) and are distributed in the northern and eastern part of the microwatershed. Maximum area of about 218 ha (42%) is moderately suitable (Class S2) for Jamun and are distributed in all part of the microwatershed. They have minor limitations of rooting depth, texture, drainage and gravelliness. An area of about 26 ha (5%) is marginally suitable lands (Class S3) for growing Jamun and are distributed in the northern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Jamun and are distributed in the northern, western, central and eastern part of the microwatershed with severe limitations of rooting depth, texture and gravelliness.

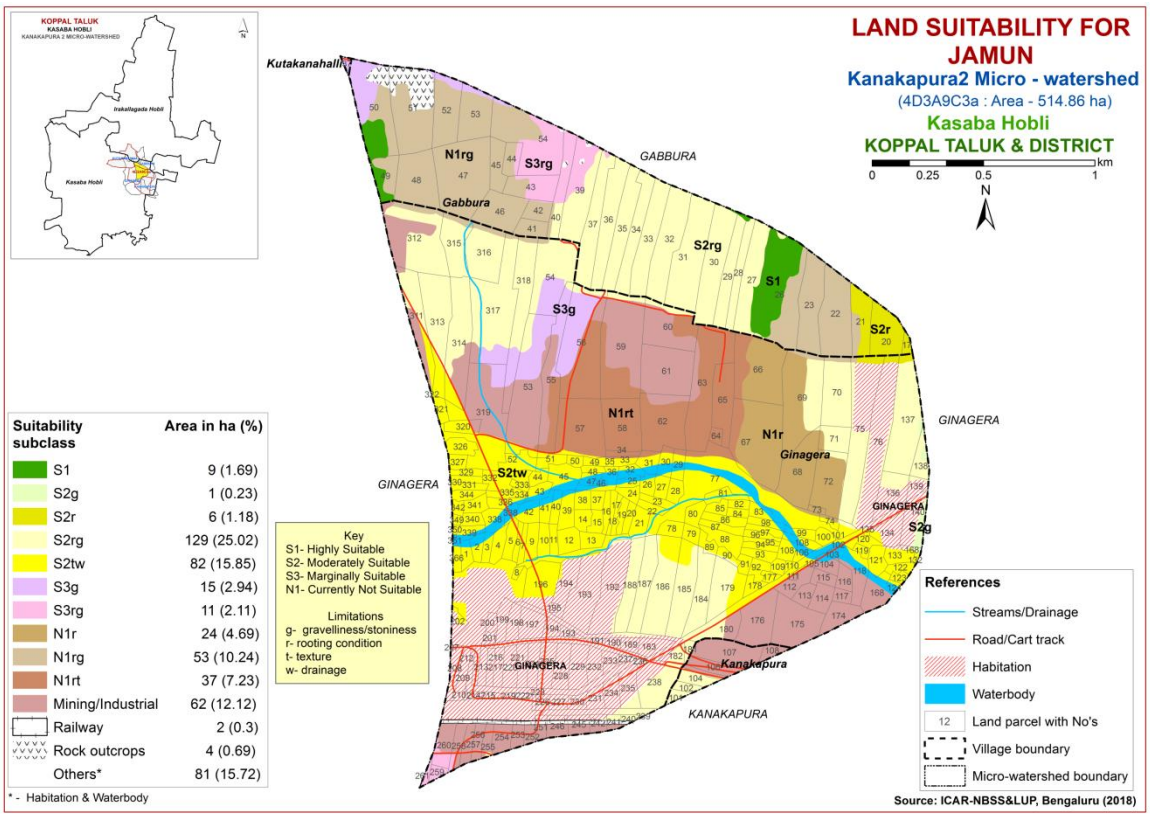


Fig. 7.24 Land Suitability map of Jamun

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

Custard apple is one of the most important fruit crop grown in 1426 ha in almost all the districts of the State. The crop requirements (Table 7.26) for growing custard apple were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing custard apple was generated .The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.25.

An area of about 15 ha (3%) is highly suitable (Class S1) for growing custard apple and are distributed in the northern and eastern part of the microwatershed. Moderately suitable (Class S2) lands cover a maximum area of about 238 ha (46%) and occur in all part of the microwatershed. They have minor limitations of rooting depth, gravelliness and drainage. An area of about 114 ha (22%) is marginally suitable lands (Class S3) for growing custard apple and are distributed in the northern, western, central and eastern part of the microwatershed with major limitations of rooting depth, calcareousness and gravelliness.

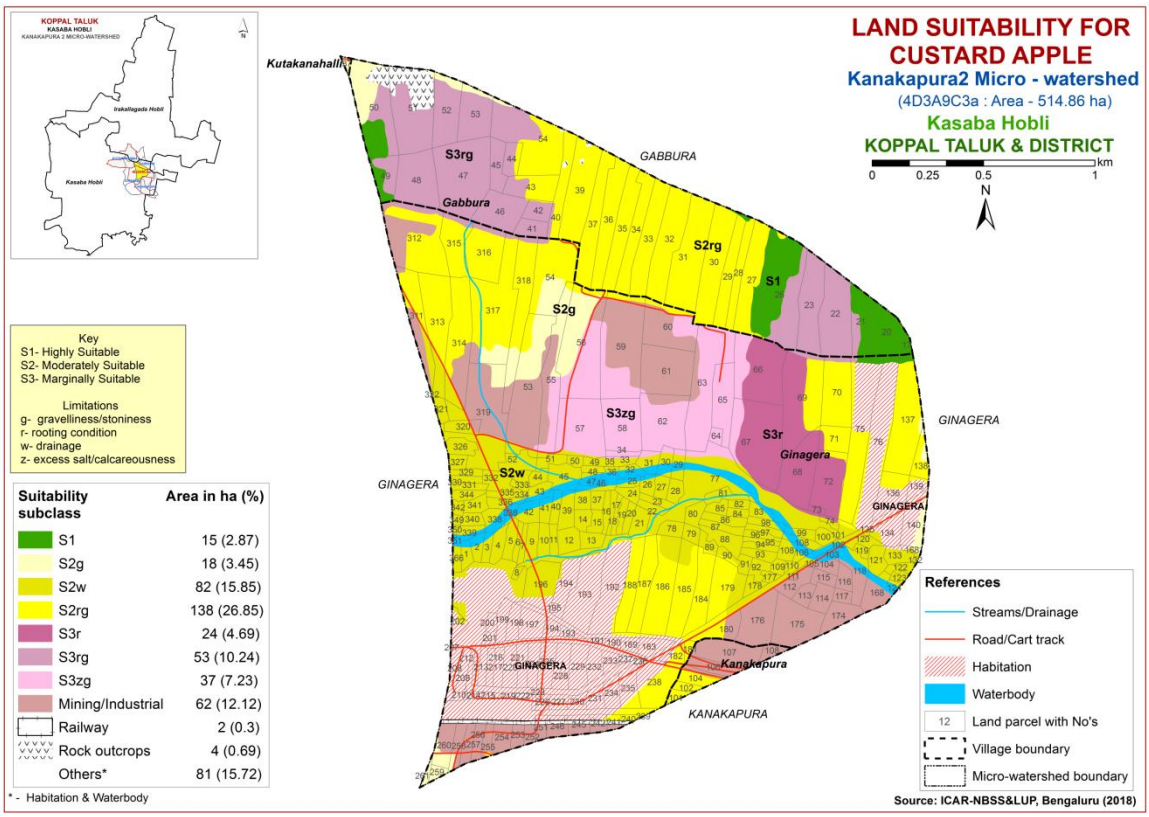


Fig. 7.25 Land Suitability map of Custard Apple

7.26 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 7.27) 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 7.26.

Highly suitable (Class S1) lands for growing Tamarind occupy an area of about 9 ha (2%) and are distributed in the northern and eastern part of the microwatershed. An area of about 100 ha (19%) is moderately suitable (Class S2) for Tamarind and are distributed in the western, eastern and central part of the microwatershed. They have minor limitations of rooting depth, texture, drainage and gravelliness. Maximum area of about 134 ha (26%) is marginally suitable lands (Class S3) for growing Tamarind and are distributed in all part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 124 ha (24%) is currently not suitable (Class N1) for growing Tamarind and are distributed in the northern, central and eastern part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

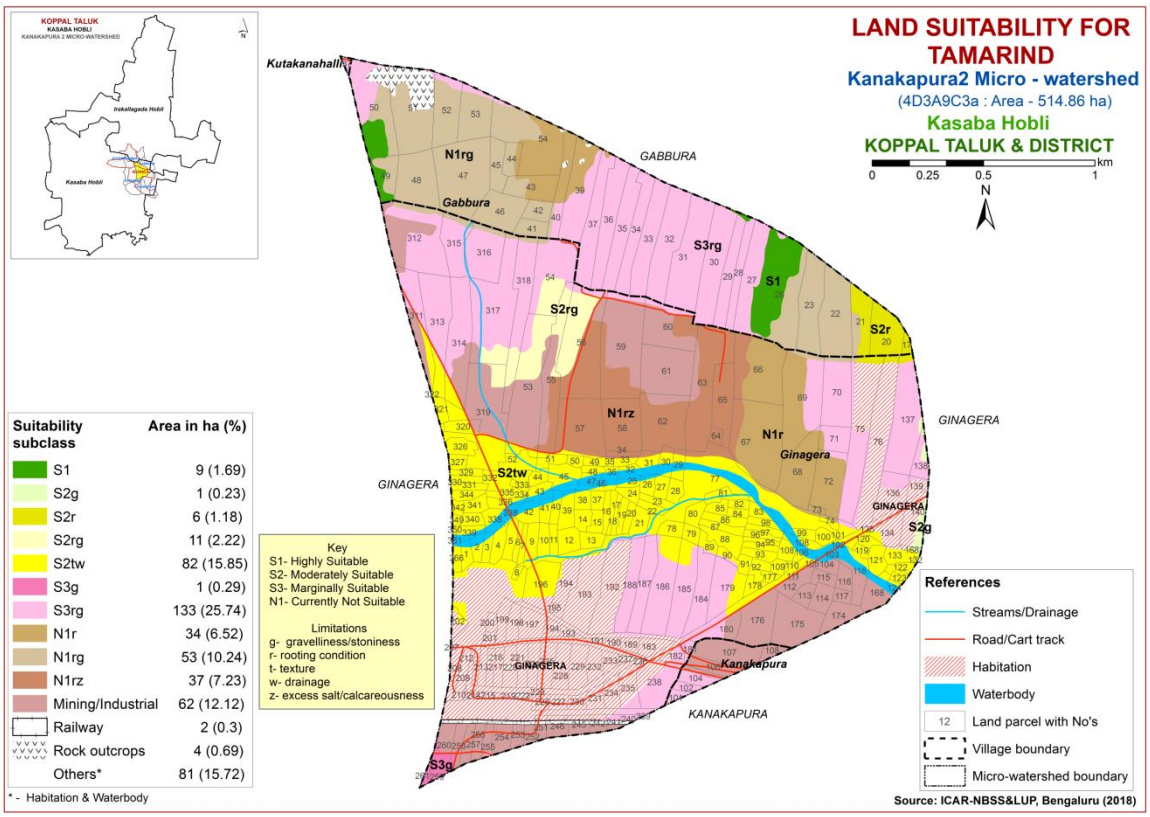


Fig. 7.26 Land Suitability map of Tamarind

7.27 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 7.28) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mulberry was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.27.

Highly suitable (Class S1) lands for growing Mulberry occupy an area of about 6 ha (1%) and are distributed in the eastern part of the microwatershed. Maximum area of about 238 ha (46%) is moderately suitable (Class S2) for Mulberry and are distributed in all part of the microwatershed. They have minor limitations of drainage, gravelliness and texture. An area of about 9 ha (2%) is marginally suitable lands (Class S3) for growing Mulberry and are distributed in the northern part of the microwatershed with major limitations of rooting depth and gravelliness. An area of about 114 ha (22%) is currently not suitable (Class N1) for growing Mulberry and are distributed in the northern, eastern, central and western part of the microwatershed with severe limitations of rooting depth, calcareousness and gravelliness.

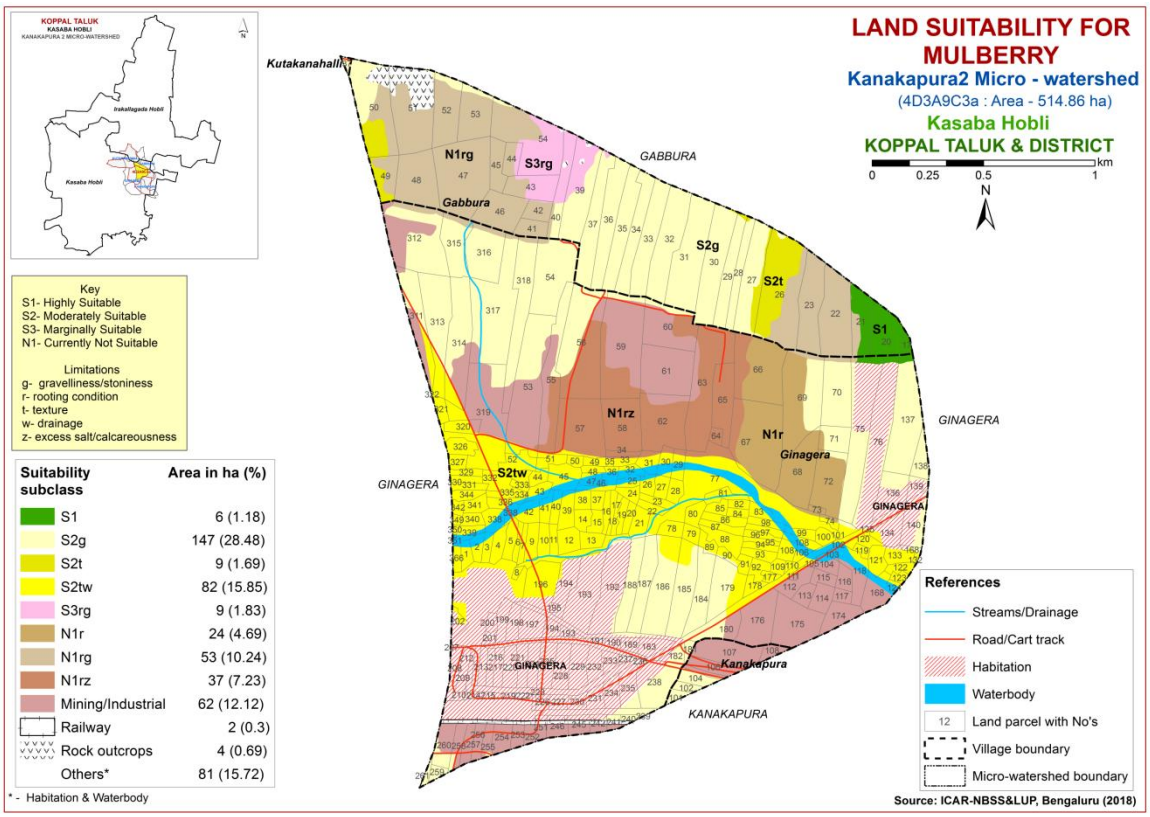


Fig. 7.27 Land Suitability map of Mulberry

7.28 Land Suitability for Marigold (*Tagetes erecta*)

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

An area of about 6 ha (1%) is highly suitable (Class S1) for growing Marigold and are distributed in the eastern part of the microwatershed. An area of about 92 ha (18%) is moderately suitable (Class S2) and occur in the northern, western, central and eastern part of the microwatershed. They have minor limitations of gravelliness, texture and drainage. Maximum area of about 269 ha (52%) is marginally suitable (Class S3) for growing Marigold and are distributed in the major part of the microwatershed with moderate limitations of gravelliness, rooting depth and calcareousness.

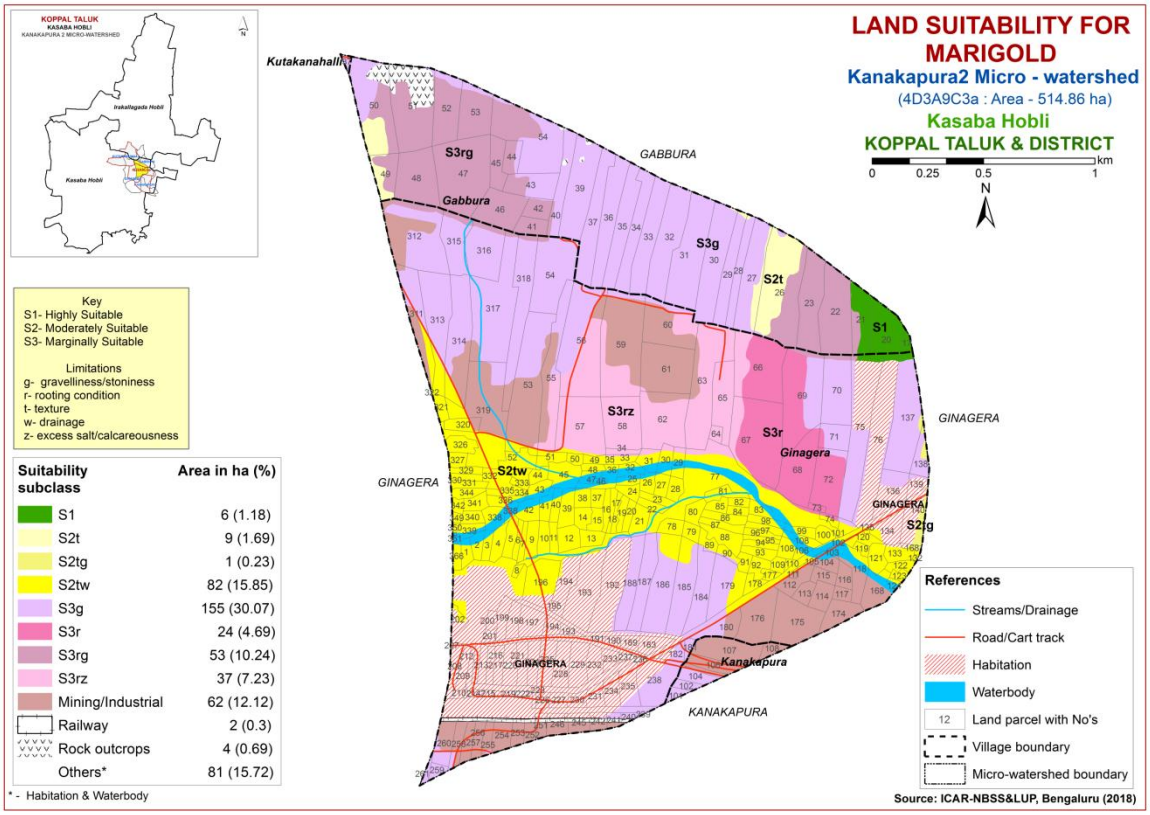


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Chrysanthemum indicum*)

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

An area of about 6 ha (1%) is highly suitable (Class S1) for growing Chrysanthemum and are distributed in the eastern part of the microwatershed. An area of about 92 ha (18%) is moderately suitable (Class S2) and occur in the northern, western, central and eastern part of the microwatershed. They have minor limitations of gravelliness, texture and drainage. Maximum area of about 269 ha (52%) is marginally suitable (Class S3) for growing Chrysanthemum and are distributed in the major part of the microwatershed with moderate limitations of gravelliness, rooting depth and calcareousness.

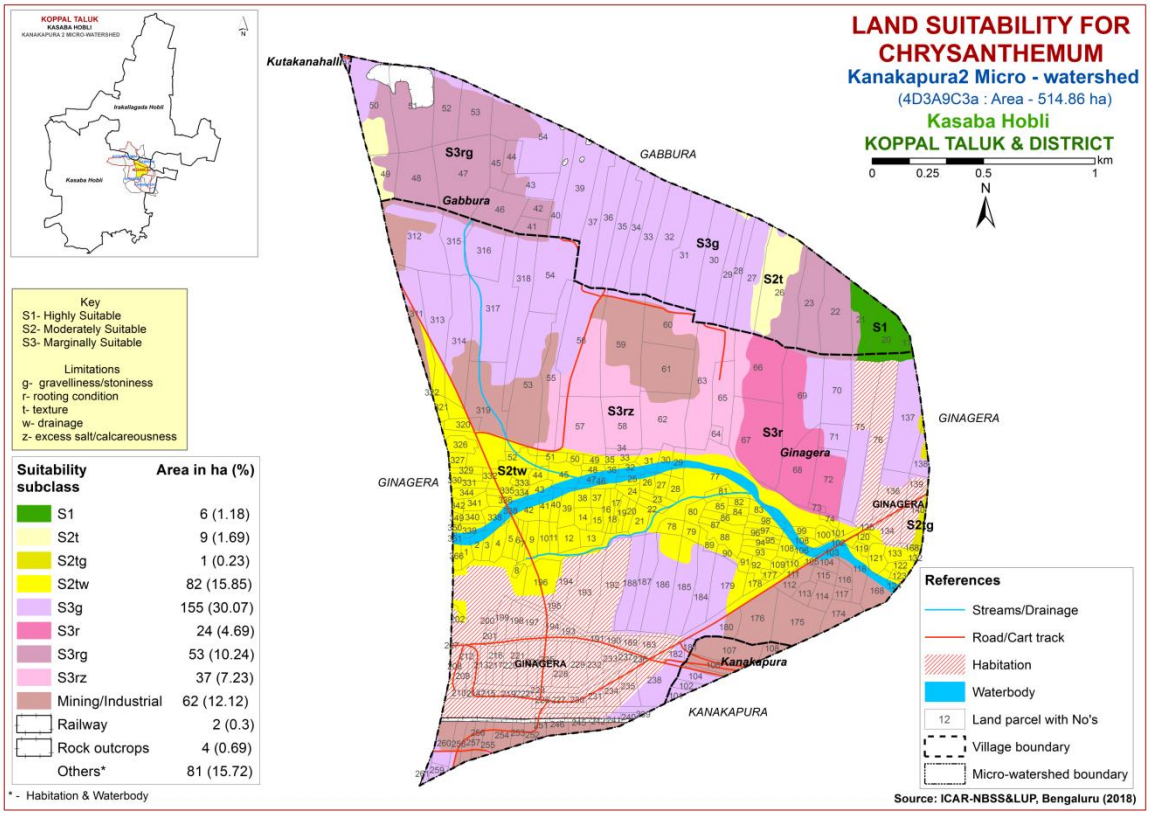


Fig. 7.29 Land Suitability map of Chrysanthemum

7. 30 Land Suitability for Jasmine *(Jasminum sp.)*

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

An area of about 6 ha (1%) is highly suitable (Class S1) for growing Jasmine and are distributed in the eastern part of the microwatershed. An area of about 10 ha (2%) is moderately suitable (Class S2) and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness and texture. Marginally suitable (Class S3) lands occupy a maximum area of about 351 ha (68%) and are distributed in all part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness, drainage and gravelliness.

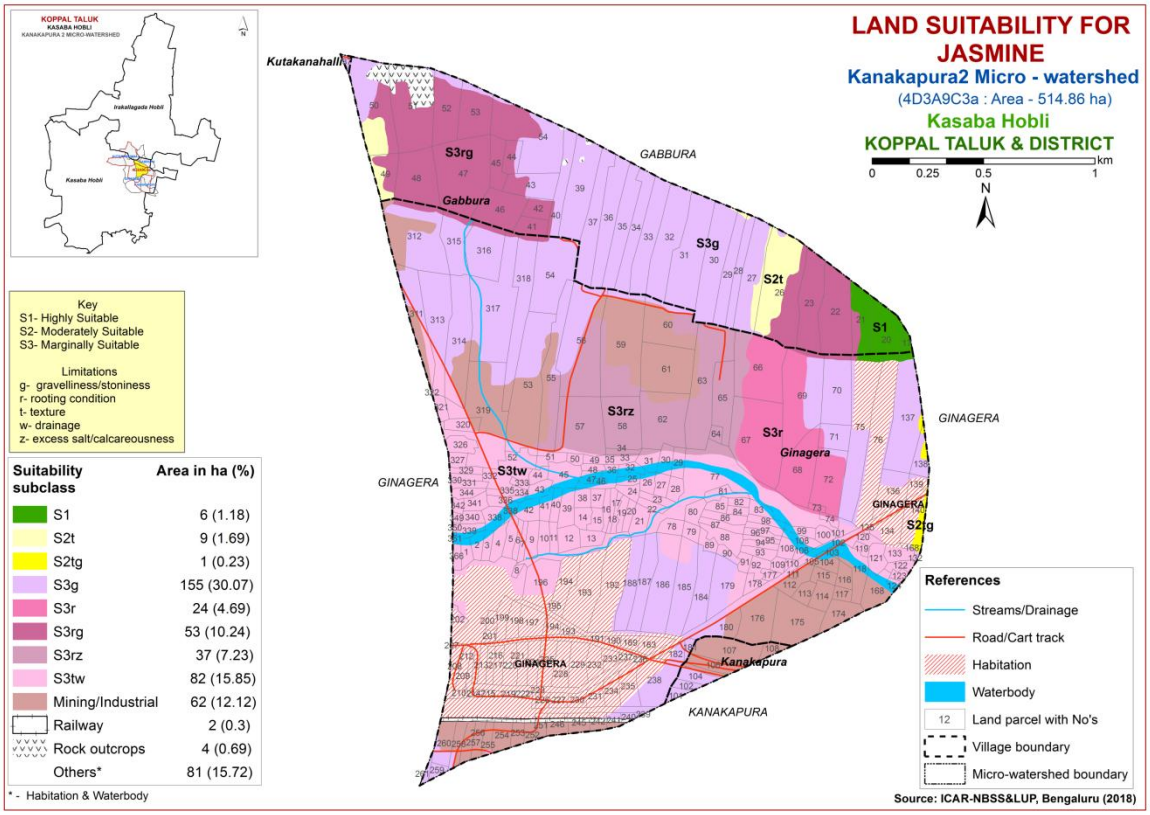


Fig. 7.30 Land Suitability map of Jasmine

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

Crossandra is one of the most important flower crop grown in almost all the districts of the State (Table 7.32). Land suitability map for growing crossandra was generated (Table 7.1). The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.31.

An area of about 15 ha (3%) is highly suitable (Class S1) for growing Crossandra and are distributed in the northern and eastern part of the microwatershed. An area of about 1 ha (<1%) is moderately suitable (Class S2) and have minor limitation of gravelliness. Maximum area of about 351 ha (68%) is marginally suitable (Class S3) for growing Crossandra and are distributed in the major part of the microwatershed with moderate limitations of gravelliness, rooting depth, drainage and calcareousness.

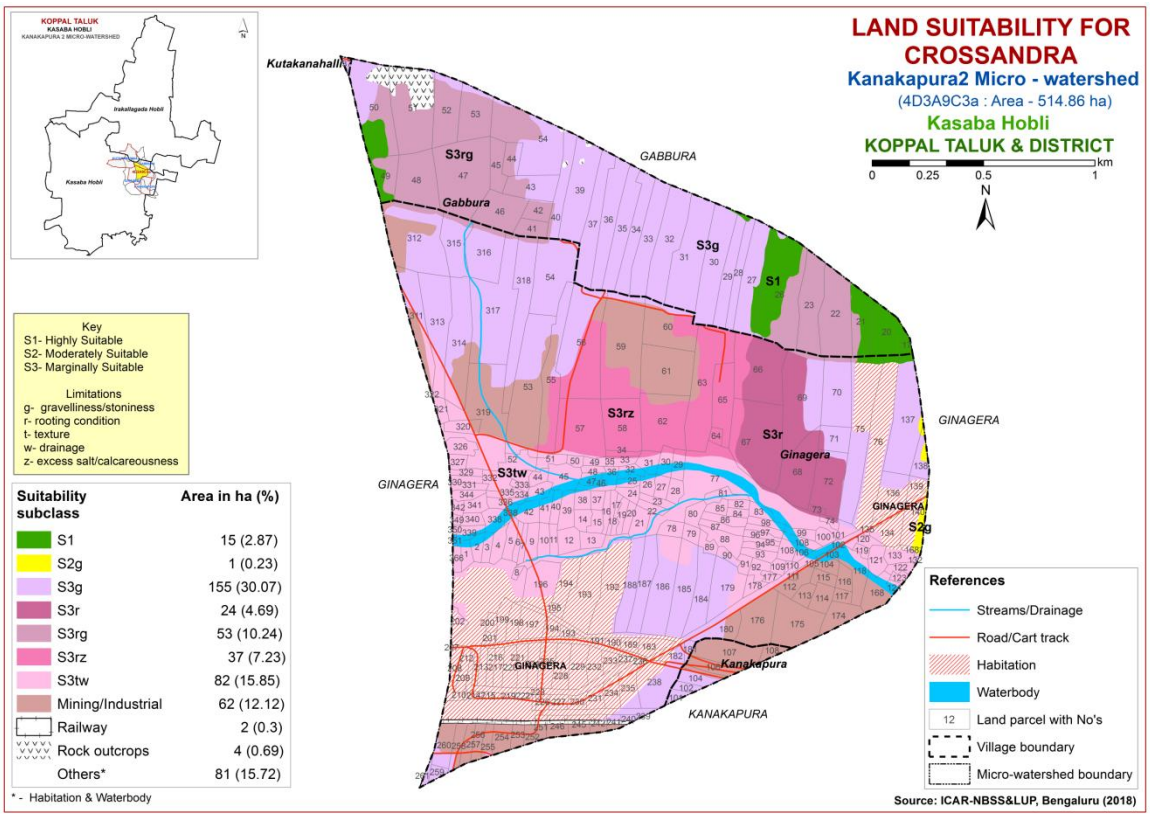


Fig. 7.31 Land Suitability map of Crossandra

Table 7.1 Soil-Site Characteristics of Kanakapura-2 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								
HRVcB2g1	662	<90	WD	25-50	sl	gscl	15-35	>35	<50	1-3	moderate	6.05	0.21	0.73	11.24	100
HRVhB2g1	662	<90	WD	25-50	scl	gscl	15-35	>35	<50	1-3	moderate	6.05	0.21	0.73	11.24	100
HRVhB2g2	662	<90	WD	25-50	scl	gscl	35-60	>35	<50	1-3	moderate	6.05	0.21	0.73	11.24	100
CSRcB2g1	662	<90	WD	25-50	sl	scl	15-35	<15	51-100	1-3	moderate	-	-	-	-	-
MKHcB2g2	662	<90	WD	50-75	sl	gsc	35-60	>35	<50	1-3	moderate	7.38	0.09	1.49	14.84	93
HDHcB1g1	662	<90	WD	75-100	sl	gsc-gc	15-35	>35	51-100	1-3	slight	6.54	0.07	7.11	3.84	84.70
HDHcB2g1	662	<90	WD	75-100	sl	gsc-gc	15-35	>35	51-100	1-3	moderate	6.54	0.07	7.11	3.84	84.70
HDHcB2g2	662	<90	WD	75-100	sl	gsc-gc	35-60	>35	51-100	1-3	moderate	6.54	0.07	7.11	3.84	84.70
HDHhB1	662	<90	WD	75-100	scl	gsc-gc	<15	>35	51-100	1-3	slight	6.54	0.07	7.11	3.84	84.70
KMHiB2	662	<90	WD	100-150	sc	sc	<15	<15	101-150	1-3	moderate	7.20	0.20	0.54	15.07	100
BPRcB2	662	<90	WD	100-150	sl	gsc-gc	<15	>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	<15	>35	51-100	1-3	moderate	6.64	0.03	0.51	5.45	63.48
BPRhB2g1	662	<90	WD	100-150	scl	gsc-gc	15-35	>35	51-100	1-3	moderate	6.64	0.03	0.51	5.45	63.48
NGPhB1	662	<90	WD	100-150	scl	gsc	<15	>35	51-100	1-3	slight	6.77	0.09	0.46	7.10	82.70
HLKhB2	662	<90	WD	>150	scl	c	<15	<15	151-200	1-3	moderate	-	-	-	-	-
NDLiB1	662	<90	WD	>150	sc	gsc	<15	>35	51-100	1-3	slight	7.46	0.08	0.32	11.45	92
TSDiA1	662	<90	MWD	>150	sc	c	<15	<15	>200	0-1	slight	8.46	0.17	0.19	36.61	100
TSDiB1	662	<90	MWD	>150	sc	c	<15	<15	>200	1-3	slight	8.46	0.17	0.19	36.61	100
TSDmA1	662	<90	MWD	>150	c	c	<15	<15	>200	0-1	slight	8.46	0.17	0.19	36.61	100
MTLbB2g2	662	<90	WD	25-50	ls	gc	35-60	15-35	51-100	1-3	moderate	8.27	0.20	0.69	36.64	-
MTLcB2g1	662	<90	WD	25-50	sl	gc	15-35	15-35	51-100	1-3	moderate	8.27	0.20	0.69	36.64	-

Table 7.2 Land suitability criteria for Sorghum

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

Table 7.3 Land suitability criteria for Maize

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

Table 7.4 Land suitability criteria for Bajra

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

Table 7.5 Land suitability criteria for Groundnut

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

Table 7.6 Land suitability criteria for Sunflower

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

Table 7.7 Land suitability criteria for Redgram

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

Table 7.8 Land suitability criteria for Bengal gram

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

Table 7.9 Land suitability criteria for Cotton

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

Table 7.10 Land suitability criteria for Chilli

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

Table 7.11 Land suitability criteria for Tomato

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

Table 7.12 Land suitability criteria for Brinjal

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

Table 7.13 Land suitability criteria for Onion

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	20-30	30-35	35-40	>40
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately /imperfectly	-	Poorly to V poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sl,scl,cl,sc,c (red)	-	c (Black),ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-7.8	7.8-8.4	>8.4
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	ds/m	<1.0	1.0-2.0	2.0-4.0	<4
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.14 Land suitability criteria for Bhendi

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

Table 7.15 Land suitability criteria for Drumstick

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

Table 7.16 Land suitability criteria for Mango

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

Table 7.17 Land suitability criteria for Guava

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	28-32	33-36 24-27	37-42 20-23	
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	sl	c (black), ls	-
	pH	1:2.5	6.0-7.8	5.0-6.0	7.8-8.4	>8.4
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	<3	3-5	5-10	>10

Table 7.18 Land suitability criteria for Sapota

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

Table 7.19 Land suitability criteria for Pomegranate

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

Table 7.20 Land suitability criteria for Musambi

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

Table 7.21 Land suitability criteria for Lime

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

Table 7.22 Land suitability criteria for Amla

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. well drained	Poorly drained	V. Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	c (black)	ls, sl	-
	pH	1:2.5	5.5-7.3	5.0-5.5 7.3-7.8	7.8-8.4	>8.4
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15-35	35-60	60-80	-
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.23 Land suitability criteria for Cashew

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

Table 7.24 Land suitability criteria for Jackfruit

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod. well	Poorly	V. Poorly
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	-	sl, ls, c (black)	-
	pH	1:2.5	5.5-7.3	5.0-5.5 7.3-7.8	7.8-8.4	>8.4
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>100	75-100	50-75	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	>60
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10-

Table 7.25 Land suitability criteria for Jamun

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well	Mod. well	Poorly	V.Poorly
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl, sc, c(red)	sl, c (black)	ls	-
	pH	1:2.5	6.0-7.8	5.0-6.0	7.8-8.4	>8.4
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>150	100-150	50-100	<50
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	>60
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2.0	2-4	4-8	>8.0
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.26 Land suitability criteria for Custard apple

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

Table 7.27 Land suitability criteria for Tamarind

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C				
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Mod.well drained	Poorly drained	V.Poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	scl, cl,sc, c (red)	sl, c (black)	ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0 7.3-7.8	7.8-8.4	>8.4
	CEC	C mol (p+)/ Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	>10
	OC	%				
Rooting conditions	Effective soil depth	cm	>150	100-150	75-100	<75
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	ds/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	<5	5-10	10-15	>15
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.28 Land suitability criteria for Mulberry

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

Table 7.29 Land suitability criteria for Marigold

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

Table 7.30 Land suitability criteria for Chrysanthemum

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

Table 7.31 Land suitability criteria for Jasmine (irrigated)

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

7.32 Land suitability criteria for Crossandra

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

7.32 Land Management Units (LMUs)

The 21 soil map units identified in Kanakapura-2 microwatershed have been grouped into 6 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.7.31) 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 6 Land Management Units along with brief description of soil and site characteristics are given below.

LMU	Mapping unit	Soil and site characteristics
1	444.TSDiA1 445.TSDiB1 446.TSDmA1	Very deep (>150 cm), lowland clay soils, slope (0-3%), slight erosion
2	270.HLKhB2 201.KMHiB2	Deep to very deep (100 to >150 cm), red sandy clay loam to clay soils, slope (1-3%), moderate erosion
3	298.NDLiB1 224.BPRcB2 230.BPRhB2 231.BPRhB2g1 257.NGPhB1 109.HDHcB1g1 111.HDHcB2g1 112.HDHcB2g2 119.HDHhB1	Moderately deep to very deep (75->150 cm), red gravelly sandy clay loam to sandy loam soils, slope (1-3%), slight to moderate erosion, gravelly to very gravelly (15-60%)
4	78.MKHcB2g2	Moderately shallow (50-75 cm), red gravelly clay soils, slope (1-3%), moderate erosion, very gravelly (35-60%)
5	36.CSRcB2g1 465.HRVcB2g1 26.HRVhB2g1 27.HRVhB2g2	Shallow (25-50 cm), gravelly red loamy soils, slope (1-3%), moderate erosion, gravelly to very gravelly (15-60%)
6	301.MTLbB2g2 302.MTLcB2g1	Shallow (25-50 cm), black calcareous clayey soils, slope (1-3%), moderate erosion, gravelly to very gravelly (15-60%)

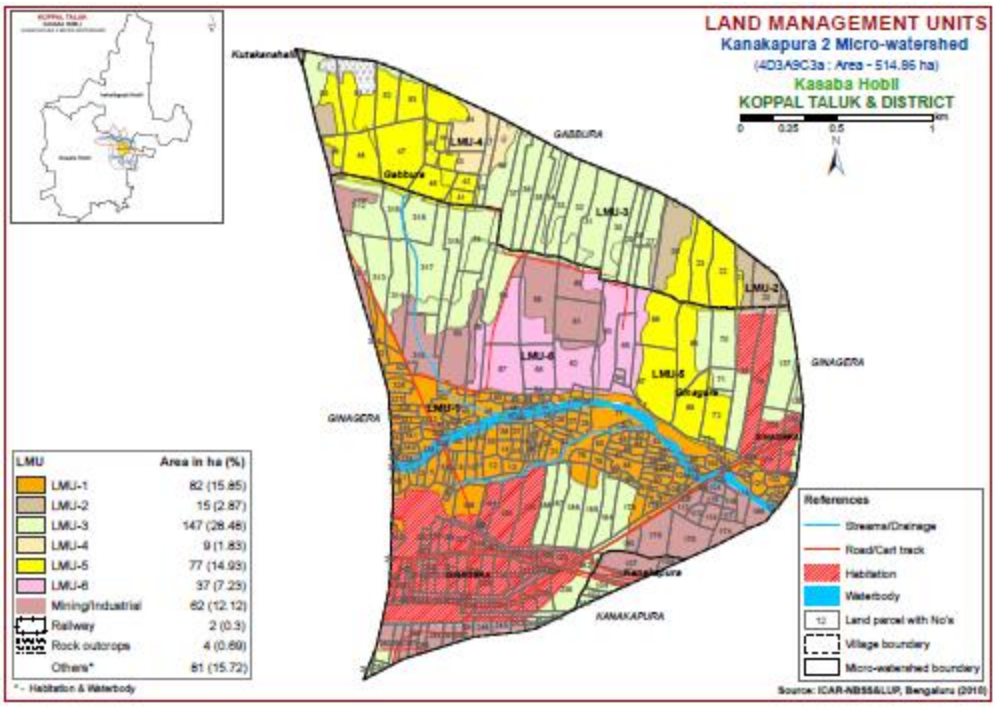


Fig 7.32 Land Management Units map of Kanakapura-2 microwatershed

7.33 Proposed Crop Plan for Kanakapura-2 Microwatershed

After assessing the land suitability for the 31 crops, the proposed crop plan has been prepared for the 6 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 31 crops. The resultant proposed crop plan is presented in Table 7.33.

Table 7.33 Proposed Crop Plan for Kanakapura-2 Microwatershed

LMU	Soil Map Units	Survey Number	Soil and site characteristics	Field Crops	Horticulture Crops	Suitable Interventions
1	444.TSDiA1 445.TSDiB1 446.TSDmA1	**Ginagera:**1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,26,27,28,29,31,35,37,38,39,40,41,42,43,44,45,48,49,50,51,52,74,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,108,109,110,119,120,121,122,123,132,133,135,177,178,196,320,321,322,326,327,329,33,330,331,332,333,334,335,336,339,340,341,342,344,349, 350,366	Very deep (>150 cm), lowland clay soils, slope (0-3%), slight erosion	Paddy, Maize, Sugarcane	**Fruit crops:** Amla Custard Apple, **Vegetable crops:** Brinjal, Tomato, Chillies, Drumstick, Bhendi, Coriander, leafy vegetables **Flower crops:** Marigold, Jasmine Chrysanthemum,	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practises
2	270.HLKhB2 201.KMHiB2	**Gabbura :** 17,20,21,26	Deep to very deep (100 to >150 cm), red sandy clay loam to clay soils, slope (1-3%), moderate erosion	Maize, Sorghum, Sunflower, Bajra, Finger millet, Groundnut, Red gram, Cowpea, Field bean, Castor	**Fruit crops:** Pomegranate, Guava, Sapota, Jackfruit, Tamarind, Lime, Musambi, Amla, Custard apple **Vegetable crops:** Drumstick, Tomato, Chilli, Brinjal, Onion, Curry leaves **Flower crops:** Marigold, Chrysanthemum, Jasmine	Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc)
3	298.NDLiB1	**Gabbura:**27,28,29,30,31,32,	Moderately deep to	Sorghum,	**Fruit crops:** Musambi,	Drip irrigation,

LMU	Soil Map Units	Survey Number	Soil and site characteristics	Field Crops	Horticulture Crops	Suitable Interventions
	224.BPRcB2 230.BPRhB2 231.BPRhB2g1 257.NGPhB1 109.HDHcB1g1 111.HDHcB2g1 112.HDHcB2g2 119.HDHhB1	33,34,35,36,37,39,50 **Ginagera:**54,70,71,75,137,138,179,181,182,184,185,186,187,188,238,239,240,241,259,261,311,312,313,314,315,316,317,318, **Kanakapura:** 101,102,104 **Kutakanahalli:** 37	very deep (75->150 cm), red gravelly sandy clay loam to sandy loam soils, slope (1-3%), slight to moderate erosion, gravelly to very gravelly (15-60%)	Groundnut, Red gram, Bajra, Horse gram, Castor	Lime, Jamun, Jackfruit Amla, Custard apple, Tamarind Vegetable crops: Drumstick, Curry leaves	mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc)
4	78.MKHcB2g2	**Gabbura :** 40,43,54	Moderately shallow (50-75 cm), red gravelly loamy soils, slope (1-3%), moderate erosion, very gravelly (35-60%)	Sorghum, Groundnut, Bajra, Castor	**Fruit crops:** Lime, Musambi, Amla, Cashew, Custard apple	Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc)
5	36.CSRcB2g1 465.HRVcB2g1 26.HRVhB2g1 27.HRVhB2g2	**Gabbura:** 22,23,41,42,44,45,46,47,48,49,52, 53 **Ginagera:** 66,67,68,69,72, 73	Shallow (25-50 cm), gravelly red loamy soils, slope (1-3%), moderate erosion, gravelly to very gravelly (15-60%)	Green gram, Black gram, Horse gram	**Agri-Silvi-Pasture:** Custard apple, Amla, Hybrid Napier, *Styloxanthes hamata, Glyricidia, Styloxanthes scabra*	Use of short duration varieties, sowing across the slope and split application of nitrogen fertilizers
6	301.MTLbB2g2 302.MTLcB2g1	**Ginagera:** 34,56,57,58,62, 63,64,65	Shallow (25-50 cm), black calcareous clayey soils, slope (1-3%), moderate erosion, gravelly to very gravelly (15-60%)	Bengal gram	**Agri-Silvi-Pasture:** *Hybrid Napier, Styloxanthes hamata, Styloxanthes scabra*	Sowing across the slope, drip irrigation and mulching is recommended

Chapter 8

SOIL HEALTH MANAGEMENT

8.1 Soil Health

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

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

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

The most important characteristics of a healthy soil are

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

Characteristics of Kanakapura-2 Microwatershed

- The soil phases with sizeable area identified in the microwatershed belonged to the soil series of HDH 129 ha (25%), TSD 82 ha (16%), HRV 53 ha (10%), MTL 38 ha (7%), CSR 24 ha (5%), BPR 15 ha (3%), MKH 9 ha (2%), HLK 9 ha (2%), KMH 6 ha (1%), NGP 1 ha (<1%) and NDL 1 ha (<1%).
- 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, wetness and erosion.

- On the basis of soil reaction, an area of about 68 ha (13%) is neutral (pH 6.5-7.3), 118 ha (23%) is slightly alkaline (pH 7.3-7.8), 115 ha (22%) is moderately alkaline (pH 7.8-8.4), 60 ha (12%) is strongly alkaline (pH 8.4-9.0) and 6 ha (1%) is very strongly alkaline (pH > 9.0) 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.

Neutral soils

About 68 ha (13%) is under neutral soils.

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

Alkaline soils

About 299 ha (58%) is under alkaline soils (slightly to very 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, Azatobacter, Rhizobium).
3. Application of 25% extra N and P (125 % RDN&P).
4. Application of $ZnSO_4$ – 12.5 kg/ha (once in three years).
5. Application of Boron – 5kg/ha (once in three years).

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

Soil Degradation

Soil erosion is one of the major factors affecting the soil health in the microwatershed. An area of about 150 ha (29%) is under slightly erosion and 216 ha (42%) is under moderate erosion. The areas with slight and 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 Kanakapura-2 Microwatershed.
- **Organic Carbon:** An area of about 33 ha (6%) is low (<0.5%), 50 ha (10%) is medium (0.5-0.75%) and 284 ha (55%) 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 83 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 108 ha (21%) and high (>57 kg/ha) in 258 ha (50%) area of the microwatershed. The areas with low and medium phosphorus content additional 25% phosphorus from the RDF.
- **Available Potassium:** Available potassium is low (<145 kg/ha) in 52 ha (10%), medium (145-337 kg/ha) in 164 ha (32%) and high in 150 ha (29%) area of the microwatershed. The areas with high potassium content reduce 25% from the RDF to avoid the excess application of fertilizer and apply additional 25% potassium in areas where it is low and medium.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops. Available sulphur is medium (10-20 ppm) in 150 ha (29%) area of the microwatershed and high (>20 ppm) in 217 ha (42%) area of the microwatershed. Areas with low in available sulphur need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertitilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Iron:** Available iron is deficient (<4.5 ppm) in 10 ha (2%) and sufficient (>4.5 ppm) in 357 ha (69%) area of the microwatershed.
- **Available Zinc:** It is deficient (<0.6 ppm) in 70 ha (14%) and sufficient (>0.6 ppm) in 296 ha (57%) area of the microwatershed. Application of zinc sulphate @ 25 kg/ha is to be followed in areas that are deficient in available zinc.
- **Available Boron:** Available boron is low in (<0.5ppm) 308 ha (60%), medium (0.5-1.0 ppm) in 58 ha (11%) and high (>1.0 ppm) in <1 ha (<1%) area in the microwatershed. The areas with low and medium in boron content need to be applied with sodium borate @ 10kg/ha as 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 Alkalinity:** An area of about 299 ha (58%) in the microwatershed has soils that are slightly 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.

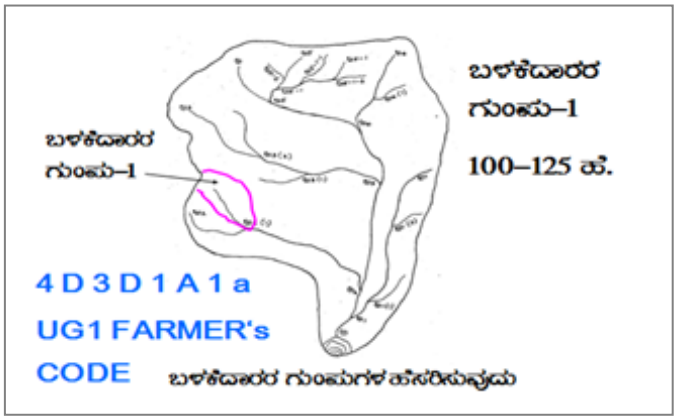
Land Suitability for various crops: Areas that are highly, moderately and marginally suitable and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, 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 Kanakapura-2 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 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.

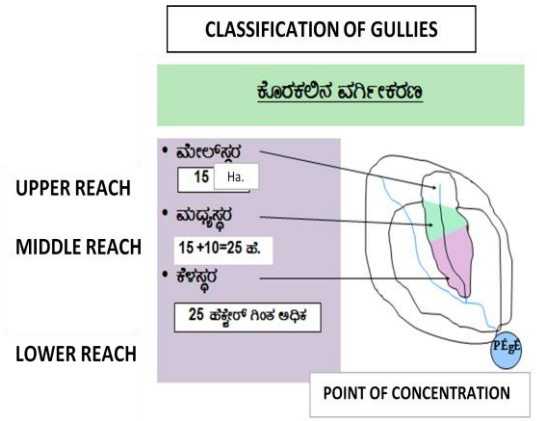
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge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

9.1 Treatment Plan

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

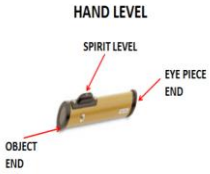
9.1.1 Arable Land Treatment

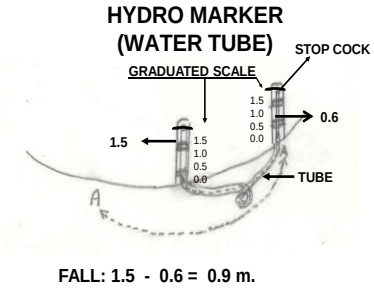
A. BUNDING

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.

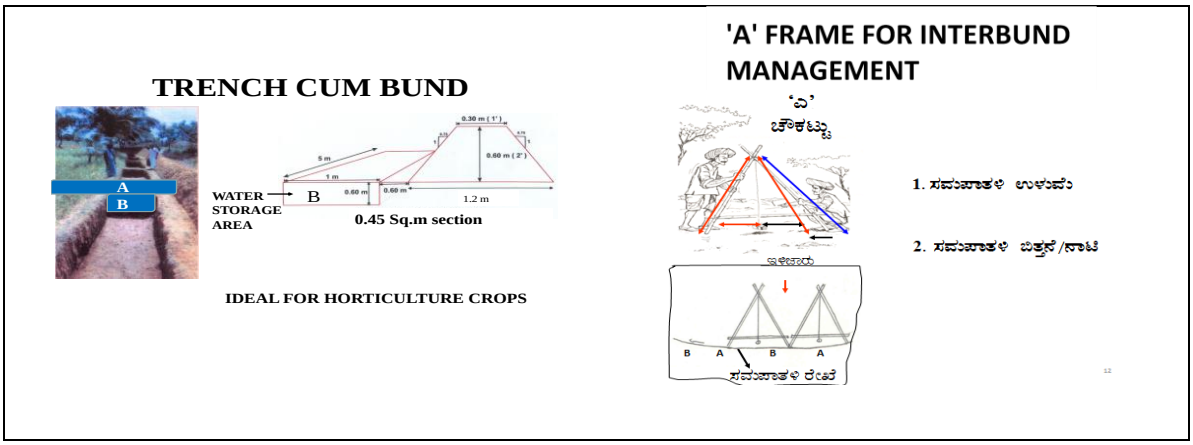
Recommended Bund Section

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

B. 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 drainge lines (gullies/ *nalas/ hallas*) and existing structures are marked to the scale and storage capacity of the existing water bodies are documented (Fig.9.1).

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

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

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

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

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

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

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

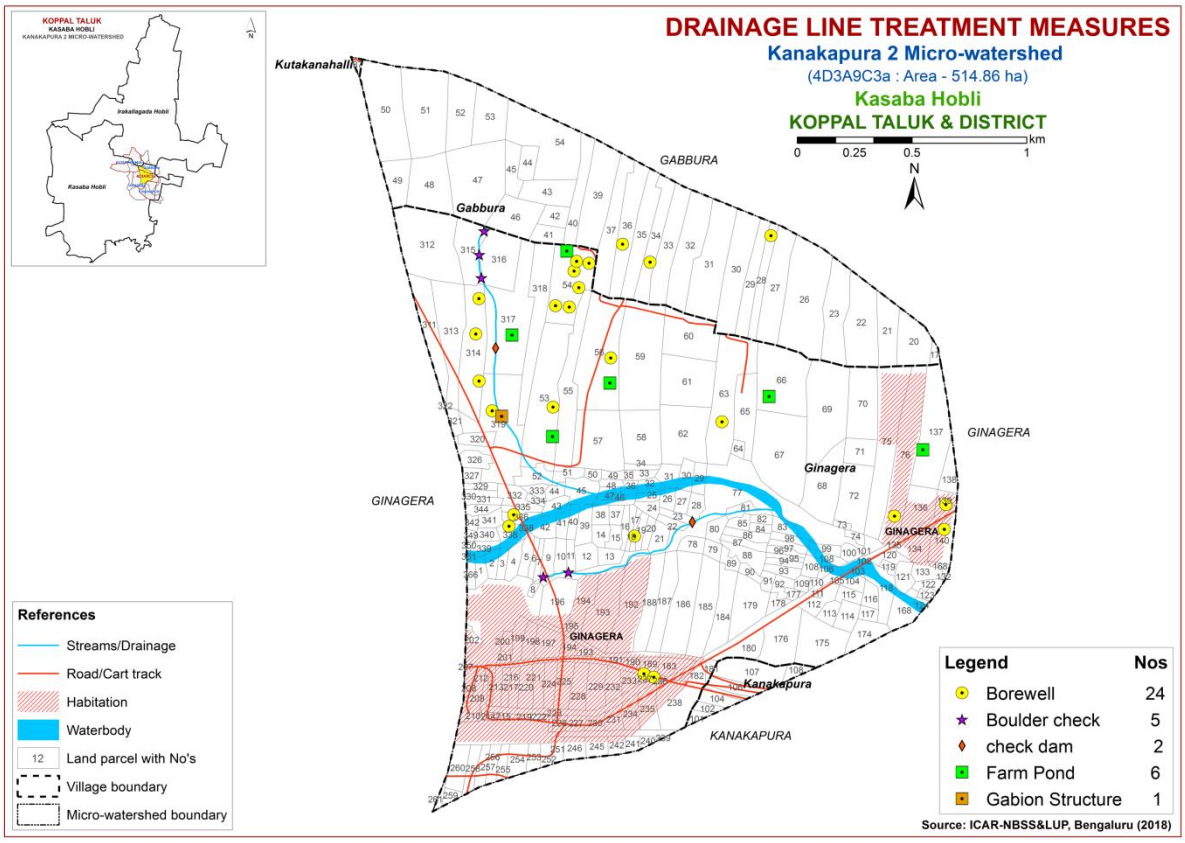


Fig. 9.1 Drainage line treatment map of Kanakapura-2 Microwatershed

9.2 Recommended Soil and Water Conservation Measures

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

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

A map (Fig. 9.2) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. A maximum area of about 248 ha (48%) needs trench cum bunding. An area of about 56 ha (11%) needs graded bunding. Strengthening of existing bunds/bunding cover an area of about 62 ha (12%). 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.

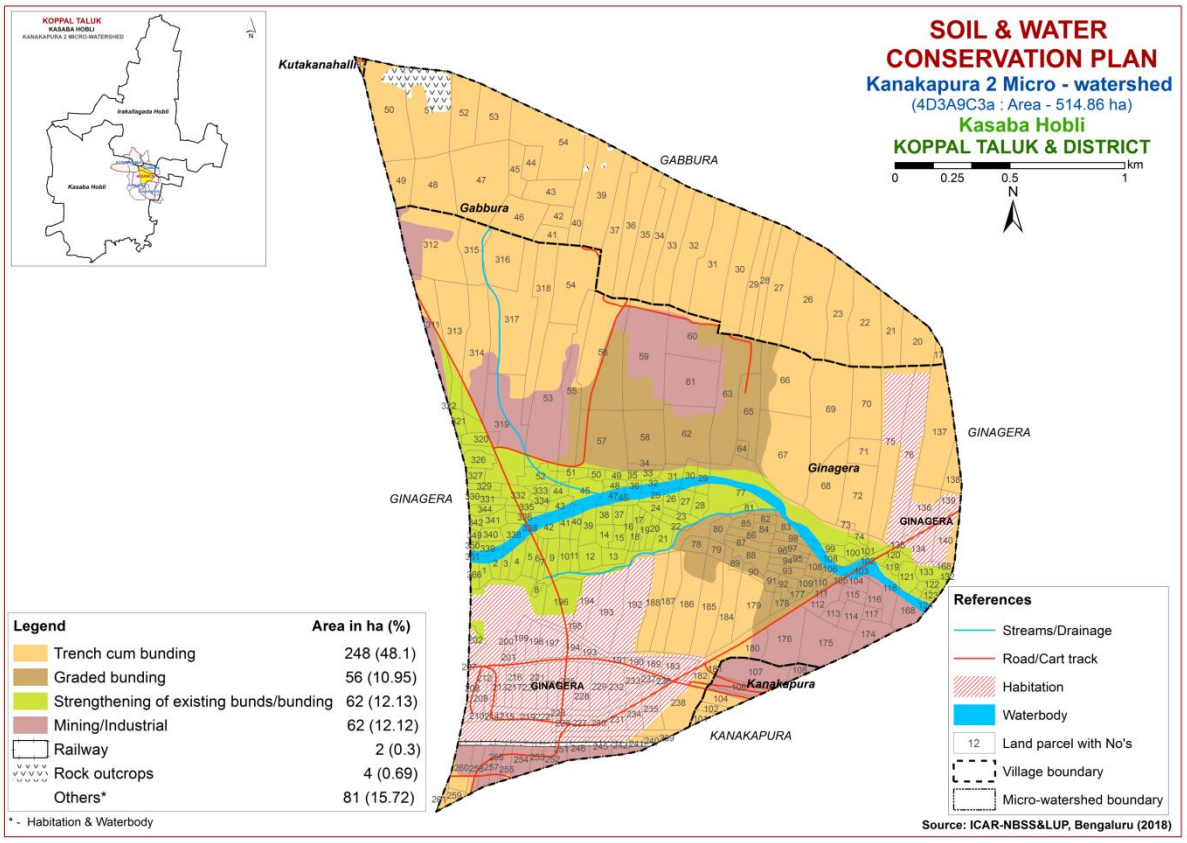


Fig. 9.2 Soil and Water Conservation Plan map of Kanakapura-2 Microwatershed

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 (*Sizyzium cumini*) and Bamboo. Dry areas are to be planted with species like Honge, Bevu, Seetaphal *etc*.

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

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Appendix-I

Kanakapura-2 (9C3a) Microwatershed

Soil Phase Information

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Gabbura	17	0.34	KMHiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Vegetables (Rg+Mz+Vg)	Not Available	IIe	TCB
Gabbura	20	2.93	KMHiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Chilli+Maize+Vegetables (Rg+Ch+Mz+Vg)	Not Available	IIe	TCB
Gabbura	21	2.62	KMHiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Vegetables+Redgram+Maize+Paddy (Vg+Rg+Mz+Pd)	Not Available	IIe	TCB
Gabbura	22	5.1	HRVcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land+Maize+Vegetables (Rg+Fl+Mz+Vg)	Not Available	IIIes	TCB
Gabbura	23	4.26	HRVcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bengalgram+Groundnut+Vegetables (Rg+Bg+Gn+Vg)	Not Available	IIIes	TCB
Gabbura	26	8.72	HLKhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Horsegram+Drumstick (Rg+Hg+Ds)	Not Available	IIes	TCB
Gabbura	27	4.6	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Drumstick+Vegetables (Rg+Ds+Vg)	Not Available	IIs	TCB
Gabbura	28	1.91	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Drumstick+Maize (Rg+Ds+Mz)	1 Borewell	IIs	TCB
Gabbura	29	2.65	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Currently FallowLand+Vegetables+Paddy (Rg+Cf+Vg+Pd)	Not Available	IIs	TCB
Gabbura	30	5.21	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Currently FallowLand+Vegetables+Paddy (Rg+Cf+Vg+Pd)	Not Available	IIs	TCB
Gabbura	31	6.41	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Vegetables+Redgram+Paddy (Vg+Rg+Pd)	Not Available	IIs	TCB
Gabbura	32	5.1	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Drumstick+Vegetables (Rg+Ds+Vg)	Not Available	IIs	TCB
Gabbura	33	3.98	HDHcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Vegetables+Habitation (Rg+Vg+Hb)	Not Available	IIs	TCB
Gabbura	34	3.13	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	1 Borewell	IIes	TCB
Gabbura	35	3.68	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIes	TCB
Gabbura	36	4	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Vegetables+Habitation (Rg+Mz+Vg+Hb)	1 Borewell	IIes	TCB
Gabbura	37	4.06	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	TCB
Gabbura	39	5.19	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Currently FallowLand+Vegetables+Maize (Rg+Cf+Vg+Mz)	Not Available	IIes	TCB
Gabbura	40	2.44	MKHcB2g2	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Currently Fallow Land+Maize (Rg+Cf+Mz)	Not Available	IIIes	TCB
Gabbura	41	1.09	HRVhB2g1	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Gabbura	42	1.06	HRVhB2g1	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Gabbura	43	2.42	MKHcB2g2	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Gabbura	44	1.09	HRVhB2g1	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Gabbura	45	1.52	HRVhB2g1	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Gabbura	46	3.16	HRVhB2g2	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIIes	TCB
Gabbura	47	7.53	HRVhB2g2	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Currently Fallow Land+Maize (Rg+Cf+Mz)	Not Available	IIIes	TCB
Gabbura	48	4.26	HRVhB2g1	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB
Gabbura	49	2.01	HRVhB2g1	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB
Gabbura	50	6.73	BPRhB2	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram (Fl+Rg)	Not Available	IIIes	TCB
Gabbura	51	6.96	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Redgram+Fallow land+Vegetables (Rg+Fl+Vg)	Not Available	Ro	Ro
Gabbura	52	3.59	HRVhB2g2	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIIes	TCB
Gabbura	53	3.26	HRVhB2g2	LMU-5	Shallow (25-50 cm)	Sandy clay loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIIes	TCB
Gabbura	54	7.04	MKHcB2g2	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Currently Fallow Land+Vegetables+Maize (Rg+Cf+Vg+Mz)	Not Available	IIIes	TCB
Ginagera	1	0.58	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Ginagera	2	0.62	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Ginagera	3	0.53	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Ginagera	4	0.87	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Ginagera	5	0.83	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Ginagera	6	0.42	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Ginagera	7	0.45	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	8	0.19	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	9	0.9	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	10	0.77	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	11	0.52	TSDiA1	LMU-1	Very deep (>150	Sandy clay	Non gravelly	Very high	Nearly level (0-	Slight	Fallow land (Fl)	Not	IIw	Graded

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
					cm)		(<15%)	(>200 mm/m)	1%)			Available		bunding
Ginagera	12	1.06	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	13	0.75	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	14	0.68	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	15	0.6	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	16	0.53	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	17	0.44	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	18	0.41	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	1 Borewell	IIw	Graded bunding
Ginagera	19	0.5	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	20	0.49	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	21	0.99	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	22	0.48	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	23	0.53	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	24	0.56	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	25	0.5	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	26	0.6	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	27	0.63	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	28	0.68	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	29	0.74	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	30	0.81	Waterbody	Others	Others	Others	Others	Others	Others	Others	Fallow land (Fl)	Not Available	Others	Others
Ginagera	31	0.87	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	32	0.57	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	33	0.43	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	34	0.38	MTLbB2g2	LMU-6	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	Graded bunding
Ginagera	35	0.16	TSDmA1	LMU-1	Very deep (>150	Clay	Non gravelly	Very high	Nearly level (0-	Slight	Fallow land (Fl)	Not	IIw	Graded

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
					cm)		(<15%)	(>200 mm/m)	1%)			Available		bunding
Ginagera	36	0.89	Waterbody	Others	Others	Others	Others	Others	Others	Others	Fallow land (Fl)	Not Available	Others	Others
Ginagera	37	0.51	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	38	0.64	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	39	1.11	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	40	0.61	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	41	0.65	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	42	0.93	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	43	0.72	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	44	0.51	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	45	1.52	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	46	0.31	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	47	0.32	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	48	0.33	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	49	0.38	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	50	0.35	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	51	0.66	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	52	1.21	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	53	8.29	MI	MI	MI	MI	MI	MI	MI	MI	Coconut+Maize (Cn+Mz)	1 Farm Pond,1 Borewell	MI	MI
Ginagera	54	5.5	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	6Borewell, 1 Farm Pond	IIs	TCB
Ginagera	55	4.98	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Redgram (Mz+Rg)	Not Available	MI	MI
Ginagera	56	8.67	MTLbB2g2	LMU-6	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Industrial area (Rg+Ia)	1 Farm Pond,1 Borewell	IIIes	Graded bunding
Ginagera	57	5.4	MTLbB2g2	LMU-6	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	58	4.01	MTLbB2g2	LMU-6	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Pearl millet (Pm)	Not Available	IIIes	Graded bunding
Ginagera	59	8.52	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Industrial area (Mz+Ia)	Not Available	MI	MI
Ginagera	60	4.44	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	61	4.92	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	62	5.05	MTLbB2g2	LMU-6	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Ginagera	63	6.92	MTLcB2g1	LMU-6	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	1 Borewell	IIIes	Graded bunding
Ginagera	64	0.39	MTLcB2g1	LMU-6	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	Graded bunding
Ginagera	65	2.98	MTLcB2g1	LMU-6	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Coconut+Mango (Cn+Mg)	Not Available	IIIes	Graded bunding
Ginagera	66	6.29	CSRcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	1 Farm Pond	IIIes	TCB
Ginagera	67	7.88	CSRcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram+Peal millet (Mz+Rg+Pm)	Not Available	IIIes	TCB
Ginagera	68	4.24	CSRcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB
Ginagera	69	7.14	CSRcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB
Ginagera	70	4.04	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	TCB
Ginagera	71	1.54	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	TCB
Ginagera	72	3.7	CSRcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Ginagera	73	0.22	CSRcB2g1	LMU-5	Shallow (25-50 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Ginagera	74	0.34	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	75	7.06	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	TCB
Ginagera	76	6.54	Habitation	Others	Others	Others	Others	Others	Others	Others	Redgram+Habitation (Rg+Hb)	1 Borewell	Others	Others
Ginagera	77	10.63	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	78	0.72	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	79	0.56	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	80	0.75	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	81	0.81	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	82	0.38	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	83	0.62	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	84	0.37	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	85	0.54	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	86	0.79	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	87	0.68	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	88	1.29	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIw	Graded bunding
Ginagera	89	0.56	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	90	0.44	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	91	0.46	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	92	0.68	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	93	0.67	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIw	Graded bunding
Ginagera	94	0.48	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	95	0.35	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	96	0.46	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	97	0.49	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	98	0.56	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	99	0.53	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	100	0.55	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	101	0.01	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	102	0.05	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	103	0.14	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	104	0.73	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	105	0.13	MI	MI	MI	MI	MI	MI	MI	MI	Not Available (NA)	Not Available	MI	MI

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	106	0.39	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	108	1.27	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	109	0.4	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	110	0.16	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	111	0.13	MI	MI	MI	MI	MI	MI	MI	MI	Not Available (NA)	Not Available	MI	MI
Ginagera	112	1.14	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	113	0.72	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	114	1.1	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	115	0.66	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	116	0.72	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	117	0.49	MI	MI	MI	MI	MI	MI	MI	MI	Not Available (NA)	Not Available	MI	MI
Ginagera	118	2.03	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	119	0.3	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	120	0.67	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	121	0.94	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	122	0.53	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	123	0.32	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	124	0.24	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	132	0.07	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	133	0.87	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	134	1.45	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	135	0.06	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	136	2.28	Habitation	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Ginagera	137	6.11	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	1 Farm Pond	IIes	TCB

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	138	1.15	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Drumstick (Rg+Mz+Ds)	Not Available	IIes	TCB
Ginagera	139	0.7	Habitation	Others	Others	Others	Others	Others	Others	Others	Sapota (Sp)	1 Borewell	Others	Others
Ginagera	140	1.9	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	1 Borewell	Others	Others
Ginagera	168	2.02	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	174	1.57	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	175	3.9	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	176	3.36	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	177	0.32	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	178	0.52	TSDiB1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	179	3.18	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIs	TCB
Ginagera	180	1.53	MI	MI	MI	MI	MI	MI	MI	MI	Industrial area	Not Available	MI	MI
Ginagera	181	0.32	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	TCB
Ginagera	182	0.61	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	TCB
Ginagera	183	0.9	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	184	2.73	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIs	TCB
Ginagera	185	3.77	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIs	TCB
Ginagera	186	4.67	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIs	TCB
Ginagera	187	2.69	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIs	TCB
Ginagera	188	2.58	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land (Fl)	Not Available	IIs	TCB
Ginagera	189	0.5	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	190	0.29	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	191	0.18	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	192	4.51	Habitation	Others	Others	Others	Others	Others	Others	Others	Current fallow+Habitation (Cf+Hb)	Not Available	Others	Others
Ginagera	193	4.38	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	194	2.41	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	195	0.13	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	196	2.81	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Habitation	Not Available	IIw	Graded bunding
Ginagera	197	1.4	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	198	0.87	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	199	0.9	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	200	0.38	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	201	0.32	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	202	0.64	Habitation	Others	Others	Others	Others	Others	Others	Others	Paddy+Maize+Habitation (Pd+Mz+Hb)	Not Available	Others	Others
Ginagera	207	0.02	Habitation	Others	Others	Others	Others	Others	Others	Others	Maize (Mz)	Not Available	Others	Others
Ginagera	208	1.04	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	209	0.98	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	210	0.07	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	211	0.09	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	212	0.46	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	213	0.61	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	214	0.1	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	215	0.13	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	216	0.55	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	217	0.74	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	218	0.1	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	219	0.17	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	220	1.16	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	221	0.95	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	222	0.14	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	223	0.04	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	224	1	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	225	1.46	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	226	0.44	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	227	0.56	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	228	1.42	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	229	1.59	Habitation	Others	Others	Others	Others	Others	Others	Others	Coconut+Fallow land (Cn+Fl)	Not Available	Others	Others
Ginagera	230	0.55	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Ginagera	231	0.75	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	232	0.99	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	233	0.59	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	234	0.99	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	235	1.53	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	236	0.06	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	237	0.21	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	238	3.34	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	TCB
Ginagera	239	0.01	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	TCB
Ginagera	240	0.29	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	TCB
Ginagera	241	0.43	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Not Available (NA)	Not Available	IIs	TCB
Ginagera	242	0.61	MI	MI	MI	MI	MI	MI	MI	MI	Not Available (NA)	Not Available	MI	MI
Ginagera	245	0.85	MI	MI	MI	MI	MI	MI	MI	MI	Current fallow (Cf)	Not Available	MI	MI
Ginagera	246	0.92	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	Not Available	MI	MI
Ginagera	251	0.58	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	Not Available	MI	MI
Ginagera	252	0.49	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	Not Available	MI	MI

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	253	0.65	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	Not Available	MI	MI
Ginagera	254	1.16	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	Not Available	MI	MI
Ginagera	255	0.65	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Habitation+Industrial area (Mz+Hb+Ia)	Not Available	MI	MI
Ginagera	256	0.74	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Habitation+Industrial area (Mz+Hb+Ia)	Not Available	MI	MI
Ginagera	257	0.82	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Habitation (Mz+Hb)	Not Available	MI	MI
Ginagera	258	0.97	MI	MI	MI	MI	MI	MI	MI	MI	Maize+Pearl millet+Habitation (Mz+Pm+Hb)	Not Available	MI	MI
Ginagera	259	0.4	NGPhB1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Fallow land+Habitation (Mz+Fl+Hb)	Not Available	IIIs	TCB
Ginagera	260	1.53	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	Not Available	MI	MI
Ginagera	261	0.25	NGPhB1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Drumstick+Pearl millet+Fallow land+Maize (Ds+Pm+Fl+Mz)	Not Available	IIIs	TCB
Ginagera	311	3.56	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Industrial area (Fl+Ia)	Not Available	IIes	TCB
Ginagera	312	7.52	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land +Industrial area (Fl+Ia)	Not Available	IIes	TCB
Ginagera	313	5	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower+Industrial area (Sf+Ia)	Not Available	IIes	TCB
Ginagera	314	5.66	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower+Industrial area (Sf+Ia)	3 Borewell	IIes	TCB
Ginagera	315	2.92	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	TCB
Ginagera	316	3.83	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Pearl millet (Mz+Pm)	Not Available	IIs	TCB
Ginagera	317	8.33	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Bajra (Mz+Bj)	1 Farm Pond	IIs	TCB
Ginagera	318	4.94	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	TCB
Ginagera	319	8.37	MI	MI	MI	MI	MI	MI	MI	MI	Fallow land (Fl)	1 Borewell	MI	MI
Ginagera	320	0.9	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	321	0.59	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	322	0	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	326	0.94	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	327	0.53	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	329	0.46	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	Wells	Land Capability	Conservation Plan
Ginagera	330	0.44	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	331	0.54	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	332	1.05	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	333	0.5	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	334	0.26	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	335	0.59	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	336	0.65	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	1 Borewell	IIw	Graded bunding
Ginagera	338	1.31	Waterbody	Others	Others	Others	Others	Others	Others	Others	Fallow land (Fl)	1 Borewell	Others	Others
Ginagera	339	0.66	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	340	0.56	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	341	0.69	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	342	0.34	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	344	0.6	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	349	0.19	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIw	Graded bunding
Ginagera	350	0.11	TSDmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIw	Graded bunding
Ginagera	351	0.1	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Ginagera	366	0.48	TSDiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Kanakapura	101	0.39	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIs	TCB
Kanakapura	102	0.45	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Sugarcane (Sc)	Not Available	IIs	TCB
Kanakapura	104	0.89	HDHhB1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Coconut (Cn)	Not Available	IIs	TCB
Kanakapura	106	1.19	MI	MI	MI	MI	MI	MI	MI	MI	Sugarcane (Sc)	Not Available	MI	MI
Kanakapura	107	2.95	MI	MI	MI	MI	MI	MI	MI	MI	Not Available (NA)	Not Available	MI	MI
Kanakapura	108	0.58	MI	MI	MI	MI	MI	MI	MI	MI	Not Available (NA)	Not Available	MI	MI
Kutakanahalli	37	0.2	BPRhB2	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB

Ro-Rock out crops, MI-Mining/industrial

Appendix II

Kanakapura-2 (9C3a) 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
Gabbura	17	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)	Sufficient (> 0.6 ppm)
Gabbura	20	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 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)	Sufficient (> 0.6 ppm)
Gabbura	21	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 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)	Sufficient (> 0.6 ppm)
Gabbura	22	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	23	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Low (< 0.5 %)	High (> 57 kg/ha)	Low (<145 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)
Gabbura	26	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gabbura	27	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)
Gabbura	28	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	29	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	30	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	31	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	32	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	33	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	34	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	35	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	36	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	37	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	39	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 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)	Sufficient (> 0.6 ppm)
Gabbura	40	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 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)	Sufficient (> 0.6 ppm)
Gabbura	41	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 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)	Sufficient (> 0.6 ppm)
Gabbura	42	Slightly alkaline (pH 7.3 – 7.8)	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)	Sufficient (> 0.6 ppm)
Gabbura	43	Slightly alkaline (pH 7.3 – 7.8)	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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Gabbura	44	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	45	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	46	Slightly alkaline (pH 7.3 – 7.8)	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)	Sufficient (> 0.6 ppm)
Gabbura	47	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	48	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	49	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	50	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Gabbura	51	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro
Gabbura	52	Slightly alkaline (pH 7.3 – 7.8)	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)	Sufficient (> 0.6 ppm)
Gabbura	53	Slightly alkaline (pH 7.3 – 7.8)	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)	Sufficient (> 0.6 ppm)
Gabbura	54	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	1	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	2	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	3	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	4	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	5	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	6	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	7	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	8	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	9	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	10	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	11	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	12	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	13	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	14	Strongly alkaline	Non saline	High (> 0.75	Medium (23 –	Medium (145 –	High (> 20	Medium (0.5 –	Sufficient	Sufficient (>	Sufficient (>	Deficient (<

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		(pH 8.4 – 9.0)	(<2 dsm)	%)	57 kg/ha)	337 kg/ha)	ppm)	1.0 ppm)	(>4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Ginagera	15	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	16	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	17	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	18	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	19	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	20	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	21	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)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	22	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)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	23	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	24	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	25	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	26	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	27	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	28	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	30	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	31	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	32	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	33	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	34	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	35	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	36	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	37	Very strongly alkaline (pH > 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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	38	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)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	39	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)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	40	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	41	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	42	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	43	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)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	44	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)	Sufficient (> 0.6 ppm)
Ginagera	45	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)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	46	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	47	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	48	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	49	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	50	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)	Sufficient (> 0.6 ppm)
Ginagera	51	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)	Sufficient (> 0.6 ppm)
Ginagera	52	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)	Sufficient (> 0.6 ppm)
Ginagera	53	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	54	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	55	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	56	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)	Sufficient (> 0.6 ppm)
Ginagera	57	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	58	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	59	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	60	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	61	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	62	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	63	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	64	Slightly alkaline (pH 7.3 – 7.8)	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)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	65	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	66	Neutral (pH 6.5 – 7.3)	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	67	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	68	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	69	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	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)	Sufficient (> 0.6 ppm)
Ginagera	70	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)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	71	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 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)	Sufficient (> 0.6 ppm)
Ginagera	72	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	73	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	74	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	75	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	76	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	77	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	78	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	79	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	80	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	81	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	82	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	83	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	84	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	85	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	86	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	87	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	88	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	89	Strongly alkaline	Non saline	High (> 0.75	High (> 57	High (> 337	High (> 20	Low (< 0.5	Sufficient	Sufficient (>	Sufficient (>	Sufficient (>

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		(pH 8.4 – 9.0)	(<2 dsm)	%)	kg/ha)	kg/ha)	ppm)	ppm)	(>4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Ginagera	90	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	91	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	92	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	93	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	94	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	95	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	96	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	97	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	98	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	99	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	100	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	101	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	102	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	103	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	104	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	105	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	106	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	108	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	109	Moderately alkaline (pH 7.8 – 8.4)	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)	Sufficient (> 0.6 ppm)
Ginagera	110	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	111	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	112	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	113	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	114	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	115	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	116	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	117	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	118	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	119	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	120	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	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)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	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)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	123	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	124	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	132	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	134	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	135	Moderately alkaline (pH 7.8 – 8.4)	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)	Sufficient (> 0.6 ppm)
Ginagera	136	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	137	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Ginagera	138	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	139	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	140	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	168	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	174	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	175	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	176	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	177	Moderately alkaline (pH 7.8 – 8.4)	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)	Sufficient (> 0.6 ppm)
Ginagera	178	Moderately alkaline (pH 7.8 – 8.4)	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)	Sufficient (> 0.6 ppm)
Ginagera	179	Strongly alkaline (pH 8.4 – 9.0)	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)	Sufficient (> 0.6 ppm)
Ginagera	180	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	181	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	182	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	183	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	184	Strongly alkaline (pH 8.4 – 9.0)	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)	Sufficient (> 0.6 ppm)
Ginagera	185	Strongly alkaline (pH 8.4 – 9.0)	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)	Sufficient (> 0.6 ppm)
Ginagera	186	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	187	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	188	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	189	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	190	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	191	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	192	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	193	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	194	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	195	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	196	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Ginagera	197	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	198	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	199	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	200	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	201	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	202	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	207	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	208	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	209	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	210	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	211	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	212	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	213	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	214	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	215	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	216	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	217	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	218	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	219	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	220	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	221	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	222	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	223	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	224	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	225	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	226	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	227	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	228	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	229	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	230	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	231	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	232	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	233	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	234	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	235	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	236	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	237	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	238	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)	Sufficient (> 0.6 ppm)
Ginagera	239	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)	Sufficient (> 0.6 ppm)
Ginagera	240	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)	Sufficient (> 0.6 ppm)
Ginagera	241	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)	Sufficient (> 0.6 ppm)
Ginagera	242	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	245	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	246	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	251	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	252	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	253	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	254	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	255	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	256	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	257	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	258	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	259	Moderately alkaline (pH 7.8 – 8.4)	Medium (4 – 8 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Ginagera	260	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	261	Moderately alkaline (pH 7.8 – 8.4)	Medium (4 – 8 dsm)	High (> 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Ginagera	311	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	312	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	313	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	314	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	315	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	316	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 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)	Sufficient (> 0.6 ppm)
Ginagera	317	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	318	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	319	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	320	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)	Sufficient (> 0.6 ppm)
Ginagera	321	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)	Sufficient (> 0.6 ppm)
Ginagera	322	Slightly alkaline (pH 7.3 – 7.8)	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)	Sufficient (> 0.6 ppm)
Ginagera	326	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)	Sufficient (> 0.6 ppm)
Ginagera	327	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)	Sufficient (> 0.6 ppm)
Ginagera	329	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)	Sufficient (> 0.6 ppm)

Village	Survey Number	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Ginagera	330	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)	Sufficient (> 0.6 ppm)
Ginagera	331	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	332	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)	Sufficient (> 0.6 ppm)
Ginagera	333	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)	Sufficient (> 0.6 ppm)
Ginagera	334	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)	Sufficient (> 0.6 ppm)
Ginagera	335	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)	Sufficient (> 0.6 ppm)
Ginagera	336	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	338	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	339	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	340	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	341	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	342	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	344	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)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	349	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	350	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Ginagera	351	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	366	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kanakapura	101	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 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)	Sufficient (> 0.6 ppm)
Kanakapura	102	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kanakapura	104	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)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kanakapura	106	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kanakapura	107	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kanakapura	108	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kutakanahalli	37	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Low (< 0.5 %)	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)	Sufficient (> 0.6 ppm)

Appendix III

Kanakapura-2 (9C3a) Microwatershed

Soil Suitability Information

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Gabbura	17	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	S1	S1	S1
Gabbura	20	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	S1	S1	S1
Gabbura	21	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	S1	S1	S1
Gabbura	22	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	S3r	S3r	S3rg	N1rg	N1rg	S3r
Gabbura	23	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	S3r	S3r	S3rg	N1rg	N1rg	S3r
Gabbura	26	S1	S2t	S1	S1	S1	S1	S1	S1	S2t	S1	S1	S1	S1	S1	S2t	S1	S1	S3t	S2t	S2t	S2t	S2t	S1	S1	S2t	S2t	S2t	S1	S1	S2t	S2t
Gabbura	27	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	28	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	29	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	30	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	31	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	32	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	33	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	34	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	35	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	36	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	37	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gabbura	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	S3g	S3g	S2g	S3g
Gabbura	40	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Gabbura	41	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	42	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	43	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Gabbura	44	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	45	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	S3rg	S3rg	N1rg	N1rg	S3rg

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Gabbura	46	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	47	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	48	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	49	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	50	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Gabbura	51	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro
Gabbura	52	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	53	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	S3rg	S3rg	N1rg	N1rg	S3rg
Gabbura	54	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Ginagera	1	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	2	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	3	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	4	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	5	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	6	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	7	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	8	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	9	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	10	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	11	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	12	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	13	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	14	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	15	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	16	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	17	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	18	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	19	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	20	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	21	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	22	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	23	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	24	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	25	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	26	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	27	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	28	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	29	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	30	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	31	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	32	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	33	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	34	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	35	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	36	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	37	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	38	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	39	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	40	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	41	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	42	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	43	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	44	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	45	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	46	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	47	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	48	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	49	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	50	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	51	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	52	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	53	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	54	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	55	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	56	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	57	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	58	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	59	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	60	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	61	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	62	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	63	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	64	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	65	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Ginagera	66	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	N1r	S3r
Ginagera	67	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	N1r	S3r
Ginagera	68	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	N1r	S3r
Ginagera	69	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	N1r	S3r

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	70	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	71	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	72	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	N1r	S3r
Ginagera	73	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	S3r	S3r	N1r	N1r	S3r
Ginagera	74	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	75	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	76	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	77	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	78	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	79	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	80	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	81	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	82	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	83	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	84	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	85	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	86	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	87	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	88	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	89	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	90	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	91	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	92	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	93	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	94	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	95	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	96	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	97	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	98	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	99	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	100	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	101	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	102	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	103	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	104	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	105	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	106	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	108	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	109	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	110	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	111	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	112	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	113	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	114	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	115	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	116	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	117	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	118	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	119	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	120	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	121	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	122	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	123	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	124	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	132	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	133	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	134	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	135	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	136	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	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	S3g	S3g	S2g	S3g
Ginagera	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	S3g	S3g	S2g	S3g
Ginagera	139	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	140	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	168	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	174	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	175	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	176	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	177	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	178	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	179	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	180	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	181	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	182	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	183	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	184	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	185	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	186	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	187	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	188	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	189	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	190	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	191	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	192	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	193	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	194	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	195	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	196	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	197	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	198	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	199	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	200	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	201	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	202	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	207	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	208	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	209	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	210	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	211	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	212	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	213	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	214	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	215	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	216	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	217	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	218	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	219	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	220	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	221	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	222	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	223	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	224	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	225	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	226	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	227	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	228	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	229	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	230	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	231	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	232	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	233	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	234	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	235	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	236	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	237	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	238	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	239	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	240	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	241	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	242	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	245	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	246	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	251	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	252	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	253	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	254	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	255	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	256	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	257	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	258	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	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	S2g	S2g	S3g	S2g	S2g	S2g
Ginagera	260	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Ginagera	261	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	S2g	S2g	S3g	S2g	S2g	S2g
Ginagera	311	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	312	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	313	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	314	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	315	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	316	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	317	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	318	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Ginagera	319	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Ginagera	320	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	321	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	322	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	326	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	327	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	329	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	330	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	331	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	332	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	333	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	334	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	335	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	336	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	338	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	339	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	340	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	341	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	342	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	344	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	349	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	350	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Ginagera	351	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ginagera	366	S3tw	S2t	S3tw	S2w	S3tw	S2w	S2tw	S2w	S1	S2w	S2tw	S2tw	S3tw	S2w	N1tw	S2tw	S2w	S3tw	S3tw	S3tw	S2tw	S2tw	S2tw	S2t	S3tw	S2tw	S2tw	S3tw	S2tw	S2tw	S2tw
Kanakapura	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	S3g	S3g	S2g	S3g
Kanakapura	102	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Kanakapura	104	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Kanakapura	106	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kanakapura	107	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kanakapura	108	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kutakanahalli	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	S2g	S2g	S3g	S2g	S2g	S2g

MI-Mining/Industrial, RO-Rock outcrops

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

CONTENTS

LIST OF TABLES

Chapter 1

SALIENT FINDINGS OF THE SURVEY

- *The data on households sampled for socio economic survey in Kanakapura-2 micro-watershed indicated that 36 farmers were sampled in Kanakapura-2 micro-watershed among them 18 (50 %) were marginal farmers, 6 (16.67 %) were small farmers, 8 (22.22 %) were semi medium farmer, 3 (8.33 %) were medium farmers and 1 (2.78 %) were large farmers.*
- *The data indicated that there were 89 (59.73 %) men and 60 (40.27 %) were women among the sampled households. The average family size of marginal farmers' was 3.9, small farmers' was 4, semi medium farmers' was 4.6, medium farmers' was 4 and large farmers' was 5.*
- *The data indicated that, 13 (8.72 %) people were in 0-15 years of age, 67 (44.97 %) were in 16-35 years of age, 53 (35.57 %) were in 36-60 years of age and 16 (10.74 %) were above 61 years of age.*
- *The results indicated that Kanakapura-2 had 38.93 per cent illiterates, 0.67 per cent Functional Literate, 18.12 per cent of them had primary school education, 2.68 per cent of them had middle school education, 16.11 per cent of them had high school education, 12.75 per cent of them had PUC education, 0.67 per cent of them had Diploma, 2.01 per cent of them had ITI, 3.36 per cent of them had degree education and 0.67 per cent of them did Masters.*
- *The results indicate that, 72.22 per cent of household heads were practicing agriculture and 22.22per cent of the household heads were agricultural labourers.*
- *The results indicate that agriculture was the major occupation for 55.03 per cent of the household members, 22.15 per cent were agricultural labourers, 1.34 per cent were in Household industry, 18.79 per cent were students and 2.01per cent were housewives.*
- *The results show that, 100 per cent of the population in the micro watershed has not participated in any of the institutions.*
- *The results indicate that 8.33 per cent of the households possess Thatched house, 27.78 per cent of the households possess katcha house, 13.89 per cent of them possess pucca/RCC house and 50 per cent of them possess semi pucca house.*
- *The results show that 86.11 per cent of the households possess TV, 2.94 per cent of the households possess DVD/VCD Player, 86.11 per cent of them possess mixer/grinder, 2.78 per cent of the households possess Refrigerator, 16.67 per cent of them possess bicycle, 44.44 per cent of the households possess motor cycle and 94.44 per cent of the households possess mobile phones.*
- *The results show that the average value of television was Rs 5,919, grinder was Rs 2,325, Refrigerator was Rs 12,000, bicycle was Rs 1,714, motor cycle was Rs. 36,875 and mobile phone was Rs. 1,576.*

- *About 11.11 per cent of the households possess bullock cart, 44.44 per cent of them possess plough, 2.78 per cent of them possess Irrigation Pump, 5.88 per cent possess tractor, 33.33 per cent of them possess sprayer and 66.67 per cent of them possess weeder.*
- *The results show that the average value of bullock cart was Rs. 17,500, plough was Rs. 1,820, Irrigation Pump was Rs.7,000, tractor was Rs 350,000, sprayer was Rs.3,828, Sprinkler was Rs. 8,000, average value of weeder was Rs. 159, Harvester was Rs. 84,000, Thresher was Rs. 277, average value of chaff cutter was 3,000 and the average value of earth mover/duster was Rs. 15,000.*
- *The results indicate that, 13.89 per cent of the households possess bullocks and 30.56 per cent of the households possess local cow, 8.33 per cent of the households possess Crossbred cow, 5.56 per cent of the households possess Buffalo and 5.56 per cent of the households possess Goat.*
- *The results indicate that, average own labour men available in the micro watershed was 1.80, average own labour (women) available was 1.43, average hired labour (men) available was 9.37 and average hired labour (women) available was 6.77.*
- *The results indicate that, 97.22 per cent of the households opined that the hired labour was adequate and 5.88 per cent of the households opined that the hired labour was inadequate.*
- *The results indicate that, households of the Kanakapura-2 micro-watershed possess 17.74 ha (36.01 %) of dry land and 31.51 ha (63.99 %) of irrigated land. Marginal farmers possess 3.30 ha (85.80 %) of dry land and 0.55 ha (14.20 %) of irrigated land. Small farmers possess 5.65 ha (52.11 %) of dry land and 5.19 ha (47.89 %) of irrigated land. Semi medium farmers possess 5.90 ha (58.47 %) of dry land and 4.19 ha (41.53 %) of irrigated land. Medium farmers possess 2.89 ha (16.56 %) of dry land and 14.56 ha (83.44 %) of irrigated land. Large farmers possess 7.03 ha (100 %) of irrigated land.*
- *The results indicate that, the average value of dry land was Rs. 504,122.95 and the average value of irrigated land was Rs. 617,861.06. In case of marginal famers, the average land value was Rs. 937,974.69 for dry land and Rs. 1,644,808.15. In case of small famers, the average land value was Rs. 293,858.52 for dry land and Rs. 859,130.44 for irrigated land. In case of semi medium famers, the average land value was Rs. 297,937.75 for dry land and Rs. 375,690.75 for irrigated land. In case of medium farmers, the average land value was Rs. 977,437.48 for irrigated land. In case of large farmers, the average land value was Rs. 138,937.50 for irrigated land.*
- *The results indicate that, there were 16 functioning and 11 de-functioning bore wells in the micro watershed.*

- *The results indicate that, bore well was the major irrigation source in the micro water shed for 44.44 per cent of the farmers.*
- *The results indicate that, the depth of bore well was found to be 45.72 meters.*
- *The results indicate that marginal, small, semi medium, medium farmers and large farmers had an irrigated area of 2.60 ha, 1.64 ha, 6.34 ha, 1.62 ha and 18.68 ha respectively.*
- *The results indicate that, farmers have grown Bajra (4.37 ha), Bengal gram (6.48 ha), Navane (1.68 ha), Pearl millet (9.66 ha), Groundnut (1.67 ha), maize (18.43 ha), Sesamum (1.32 ha), Red gram (2.19 ha) and Cowpea (0.40 ha).*
- *The results indicate that, the cropping intensity in Kanakapura-2 micro-watershed was found to be 75.02 per cent.*
- *The results indicate that, the total cost of cultivation for Bajra was Rs. 26117.90. The gross income realized by the farmers was Rs. 23737.72. The net income from Bajra cultivation was Rs. -2380.18. Thus the benefit cost ratio was found to be 1: 0.91.*
- *The results indicate that, the total cost of cultivation for bengal gram was Rs. 7938.92. The gross income realized by the farmers was Rs. 74236.52. The net income from bengal gram cultivation was Rs. 22418.17. Thus the benefit cost ratio was found to be 1: 1.43.*
- *The results indicate that, the total cost of cultivation for Navane was Rs. 318503.50. The gross income realized by the farmers was Rs. 18516.95. The net income from Navane cultivation was Rs. -1751.47. Thus the benefit cost ratio was found to be 1: 0.91.*
- *The results indicate that, the total cost of cultivation for groundnut was Rs. 72585.96. The gross income realized by the farmers was Rs. 58850.69. The net income from groundnut cultivation was Rs. -13735.27. Thus the benefit cost ratio was found to be 1: 0.81.*
- *The results indicate that, the total cost of cultivation for Sesamum was Rs. 76069.80. The gross income realized by the farmers was Rs. 42048.81. The net income from Sesamum cultivation was Rs. -34020. Thus the benefit cost ratio was found to be 1: 0.55.*
- *The results indicate that, the total cost of cultivation for maize was Rs. 33731.06. The gross income realized by the farmers was Rs. 43575.50. The net income from maize cultivation was Rs. 9844.44. Thus the benefit cost ratio was found to be 1: 1.29.*
- *The results indicate that, the total cost of cultivation for Cowpea was Rs. 39947.49. The gross income realized by the farmers was Rs. 41496. The net income from Cowpea cultivation was Rs. 1548.51. Thus the benefit cost ratio was found to be 1: 1.04.*

- *The results indicate that, the total cost of cultivation for redgram was Rs. 75605.27. The gross income realized by the farmers was Rs. 49810.42. The net income from redgram cultivation was Rs. --25794.85. Thus the benefit cost ratio was found to be 1: 0.66.*
- *The results indicate that, 44.44 per cent of the households opined that dry fodder was adequate and 47.22 per cent of the households opined that green fodder was adequate.*
- *The results indicate that the annual gross income was Rs. 2,400 for landless households, for marginal farmers it was Rs. 127,133.33, for small farmers it was Rs. 61,066.67, for semi medium farmers it was Rs. 103,312.50, for medium farmers it was Rs. 59,666.67 and for semi large farmers it was Rs. 445,000.*
- *The results indicate that the average annual expenditure is Rs. 32,321.01. For marginal farmers it was Rs. 22,912.85, for small farmers it was Rs. 14,583.33, for semi medium farmers it was Rs. 20,578.13, for medium farmers it was Rs. 23,000 and for large farmers it was Rs. 430,000.*
- *The results indicate that, sampled households have grown 83 coconut trees in their field and 13 in backyard and 2 Lemon trees in backyard.*
- *The results indicate that, households have planted 6 Cashew, 110 Teak, 128 neem, 3 tamarind, 10 Pongamia and 8 banyan trees in their field. Also, 3 neem trees in their backyard.*
- *The results indicated that, Bajra, Bengalgram, Cow Pea, Groundnut, Maize, Navane, Sesamum and Redgram were sold to the extent of 100 per cent.*
- *The results indicated that, about 41.67 per cent of the farmers sold their produce to local/village merchants and 8.33 per cent of the farmers sold their produce to regulated market, 8.82 per cent of the farmers sold their produce to Cooperative marketing Society and 75 per cent of the farmers sold their produce to Agent/Traders.*
- *The results indicated that 100 per cent of the households used tractor as a mode of transportation for their agricultural produce.*
- *The results indicated that, 19.44 per cent of the households have experienced soil and water erosion problems in the farm.*
- *The results indicated that, 22.22 per cent have shown interest in soil test.*
- *The results indicated that, 75 per cent of the households used firewood, 16.67 per cent of the households used LPG as a source of fuel and 2.78 per cent of the households used Dung Cake and 5.56 per cent of the households used Biogas as a source of fuel.*
- *The results indicated that, piped supply was the source of drinking water for 22.22 per cent of the households and bore well was the source of drinking water for 75 per cent of the households in micro watershed.*

- *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, 38.89 per cent of the households possess sanitary toilet facility.*
- *The results indicated that, 88.89 per cent of the sampled households possessed BPL card and 11.11 per cent of the households did not possess PDS card.*
- *The results indicated that, 44.44 per cent of the households participated in NREGA programme.*
- *The results indicated that, cereals were adequate for 100 per cent of the households, pulses were adequate for 47.22 per cent, oilseeds were adequate for 77.78 per cent, vegetables were adequate for 77.78 per cent, milk was adequate for 100 per cent, eggs were adequate for 58.33 per cent and meat was adequate for 52.78 per cent.*
- *The results indicated that, pulses were inadequate for 50 per cent of the households, oilseeds were inadequate for 22.22 per cent, fruits were inadequate for 22.22 per cent and Vegetables was inadequate for 22.22 per cent of the households.*
- *The results indicated that, lower fertility status of the soil was the constraint experienced by 22.22 per cent of the households, wild animal menace on farm field (58.33 %), frequent incidence of pest and diseases (63.89 %), inadequacy of irrigation water (22.22 %), high cost of fertilizers and plant protection chemicals (69.44 %), high rate of interest on credit (52.78 %), lack of marketing facilities in the area (33.33 %), lack of transport for safe transport of the agricultural produce to the market (5.56 %), less rainfall (75 %) and source of agri-technology information (27.78 %).*

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

Kanakapura-2 micro-watershed in Ginigera sub-watershed (Koppal taluk and district) is located in between $15^0$22’28.811’’ to $15^0$20’42.309’’ North latitudes and $76^0$15’58.093’’ to $76^0$14’33.578’’ East longitudes, covering an area of about 515.02 ha, bounded by Rudrapura and Ginagera 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 36 households located in the micro-watershed were interviewed for the survey.

Chapter 4

SALIENT FEATURES OF THE SURVEY

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Kanakapura-2 micro-watershed is presented in Table 1 and it indicated that 36 farmers were sampled in Kanakapura-2 micro-watershed among them 18 (50 %) were marginal farmers, 6 (16.67 %) were small farmers, 8 (22.22 %) were semi medium farmer, 3 (8.33 %) were medium farmers and 1 (2.78 %) were large farmers.

Table 1: Households sampled for socio economic survey in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	18	50	6	16.67	8	22.22	3	8.33	1	2.78	36	100

Population characteristics: The population characteristics of households sampled for socio-economic survey in Kanakapura-2 micro-watershed is presented in Table 2. The data indicated that there were 89 (59.73 %) men and 60 (40.27 %) were women among the sampled households. The average family size of marginal farmers' was 3.9, small farmers' was 4, semi medium farmers' was 4.6, medium farmers' was 4 and large farmers' was 5.

Table 2: Population characteristics of Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (71)		SF (24)		SMF (37)		MDF (12)		LF (5)		All (149)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Men	40	56.34	15	62.50	21	56.76	9	75	4	80	89	59.73
2	Women	31	43.66	9	37.50	16	43.24	3	25	1	20	60	40.27
Total		71	100	24	100	37	100	12	100	5	100	149	100
Average		3.9		4		4.6		4		5		4.1	

Age wise classification of population: The age wise classification of household members in Kanakapura-2 micro-watershed is presented in Table 3. The data indicated that, 13 (8.72 %) people were in 0-15 years of age, 67 (44.97 %) were in 16-35 years of age, 53 (35.57 %) were in 36-60 years of age and 16 (10.74 %) were above 61 years of age.

Table 3: Age wise classification of household members in Kanakapura-2 micro-watershed

Sl. No.	Particulars	MF (71)		SF (24)		SMF (37)		MDF (12)		LF (5)		All (149)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years of age	5	7.04	1	4.17	6	16.22	1	8.33	0	0	13	8.72
2	16-35 years of age	31	43.66	14	58.33	15	40.54	4	33.33	3	60	67	44.97
3	36-60 years of age	28	39.44	8	33.33	10	27.03	5	41.67	2	40	53	35.57
4	> 61 years	7	9.86	1	4.17	6	16.22	2	16.67	0	0	16	10.74
Total		71	100	24	100	37	100	12	100	5	100	149	100

Education level of household members: Education level of household members in Kanakapura-2 micro-watershed is presented in Table 4. The results indicated that

Kanakapura-2 had 38.93 per cent illiterates, 0.67 per cent Functional Literate, 18.12 per cent of them had primary school education, 2.68 per cent of them had middle school education, 16.11 per cent of them had high school education, 12.75 per cent of them had PUC education, 0.67 per cent of them had Diploma, 2.01 per cent of them had ITI, 3.36 per cent of them had degree education and 0.67 per cent of them did Masters.

Table 4. Education level of household members in Kanakapura-2 micro-watershed

Sl. No.	Particulars	MF (71)		SF (24)		SMF (37)		MDF (12)		LF (5)		All (149)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	29	40.85	10	41.67	14	37.84	3	25	2	40	58	38.93
2	Functional Literate	0	0	1	4.17	0	0	0	0	0	0	1	0.67
3	Primary School	10	14.08	4	16.67	9	24.32	3	25	1	20	27	18.12
4	Middle School	3	4.23	1	4.17	0	0	0	0	0	0	4	2.68
5	High School	13	18.31	3	12.50	6	16.22	2	16.67	0	0	24	16.11
6	PUC	9	12.68	5	20.83	2	5.41	2	16.67	1	20	19	12.75
7	Diploma	0	0	0	0	1	2.70	0	0	0	0	1	0.67
8	ITI	2	2.82	0	0	0	0	1	8.33	0	0	3	2.01
9	Degree	3	4.23	0	0	2	5.41	0	0	0	0	5	3.36
10	Masters	1	1.41	0	0	0	0	0	0	0	0	1	0.67
11	Others	1	1.41	0	0	3	8.11	1	8.33	1	20	6	4.03
Total		71	100	24	100	37	100	12	100	5	100	149	100

Occupation of household heads: The data regarding the occupation of the household heads in Kanakapura-2 micro-watershed is presented in Table 5. The results indicate that, 72.22 per cent of household heads were practicing agriculture and 22.22per cent of the household heads were agricultural labourers.

Table 5: Occupation of household heads in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	15	83.33	3	50	5	62.50	2	66.67	1	100	26	72.22
2	Agricultural Labour	3	16.67	3	50	3	37.50	1	33.33	0	0	10	27.78
Total		17	100	5	100	8	100	3	100	1	100	34	100

Table 6: Occupation of family members in Kanakapura-2 micro-watershed

Sl. No.	Particulars	MF (71)		SF (24)		SMF (37)		MDF (12)		LF (5)		All (149)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	42	59.15	14	58.33	17	45.95	5	41.67	4	80	82	55.03
2	Agricultural Labour	12	16.90	7	29.17	10	27.03	4	33.33	0	0	33	22.15
3	Household industry	2	2.82	0	0	0	0	0	0	0	0	2	1.34
4	Student	15	21.13	2	8.33	8	21.62	3	25	0	0	28	18.79
5	Others	0	0	0	0	0	0	0	0	1	20	1	0.67
6	Housewife	0	0	1	4.17	2	5.41	0	0	0	0	3	2.01
Total		71	100	24	100	37	100	12	100	5	100	149	100

Occupation of the household members: The data regarding the occupation of the household members in Kanakapura-2 micro-watershed is presented in Table 6. The results indicate that agriculture was the major occupation for 55.03 per cent of the

household members, 22.15 per cent were agricultural labourers, 1.34 per cent were in Household industry, 18.79 per cent were students and 2.01per cent were housewives.

Institutional participation of the household members: The data regarding the institutional participation of the household members in Kanakapura-2 micro-watershed is presented in Table 7. The results show that, 100 per cent of the population in the micro watershed has not participated in any of the institutions.

Table7. Institutional Participation of household members in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (71)		SF (24)		SMF (37)		MDF (12)		LF (5)		All (149)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	No Participation	71	100	24	100	37	100	12	100	5	100	149	100
Total		71	100	24	100	37	100	12	100	5	100	149	100

Type of house owned: The data regarding the type of house owned by the households in Kanakapura-2 micro-watershed is presented in Table 8. The results indicate that 8.33 per cent of the households possess Thatched house, 27.78 per cent of the households possess katcha house, 13.89 per cent of them possess pucca/RCC house and 50 per cent of them possess semi pucca house.

Table 8. Type of house owned by households in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (71)		SF (24)		SMF (37)		MDF (12)		LF (5)		All (149)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	0	0	0	0	2	25	1	33.33	0	0	3	8.33
2	Katcha	3	16.67	5	83.33	2	25	0	0	0	0	10	27.78
3	Pucca/RCC	3	16.67	0	0	1	12.50	1	33.33	0	0	5	13.89
4	Semi pacca	12	66.67	1	16.67	3	37.50	1	33.33	1	100	18	50
Total		18	100	6	100	8	100	3	100	1	100	36	100

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Kanakapura-2 micro-watershed is presented in Table 9. The results show that 86.11 per cent of the households possess TV, 2.94 per cent of the households possess DVD/VCD Player, 86.11 per cent of them possess mixer/grinder, 2.78 per cent of the households possess Refrigerator, 16.67 per cent of them possess bicycle, 44.44 per cent of the households possess motor cycle and 94.44 per cent of the households possess mobile phones.

Table 9. Durable Assets owned by households in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	15	83.33	6	100	8	100	1	33.33	1	100	31	86.11
2	Mixer/Grinder	15	83.33	6	100	7	87.50	3	100	0	0	31	86.11
3	Refrigerator	1	5.56	0	0	0	0	0	0	0	0	1	2.78
4	Bicycle	5	27.78	1	16.67	0	0	0	0	0	0	6	16.67
5	Motor Cycle	7	38.89	3	50	4	50	1	33.33	1	100	16	44.44
6	Mobile Phone	17	94.44	6	100	8	100	3	100	0	0	34	94.44

Average value of durable: The data regarding the average value of durable assets owned by the households in Kanakapura-2 micro-watershed is presented in Table 10. The results show that the average value of television was Rs 5,919, grinder was Rs 2,325, Refrigerator was Rs 12,000, bicycle was Rs 1,714, motor cycle was Rs. 36,875 and mobile phone was Rs. 1,576.

Table 10. Average value of durable assets owned by households in Kanakapura-2 micro-watershed

Average value (Rs.)

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
1	Television	5,033	7,000	6,500	9,000	5,000	5,919
2	Mixer/Grinder	2,226	2,833	2,457	1,500	0	2,325
3	Refrigerator	12,000	0	0	0	0	12,000
4	Bicycle	1,416	3,500	0	0	0	1,714
5	Motor Cycle	36,714	36,666	40,750	35,000	25,000	36,875
6	Mobile Phone	1,214	2,333	1,553	2,300	0	1,576

Farm Implements owned: The data regarding the farm implements owned by the households in Kanakapura-2 micro-watershed is presented in Table 11. About 11.11 per cent of the households possess bullock cart, 44.44 per cent of them possess plough, 2.78 per cent of them possess Irrigation Pump, 5.88 per cent possess tractor, 33.33 per cent of them possess sprayer and 66.67 per cent of them possess weeder.

Table 11. Farm Implements owned by households in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	0	0	1	16.67	3	37.50	0	0	0	0	4	11.11
2	Plough	9	50	1	16.67	4	50	1	33.33	1	100	16	44.44
3	Irrigation Pump	0	0	1	16.67	0	0	0	0	0	0	1	2.78
4	Sprayer	5	27.78	2	33.33	4	50	1	33.33	0	0	12	33.33
5	Weeder	13	72.22	4	66.67	7	87.50	0	0	0	0	24	66.67

Table 12. Average value of farm implements owned by households in Kanakapura-2 micro-watershed

Average Value (Rs.)

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
1	Bullock Cart	0	25,000	10,000	0	0	17,500
2	Plough	1,866	1,666	1,800	1,933	0	1,820
3	Irrigation Pump	0	0	0	7,000	0	7,000
4	Tractor	0	200,000	0	500,000	0	350,000
5	Sprayer	0	4,100	5,000	2,250	0	3,828
6	Sprinkler	0	8,000	0	0	0	8,000
7	Weeder	111	82	145	450	0	159
8	Harvester	0	84,000	0	0	0	84,000
9	Thresher	245	300	0	271	0	277
10	Chaff Cutter	0	3,000	0	0	0	3,000
11	Earth remover/Duster	0	15,000	0	0	0	15,000

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Kanakapura-2 micro-watershed is presented in Table 12. The results show that the average value of bullock cart was Rs. 17,500, plough was Rs. 1,820, Irrigation Pump was Rs.7,000, tractor was Rs 350,000, sprayer was Rs.3,828, Sprinkler was Rs. 8,000, average value of weeder was Rs. 159, Harvester was Rs. 84,000, Thresher was Rs. 277, average value of chaff cutter was 3,000 and the average value of earth mover/duster was Rs. 15,000.

Livestock possession by the households: The data regarding the Livestock possession by the households in Kanakapura-2 micro-watershed is presented in Table 13. The results indicate that, 13.89 per cent of the households possess bullocks and 30.56 per cent of the households possess local cow, 8.33 per cent of the households possess Crossbred cow, 5.56 per cent of the households possess Buffalo and 5.56 per cent of the households possess Goat.

Table 13. Livestock possession by households in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock	0	0	0	0	4	50	1	33.33	0	0	5	13.89
2	Local cow	4	22.22	3	50	4	50	0	0	0	0	11	30.56
3	Crossbred cow	1	5.56	0	0	0	0	1	33.33	1	100	3	8.33
4	Buffalo	0	0	0	0	1	12.50	0	0	1	100	2	5.56
5	Sheep	1	5.56	0	0	1	12.50	0	0	0	0	2	5.56

Average Labour availability: The data regarding the average labour availability in Kanakapura-2 micro-watershed is presented in Table 14. The results indicate that, average own labour men available in the micro watershed was 1.80, average own labour (women) available was 1.43, average hired labour (men) available was 9.37 and average hired labour (women) available was 6.77.

Table 14. Average Labour availability in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
		N	N	N	N	N	N
1	Hired labour Female	4.56	4	7	12.50	50	6.77
2	Own Labour Female	1.39	1.33	1.75	1	1	1.43
3	Own labour Male	1.44	2.50	1.75	2	4	1.80
4	Hired labour Male	5.56	5.33	8.25	15	100	9.37

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Kanakapura-2 micro-watershed is presented in Table 15. The results indicate that, 97.22 per cent of the households opined that the hired labour was adequate and 5.88 per cent of the households opined that the hired labour was inadequate.

Table 15. Adequacy of Hired Labour in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate	18	100	6	100	8	100	2	66.67	1	100	35	97.22

Distribution of land (ha): The data regarding the distribution of land (ha) in Kanakapura-2 micro-watershed is presented in Table 16. The results indicate that, households of the Kanakapura-2 micro-watershed possess 17.74 ha (36.01 %) of dry land and 31.51 ha (63.99 %) of irrigated land.

Table 16. Distribution of land (Ha) in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	7.99	81.68	6.29	81.84	10.40	66.15	0	0	0	0	24.69	53.87
2	Irrigated	1.79	18.32	1.40	18.16	5.32	33.85	6.15	100	6.48	100	21.14	46.13
Total		9.79	100	7.69	100	15.72	100	6.15	100	6.48	100	45.82	100

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Kanakapura-2 micro-watershed is presented in Table 17. The results indicate that, the average value of dry land was Rs. 504,122.95 and the average value of irrigated land was Rs. 617,861.06.

Table 17. Average land value (Rs./ha) in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
		N	N	N	N	N	N
1	Dry	937,974.69	293,858.52	297,937.75	0	0	504,122.95
2	Irrigated	1,644,808.15	859,130.44	375,690.75	977,437.48	138,937.50	617,861.06

Status of bore wells: The data regarding the status of bore wells in Kanakapura-2 micro-watershed is presented in Table 18. The results indicate that, there were 16 functioning and 11 de-functioning bore wells in the micro watershed.

Table 18. Status of bore wells in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
		N	N	N	N	N	N
1	De-functioning	4	1	3	2	1	11
2	Functioning	5	2	5	3	1	16

Source of irrigation: The data regarding the source of irrigation in Kanakapura-2 micro-watershed is presented in Table 19. The results indicate that, bore well was the major irrigation source in the micro water shed for 44.44 per cent of the farmers.

Table 19. Source of irrigation in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bore Well	5	27.78	2	33.33	5	62.50	3	100	1	100	16	44.44

Table 20. Depth of water (Avg in meters) in Kanakapura-2 micro-watershed

Sl.No.	Particulars	LL (0)	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
		N	N	N	N	N	N	N
1	Bore Well	0	27.94	33.02	66.68	101.60	106.68	45.72

Depth of water (Avg in meters): The data regarding the depth of water in Kanakapura-2 micro-watershed is presented in Table 20. The results indicate that, the depth of bore well was found to be 45.72 meters.

Irrigated Area (ha): The results (Table 21) indicate that marginal, small, semi medium, medium farmers and large farmers had an irrigated area of 2.60 ha, 1.64 ha, 6.34 ha, 1.62 ha and 18.68 ha respectively.

Table 21. Irrigated Area (ha) in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
1	Kharif	1.79	1.64	6.48	6.34	1.62	17.87
2	Rabi	0.81	0	0	0	0	0.81
Total		2.60	1.64	6.48	6.34	1.62	18.68

Cropping pattern: The data regarding the cropping pattern in Kanakapura-2 micro-watershed is presented in Table 22. The results indicate that, farmers have grown Bajra (4.37 ha), Bengal gram (6.48 ha), Navane (1.68 ha), Pearl millet (9.66 ha), Groundnut (1.67 ha), maize (18.43 ha), Sesamum (1.32 ha), Red gram (2.19 ha) and Cowpea (0.40 ha).

Table 22. Cropping pattern in Kanakapura-2 micro-watershed

(Area in ha)

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
1	Kharif - Bajra	0.93	0.00	1.21	2.23	0.00	4.37
2	Kharif - Groundnut	0.45	0.40	0.81	0.00	0.00	1.67
3	Kharif - Maize	1.34	4.47	6.88	4.11	1.62	18.43
4	Kharif - Navane (Fox Millet)	0.47	0.00	1.21	0.00	0.00	1.68
5	Kharif - Pearl millet (Sajje)	4.40	1.62	2.83	0.00	0.00	8.85
6	Kharif - Red gram (togari)	0.98	0.00	0.81	0.00	0.00	1.79
7	Kharif - Sesamum (yellu)	0.00	1.21	0.00	0.00	0.00	1.21
8	Rabi - Bengal gram	0.00	0.00	0.00	0.00	6.48	6.48
9	Rabi - Cowpea	0.40	0.00	0.00	0.00	0.00	0.40
10	Rabi - Pearl millet (Sajje)	0.81	0.00	0.00	0.00	0.00	0.81
11	Rabi - Red gram (togari)	0.40	0.00	0.00	0.00	0.00	0.40
12	Rabi - Sesamum (yellu)	0.11	0.00	0.00	0.00	0.00	0.11
Total		10.31	7.71	13.77	6.34	8.10	46.22

Cropping intensity: The data regarding the cropping intensity in Kanakapura-2 micro-watershed is presented in Table 23. The results indicate that, the cropping intensity in Kanakapura-2 micro-watershed was found to be 75.02 per cent.

Table 23. Cropping intensity (%) in Kanakapura-2 micro-watershed

Sl.No.	Particulars	LL (0)	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
1	Cropping Intensity	0	100	96.16	56.95	102.96	62.50	75.02

Cost of cultivation of Bajra: The data regarding the cost of cultivation of Bajra in Kanakapura-2 micro-watershed is presented in Table 24. The results indicate that, the total cost of cultivation for Bajra was Rs. 26117.90. The gross income realized by the farmers was Rs. 23737.72. The net income from Bajra cultivation was Rs. -2380.18. Thus the benefit cost ratio was found to be 1: 0.91.

Table 24. Cost of Cultivation of bajra in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	29.57	4799.82	18.38
2	Bullock		Pairs/day	2.14	1560.39	5.97
3	Tractor		Hours	2.42	1907.49	7.30
4	Machinery		Hours	0.93	1021.68	3.91
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	7.89	884.27	3.39
6	FYM		Quintal	1.72	2888.65	11.06
7	Fertilizer + micronutrients		Quintal	5.47	4822.01	18.46
8	Pesticides (PPC)		Kgs / liters	0.72	720.42	2.76
9	Irrigation		Number	1.35	0	0
10	Depreciation charges			0	127.38	0.49
11	Land revenue and Taxes			0	3.29	0.01
II	**Cost B1**					
12	Interest on working capital				1118.06	4.28
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				19853.46	76.01
III	**Cost B2**					
14	Rental Value of Land				380.95	1.46
15	**Cost B2 = (Cost B1 + Rental value)**				20234.41	77.47
IV	**Cost C1**					
16	Family Human Labour			18.69	3507.35	13.43
17	**Cost C1 = (Cost B2 + Family Labour)**				23741.76	90.90
V	**Cost C2**					
18	Risk Premium				1.79	0.01
19	**Cost C2 = (Cost C1 + Risk Premium)**				23743.54	90.91
VI	**Cost C3**					
20	Managerial Cost				2374.35	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				26117.90	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.41	22949.98	
		b) Main Crop Sales Price (Rs.)			1592.86	
	By Product	c) Main Product (q)		2.04	787.74	
		d) Main Crop Sales Price (Rs.)			385.71	
b.	Gross Income (Rs.)				23737.72	
c.	Net Income (Rs.)				-2380.18	
d.	Cost per Quintal (Rs./q.)				1812.73	
e.	Benefit Cost Ratio (BC Ratio)				1:0.91	

Cost of Cultivation of Bengal gram: The data regarding the cost of cultivation of bengal gram in Kanakapura-2 micro-watershed is presented in Table 25. The results indicate that, the total cost of cultivation for bengal gram was Rs. 7938.92. The gross income realized by the farmers was Rs. 74236.52. The net income from bengal gram cultivation was Rs. 22418.17. Thus the benefit cost ratio was found to be 1: 1.43.

Table 25. Cost of Cultivation of bengal gram in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	10.03	1783.03	22.46
3	Tractor		Hours	0.93	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	7.72	771.88	9.72
8	Fertilizer + micronutrients		Quintal	4.01	2979.44	37.53
13	Depreciation charges			0	6.18	0.08
14	Land revenue and Taxes			0	3.29	0.04
II	**Cost B1**					
16	Interest on working capital				450.40	5.67
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				5994.21	75.50
III	**Cost B2**					
18	Rental Value of Land				333.33	4.20
19	**Cost B2 = (Cost B1 + Rental value)**				6327.54	79.70
IV	**Cost C1**					
20	Family Human Labour			3.86	887.66	11.18
21	**Cost C1 = (Cost B2 + Family Labour)**				7215.20	90.88
V	**Cost C2**					
22	Risk Premium				2	0.03
23	**Cost C2 = (Cost C1 + Risk Premium)**				7217.20	90.91
VI	**Cost C3**					
24	Managerial Cost				721.72	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				7938.92	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		15.44	61750	
		b) Main Crop Sales Price (Rs.)			4000	
b.	Gross Income (Rs.)				61750	
c.	Net Income (Rs.)				53811.08	
d.	Cost per Quintal (Rs./q.)				514.26	
e.	Benefit Cost Ratio (BC Ratio)				1:7.78	

Cost of Cultivation of Navane: The data regarding the cost of cultivation of Navane in Kanakapura-2 micro-watershed is presented in Table 26. The results indicate that, the total cost of cultivation for Navane was Rs. 318503.50. The gross income realized by the farmers was Rs. 18516.95. The net income from Navane cultivation was Rs. -1751.47. Thus the benefit cost ratio was found to be 1: 0.91.

Table 26. Cost of Cultivation of Navane in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	23.27	4043.28	19.95
2	Bullock		Pairs/day	2.56	1997.48	9.86
3	Tractor		Hours	1.49	1979.58	9.77
4	Machinery		Hours	0	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	5.28	549.93	2.71
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	0	0	0
8	Fertilizer + micronutrients		Quintal	5.44	5594.19	27.60
9	Pesticides (PPC)		Kgs / liters	0	0	0
10	Irrigation		Number	0	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	323.78	1.60
14	Land revenue and Taxes			0	3.29	0.02
II	**Cost B1**					
16	Interest on working capital				737.48	3.64
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				15229.02	75.14
III	**Cost B2**					
18	Rental Value of Land				333.33	1.64
19	**Cost B2 = (Cost B1 + Rental value)**				15562.35	76.78
IV	**Cost C1**					
20	Family Human Labour			13.85	2861.98	14.12
21	**Cost C1 = (Cost B2 + Family Labour)**				18424.33	90.90
V	**Cost C2**					
22	Risk Premium				1.50	0.01
23	**Cost C2 = (Cost C1 + Risk Premium)**				18425.83	90.91
VI	**Cost C3**					
24	Managerial Cost				1842.58	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				20268.41	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		11.22	18516.95	
		b) Main Crop Sales Price (Rs.)			1650	
b.	Gross Income (Rs.)				18516.95	
c.	Net Income (Rs.)				-1751.47	
d.	Cost per Quintal (Rs./q.)				1806.07	
e.	Benefit Cost Ratio (BC Ratio)				1:0.91	

Cost of cultivation of Groundnut: The data regarding the cost of cultivation groundnut in Kanakapura-2 micro-watershed is presented in Table 27. The results indicate that, the total cost of cultivation for groundnut was Rs. 72585.96. The gross income realized by the farmers was Rs. 58850.69. The net income from groundnut cultivation was Rs. -13735.27. Thus the benefit cost ratio was found to be 1: 0.81.

Table 27. Cost of Cultivation of groundnut in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	67.07	11193.22	15.42
2	Bullock		Pairs/day	4.03	3222.76	4.44
3	Tractor		Hours	5.09	4069.62	5.61
4	Machinery		Hours	2.29	1764.29	2.43
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	45.14	5483.99	7.56
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	1.97	7262.98	10.01
8	Fertilizer + micronutrients		Quintal	15.35	14790.60	20.38
9	Pesticides (PPC)		Kgs / liters	2.79	2793.45	3.85
10	Irrigation		Number	7.38	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	1179.01	1.62
14	Land revenue and Taxes			0	3.29	0
II	**Cost B1**					
16	Interest on working capital				3639.96	5.01
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				55403.16	76.33
III	**Cost B2**					
18	Rental Value of Land				333.33	0.46
19	**Cost B2 = (Cost B1 + Rental value)**				55736.50	76.79
IV	**Cost C1**					
20	Family Human Labour			46.11	10248.74	14.12
21	**Cost C1 = (Cost B2 + Family Labour)**				65985.23	90.91
V	**Cost C2**					
22	Risk Premium				2	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				65987.23	90.91
VI	**Cost C3**					
24	Managerial Cost				6598.72	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				72585.96	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		15.58	57143.25	
		b) Main Crop Sales Price (Rs.)			3666.67	
	By Product	e) Main Product (q)		1.97	1707.44	
		f) Main Crop Sales Price (Rs.)			866.67	
b.	Gross Income (Rs.)				58850.69	
c.	Net Income (Rs.)				-13735.27	
d.	Cost per Quintal (Rs./q.)				4657.57	
e.	Benefit Cost Ratio (BC Ratio)				1:0.81	

Cost of cultivation of Sesamum: The data regarding the cost of cultivation of Sesamum in Kanakapura-2 micro-watershed is presented in Table 28. The results indicate that, the total cost of cultivation for Sesamum was Rs. 76069.80. The gross income realized by the farmers was Rs. 42048.81. The net income from Sesamum cultivation was Rs. -34020. Thus the benefit cost ratio was found to be 1: 0.55.

Table 28. Cost of Cultivation of Sesamum in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	129.50	16900.68	22.22
2	Bullock		Pairs/day	0	0	0
3	Tractor		Hours	0.82	658.67	0.87
4	Machinery		Hours	9.64	10585.71	13.92
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	10.88	1720.18	2.26
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	0.82	2881.67	3.79
8	Fertilizer + micronutrients		Quintal	20.11	16090.29	21.15
9	Pesticides (PPC)		Kgs / liters	4.82	4822.38	6.34
10	Land revenue and Taxes			0	3.29	0
II	**Cost B1**					
11	Interest on working capital				3061.98	4.03
12	**Cost B1 = (Cost A1 + sum of 15 and 16)**				56724.85	74.57
III	**Cost B2**					
13	Rental Value of Land				333.33	0.44
14	**Cost B2 = (Cost B1 + Rental value)**				57058.18	75.01
IV	**Cost C1**					
15	Family Human Labour			61.99	12094.18	15.90
16	**Cost C1 = (Cost B2 + Family Labour)**				69152.36	90.91
V	**Cost C2**					
17	Risk Premium				2	0
18	**Cost C2 = (Cost C1 + Risk Premium)**				69154.36	90.91
VI	**Cost C3**					
19	Managerial Cost				6915.44	9.09
20	**Cost C3 = (Cost C2 + Managerial Cost)**				76069.80	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		6.47	42048.81	
		b) Main Crop Sales Price (Rs.)			6500	
b.	Gross Income (Rs.)				42048.81	
c.	Net Income (Rs.)				-34020.99	
d.	Cost per Quintal (Rs./q.)				11759.04	
e.	Benefit Cost Ratio (BC Ratio)				1:0.55	

Cost of cultivation of Maize: The data regarding the cost of cultivation of maize in Kanakapura-2 micro-watershed is presented in Table 29. The results indicate that, the total cost of cultivation for maize was Rs. 33731.06. The gross income realized by the farmers was Rs. 43575.50. The net income from maize cultivation was Rs. 9844.44. Thus the benefit cost ratio was found to be 1: 1.29.

Table 29. Cost of Cultivation of Maize in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	31.84	4747.87	14.08
2	Bullock		Pairs/day	1.97	1304.28	3.87
3	Tractor		Hours	2.78	2358.25	6.99
4	Machinery		Hours	0.36	185.25	0.55
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	12.62	1608.91	4.77
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	2.40	2215.03	6.57
8	Fertilizer + micronutrients		Quintal	10.42	9613.47	28.50
9	Pesticides (PPC)		Kgs /liters	1.61	1612.89	4.78
10	Irrigation		Number	6.71	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	224.58	0.67
14	Land revenue and Taxes			0	3.29	0.01
II	**Cost B1**					
15	Interest on working capital				1806.22	5.35
16	**Cost B1 = (Cost A1 + sum of 15 and 16)**				25680.05	76.13
III	**Cost B2**					
17	Rental Value of Land				352.94	1.05
18	**Cost B2 = (Cost B1 + Rental value)**				26032.99	77.18
IV	**Cost C1**					
19	Family Human Labour			23.02	4630.08	13.73
20	**Cost C1 = (Cost B2 + Family Labour)**				30663.07	90.90
V	**Cost C2**					
21	Risk Premium				1.53	0
22	**Cost C2 = (Cost C1 + Risk Premium)**				30664.60	90.91
VI	**Cost C3**					
24	Managerial Cost				3066.46	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				33731.06	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		25.10	34703	
		b) Main Crop Sales Price (Rs.)			1382.35	
	By Product	c) Main Product (q)		11.01	8872.50	
		d) Main Crop Sales Price (Rs.)			805.88	
b.	Gross Income (Rs.)				43575.50	
c.	Net Income (Rs.)				9844.44	
d.	Cost per Quintal (Rs./q.)				1343.64	
e.	Benefit Cost Ratio (BC Ratio)				1:1.29	

Cost of cultivation of Cowpea: The data regarding the cost of cultivation of Cowpea in Kanakapura-2 micro-watershed is presented in Table 30. The results indicate that, the total cost of cultivation for Cowpea was Rs. 39947.49. The gross income realized by the farmers was Rs. 41496. The net income from Cowpea cultivation was Rs. 1548.51. Thus the benefit cost ratio was found to be 1: 1.04.

Table 30. Cost of Cultivation of Cowpea in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	27.17	4223.70	10.57
2	Bullock		Pairs/day	4.94	5928	14.84
3	Tractor		Hours	2.47	4940	12.37
4	Machinery		Hours	0	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	4.94	395.20	0.99
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	0	0	0
8	Fertilizer + micronutrients		Quintal	9.88	8941.40	22.38
9	Pesticides (PPC)		Kgs / liters	0	0	0
10	Irrigation		Number	19.76	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	4.94	0.01
14	Land revenue and Taxes			0	3.29	0.01
II	**Cost B1**					
16	Interest on working capital				1120.63	2.81
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				25557.17	63.98
III	**Cost B2**					
18	Rental Value of Land				333.33	0.83
19	**Cost B2 = (Cost B1 + Rental value)**				25890.50	64.81
IV	**Cost C1**					
20	Family Human Labour			49.40	10423.40	26.09
21	**Cost C1 = (Cost B2 + Family Labour)**				36313.90	90.90
V	**Cost C2**					
22	Risk Premium				2	0.01
23	**Cost C2 = (Cost C1 + Risk Premium)**				36315.90	90.91
VI	**Cost C3**					
24	Managerial Cost				3631.59	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				39947.49	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.82	41496	
		b) Main Crop Sales Price (Rs.)			2800	
b.	Gross Income (Rs.)				41496	
c.	Net Income (Rs.)				1548.51	
d.	Cost per Quintal (Rs./q.)				2695.51	
e.	Benefit Cost Ratio (BC Ratio)				1:1.04	

Cost of cultivation of Redgram: The data regarding the cost of cultivation of redgram in Kanakapura-2 micro-watershed is presented in Table 31. The results indicate that, the total cost of cultivation for redgram was Rs. 75605.27. The gross income realized by the farmers was Rs. 49810.42. The net income from redgram cultivation was Rs. --25794.85. Thus the benefit cost ratio was found to be 1: 0.66.

Table 31. Cost of Cultivation of Redgram in Kanakapura-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	82.98	11964.56	15.83
2	Bullock		Pairs/day	1.66	1282.25	1.70
3	Tractor		Hours	5.87	4868.66	6.44
4	Machinery		Hours	2.34	2809.36	3.72
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	7.93	1065.78	1.41
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	5.87	19095.52	25.26
8	Fertilizer + micronutrients		Quintal	12.85	10247.86	13.55
9	Pesticides (PPC)		Kgs / liters	3.43	3231.25	4.27
10	Irrigation		Number	6.44	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	247	0.33
14	Land revenue and Taxes			0	3.29	0
II	**Cost B1**					
16	Interest on working capital				4037.09	5.34
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				58852.62	77.84
III	**Cost B2**					
18	Rental Value of Land				333.33	0.44
19	**Cost B2 = (Cost B1 + Rental value)**				59185.95	78.28
IV	**Cost C1**					
20	Family Human Labour			48.02	9544.11	12.62
21	**Cost C1 = (Cost B2 + Family Labour)**				68730.06	90.91
V	**Cost C2**					
22	Risk Premium				2	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				68732.06	90.91
VI	**Cost C3**					
24	Managerial Cost				6873.21	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				75605.27	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		10.63	49770.90	
		b) Main Crop Sales Price (Rs.)			4680	
	By Product	e) Main Product (q)		0.25	39.52	
		f) Main Crop Sales Price (Rs.)			160	
b.	Gross Income (Rs.)				49810.42	
c.	Net Income (Rs.)				-25794.85	
d.	Cost per Quintal (Rs./q.)				7109.23	
e.	Benefit Cost Ratio (BC Ratio)				1:0.66	

Adequacy of fodder: The data regarding the adequacy of fodder in Kanakapura-2 micro-watershed is presented in Table 32. The results indicate that, 44.44 per cent of the households opined that dry fodder was adequate and 47.22 per cent of the households opined that green fodder was adequate.

Table 32. Adequacy of fodder in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	5	27.78	2	33.33	6	75	2	66.67	1	100	16	44.44
2	Adequate-Green Fodder	5	27.78	3	50	6	75	2	66.67	1	100	17	47.22

Annual gross income: The data regarding the annual gross income in Kanakapura-2 micro-watershed is presented in Table 33. The results indicate that the annual gross income was Rs. 2,400 for landless households, for marginal farmers it was Rs. 127,133.33, for small farmers it was Rs. 61,066.67, for semi medium farmers it was Rs. 103,312.50, for medium farmers it was Rs. 59,666.67 and for semi large farmers it was Rs. 445,000.

Table 33. Annual gross income in Kanakapura-2 micro-watershed

(Avg value in Rs.)

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	7,777.78	10,000	0	0	0	5,555.56
2	Business	0	0	12,500	0	0	2,777.78
3	Wage	19,166.67	10,833.33	9,375	15,000	0	14,722.22
4	Agriculture	100,022.22	39,150	79,687.50	44,666.67	445,000	90,327.78
5	Dairy Farm	166.67	1,083.33	1,750	0	0	652.78
Income(Rs.)		127,133.33	61,066.67	103,312.50	59,666.67	445,000	114,036.11

Average annual expenditure: The data regarding the average annual expenditure in Kanakapura-2 micro-watershed is presented in Table 34. The results indicate that the average annual expenditure is Rs. 32,321.01. For marginal farmers it was Rs. 22,912.85, for small farmers it was Rs. 14,583.33, for semi medium farmers it was Rs. 20,578.13, for medium farmers it was Rs. 23,000 and for large farmers it was Rs. 430,000.

Table 34. Average annual expenditure in Kanakapura-2 micro-watershed

(Avg value in Rs.)

Sl.No.	Particulars	MF (18)	SF (6)	SMF (8)	MDF (3)	LF (1)	All (36)
1	Service/salary	55,000	50,000	0	0	0	4,444.44
2	Business	0	0	90,000	0	0	2,500
3	Wage	6,666.67	7,000	9,000	16,500	0	5,000
4	Agriculture	349,764.71	29,000	62,125	52,500	430,000	198,666.67
5	Dairy Farm	1,000	1,500	3,500	0	0	305.56
Total		412,431.37	87,500	164,625	69,000	430,000	1,163,556.37
Average		22,912.85	14,583.33	20,578.13	23,000	430,000	32,321.01

Horticulture species grown: The data regarding horticulture species grown in Kanakapura-2 micro-watershed is presented in Table 35. The results indicate that,

sampled households have grown 83 coconut trees in their field and 13 in backyard and 2 Lemon trees in backyard.

Table 35. Horticulture species grown in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Coconut	4	10	2	1	2	1	72	1	3	0	83	13
2	Lemon	0	2	0	0	0	0	0	0	0	0	0	2

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

Forest species grown: The data regarding forest species grown in Kanakapura-2 micro-watershed is presented in Table 36. The results indicate that, households have planted 6 Cashew, 110 Teak, 128 neem, 3 tamarind, 10 Pongamia and 8 banyan trees in their field, Also, 3 neem trees in their backyard.

Table 36: Forest species grown in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Cashew	6	0	0	0	0	0	0	0	0	0	6	0
2	Teak	0	0	0	0	100	0	10	0	0	0	110	0
3	Neem	24	2	18	1	75	0	9	0	2	0	128	3
4	Tamarind	3	0	0	0	0	0	0	0	0	0	3	0
5	Pongamia	10	0	0	0	0	0	0	0	0	0	10	0
6	Banyan	6	0	2	0	0	0	0	0	0	0	8	0

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

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Kanakapura-2 micro-watershed is presented in Table 37. The results indicated that, Bajra, Bengalgram, Cow Pea, Groundnut, Maize, Navane, Sesamum and Redgram were sold to the extent of 100 per cent.

Table 37. Marketing of the agricultural produce in Kanakapura-2 micro-watershed

Sl.No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Bajra	208.0	0.0	208.0	100.0	1592.86
2	Bengalgram (Kadale)	100.0	0.0	100.0	100.0	4000.0
3	Cow Pea	6.0	0.0	6.0	100.0	2800.0
4	Groundnut	24.0	0.0	24.0	100.0	3666.67
5	Maize	428.0	0.0	428.0	100.0	1382.35
6	Navane	16.0	0.0	16.0	100.0	1650.0
7	Redgram	25.0	0.0	25.0	100.0	4680.0
8	Sesamum	6.0	0.0	6.0	100.0	6500.0

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Kanakapura-2 micro-watershed is presented in Table 38. The results indicated that, about 41.67 per cent of the farmers sold their produce to local/village merchants and 8.33 per cent of the farmers sold

their produce to regulated market, 8.82 per cent of the farmers sold their produce to Cooperative marketing Society and 75 per cent of the farmers sold their produce to Agent/Traders.

Table 38. Marketing Channels used for sale of agricultural produce in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agent/Traders	14	77.78	4	66.67	7	87.50	2	66.67	0	0	27	75
2	Local/village Merchant	6	33.33	1	16.67	5	62.50	1	33.33	2	200	15	41.67
3	Regulated Market	0	0	2	33.33	1	12.50	0	0	0	0	3	8.33

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Kanakapura-2 micro-watershed is presented in Table 39. The results indicated that 100 per cent of the households used tractor as a mode of transportation for their agricultural produce.

Table 39. Mode of transport of agricultural produce in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Tractor	18	100	6	100	8	100	3	100	1	100	36	100

Incidence of soil and water erosion problems: The data regarding incidence of soil and water erosion problems in Kanakapura-2 micro-watershed is presented in Table 40. The results indicated that, 19.44 per cent of the households have experienced soil and water erosion problems in the farm.

Table 40. Incidence of soil and water erosion problems in Kanakapura-2 micro-watershed

Sl. No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All(36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Soil and water erosion problems in the farm	2	11.11	2	33.33	3	37.50	0	0	0	0	7	19.44

Interest shown towards soil testing: The data regarding incidence of soil and water erosion problems in Kanakapura-2 micro-watershed is presented in Table 41. The results indicated that, 22.22 per cent have shown interest in soil test.

Table 41. Interest shown towards soil testing in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	2	11.11	2	33.33	3	37.50	1	33.33	0	0	8	22.22

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Kanakapura-2 micro-watershed is presented in Table 42. The results indicated that, 75 per cent of the households used firewood, 16.67 per cent of the

households used LPG as a source of fuel and 2.78 per cent of the households used Dung Cake and 5.56 per cent of the households used Biogas as a source of fuel.

Table 42. Usage pattern of fuel for domestic use in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Dung Cake	1	5.56	0	0	0	0	0	0	0	0	1	2.78
2	Fire Wood	12	66.67	4	66.67	7	87.50	3	100	1	100	27	75
3	Biogas	2	11.11	0	0	0	0	0	0	0	0	2	5.56
4	LPG	3	16.67	2	33.33	1	12.50	0	0	0	0	6	16.67

Source of drinking water: The data regarding source of drinking water in Kanakapura-2 micro-watershed is presented in Table 43. The results indicated that, piped supply was the source of drinking water for 22.22 per cent of the households and bore well was the source of drinking water for 75 per cent of the households in micro watershed.

Table 43. Source of drinking water in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	2	11.11	2	33.33	3	37.50	1	33.33	0	0	8	22.22
2	Bore Well	15	83.33	4	66.67	5	62.50	2	66.67	1	100	27	75

Source of light: The data regarding source of light in Kanakapura-2 micro-watershed is presented in Table 44. The results indicated that, Electricity was the major source of light for 100 per cent of the households in micro watershed.

Table 44. Source of light in Kanakapura-2 micro-watershed

Sl.No.	Particulars	LL (0)		MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%
1	Electricity	0	0	18	100	6	100	8	100	3	100	1	100	36	100

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facili**y** in Kanakapura-2 micro-watershed is presented in Table 45. The results indicated that, 38.89 per cent of the households possess sanitary toilet facility.

Table 45. Existence of Sanitary toilet facility in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	7	38.89	2	33.33	1	12.50	3	100	1	100	14	38.89

Table 46. Possession of PDS card in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	BPL	14	77.78	6	100	8	100	3	100	1	100	32	88.89
2	Not Possessed	4	22.22	0	0	0	0	0	0	0	0	4	11.11

Possession of PDS card: The data regarding possession of PDS card in Kanakapura-2 micro-watershed is presented in Table 46. The results indicated that, 88.89 per cent of the

sampled households possessed BPL card and 11.11 per cent of the households did not possess PDS card.

Participation in NREGA program: The data regarding participation in NREGA programme in Kanakapura-2 micro-watershed is presented in Table 47. The results indicated that, 44.44 per cent of the households participated in NREGA programme.

Table 47. Participation in NREGA programme in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	9	50	2	33.33	1	12.50	3	100	1	100	16	44.44

Adequacy of food items: The data regarding adequacy of food items in Kanakapura-2 micro-watershed is presented in Table 48. The results indicated that, cereals were adequate for 100 per cent of the households, pulses were adequate for 47.22 per cent, oilseeds were adequate for 77.78 per cent, vegetables were adequate for 77.78 per cent, milk was adequate for 100 per cent, eggs were adequate for 58.33 per cent and meat was adequate for 52.78 per cent.

Table 48. Adequacy of food items in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	18	100	6	100	8	100	3	100	1	100	36	100
2	Pulses	5	27.78	5	83.33	4	50	3	100	0	0	17	47.22
3	Oilseed	16	88.89	4	66.67	5	62.50	2	66.67	1	100	28	77.78
4	Vegetables	15	83.33	4	66.67	6	75	2	66.67	1	100	28	77.78
5	Milk	18	100	6	100	8	100	3	100	1	100	36	100
6	Egg	10	55.56	5	83.33	4	50	1	33.33	1	100	21	58.33
7	Meat	9	50	5	83.33	4	50	1	33.33	0	0	19	52.78

Response on Inadequacy of food items: The data regarding inadequacy of food items in Kanakapura-2 micro-watershed is presented in Table 49. The results indicated that, pulses were inadequate for 50 per cent of the households, oilseeds were inadequate for 22.22 per cent, fruits were inadequate for 22.22 per cent and Vegetables was inadequate for 22.22 per cent of the households.

Table 49. Response on Inadequacy of food items in Kanakapura-2 micro-watershed

Sl.No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Pulses	12	66.67	1	16.67	4	50	0	0	1	100	18	50
2	Oilseed	2	11.11	2	33.33	3	37.50	1	33.33	0	0	8	22.22
3	Vegetables	3	16.67	2	33.33	2	25	1	33.33	0	0	8	22.22
4	Fruits	2	11.11	2	33.33	3	37.50	1	33.33	0	0	8	22.22

Farming constraints: The data regarding farming constraints experienced by households in Kanakapura-2 micro-watershed is presented in Table 50. The results indicated that, lower fertility status of the soil was the constraint experienced by 22.22 per cent of the

households, wild animal menace on farm field (58.33 %), frequent incidence of pest and diseases (63.89 %), inadequacy of irrigation water (22.22 %), high cost of fertilizers and plant protection chemicals (69.44 %), high rate of interest on credit (52.78 %), lack of marketing facilities in the area (33.33 %), lack of transport for safe transport of the agricultural produce to the market (5.56 %), less rainfall (75 %) and source of agri-technology information (27.78 %).

Table 50. Farming constraints Experienced in Kanakapura-2 micro-watershed

Sl. No.	Particulars	MF (18)		SF (6)		SMF (8)		MDF (3)		LF (1)		All (36)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	2	11.11	2	33.33	3	37.50	1	33.33	0	0	8	22.22
2	Wild animal menace on farm field	6	33.33	5	83.33	6	75	3	100	1	100	21	58.33
3	Frequent incidence of pest and diseases	10	55.56	5	83.33	6	75	1	33.33	1	100	23	63.89
4	Inadequacy of irrigation water	2	11.11	2	33.33	3	37.50	1	33.33	0	0	8	22.22
5	High cost of Fertilizers and plant protection chemicals	14	77.78	2	33.33	8	100	1	33.33	0	0	25	69.44
6	High rate of interest on credit	9	50	3	50	4	50	3	100	0	0	19	52.78
8	Lack of marketing facilities in the area	8	44.44	2	33.33	2	25	0	0	0	0	12	33.33
10	Lack of transport for safe transport of the Agril produce to the market.	1	5.56	0	0	1	12.50	0	0	0	0	2	5.56
11	Less rainfall	16	88.89	4	66.67	4	50	2	66.67	1	100	27	75
12	Source of Agri-technology information(Newspaper/TV/Mobile)	7	38.89	1	16.67	2	25	0	0	0	0	10	27.78

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

The data on households sampled for socio economic survey in Kanakapura-2 micro-watershed indicated that 36 farmers were sampled in Kanakapura-2 micro-watershed among them 18 (50 %) were marginal farmers, 6 (16.67 %) were small farmers, 8 (22.22 %) were semi medium farmer, 3 (8.33 %) were medium farmers and 1 (2.78 %) were large farmers.

The data indicated that there were 89 (59.73 %) men and 60 (40.27 %) were women among the sampled households. The average family size of marginal farmers' was 3.9, small farmers' was 4, semi medium farmers' was 4.6, medium farmers' was 4 and large farmers' was 5.

The data indicated that, 13 (8.72 %) people were in 0-15 years of age, 67 (44.97 %) were in 16-35 years of age, 53 (35.57 %) were in 36-60 years of age and 16 (10.74 %) were above 61 years of age.

The results indicated that Kanakapura-2 had 38.93 per cent illiterates, 0.67 per cent Functional Literate, 18.12 per cent of them had primary school education, 2.68 per cent of them had middle school education, 16.11 per cent of them had high school education, 12.75 per cent of them had PUC education, 0.67 per cent of them had Diploma, 2.01 per cent of them had ITI, 3.36 per cent of them had degree education and 0.67 per cent of them did Masters.

The results indicate that, 72.22 per cent of household heads were practicing agriculture and 22.22per cent of the household heads were agricultural labourers. The results indicate that agriculture was the major occupation for 55.03 per cent of the household members, 22.15 per cent were agricultural labourers, 1.34 per cent were in Household industry, 18.79 per cent were students and 2.01per cent were housewives.

The results show that, 100 per cent of the population in the micro watershed has not participated in any of the institutions. The results indicate that 8.33 per cent of the households possess Thatched house, 27.78 per cent of the households possess katcha house, 13.89 per cent of them possess pucca/RCC house and 50 per cent of them possess semi pucca house.

The results show that 86.11 per cent of the households possess TV, 2.94 per cent of the households possess DVD/VCD Player, 86.11 per cent of them possess mixer/grinder, 2.78 per cent of the households possess Refrigerator, 16.67 per cent of them possess bicycle, 44.44 per cent of the households possess motor cycle and 94.44 per cent of the households possess mobile phones. The results show that the average value of television was Rs 5,919, grinder was Rs 2,325, Refrigerator was Rs 12,000, bicycle was Rs 1,714, motor cycle was Rs. 36,875 and mobile phone was Rs. 1,576.

About 11.11 per cent of the households possess bullock cart, 44.44 per cent of them possess plough, 2.78 per cent of them possess Irrigation Pump, 5.88 per cent possess tractor, 33.33 per cent of them possess sprayer and 66.67 per cent of them possess weeder. The results show that the average value of bullock cart was Rs. 17,500, plough was Rs. 1,820, Irrigation Pump was Rs.7,000, tractor was Rs 350,000, sprayer was Rs.3,828, Sprinkler was Rs. 8,000, average value of weeder was Rs. 159, Harvester was Rs. 84,000, Thresher was Rs. 277, average value of chaff cutter was 3,000 and the average value of earth mover/duster was Rs. 15,000.

The results indicate that, 13.89 per cent of the households possess bullocks and 30.56 per cent of the households possess local cow, 8.33 per cent of the households possess Crossbred cow, 5.56 per cent of the households possess Buffalo and 5.56 per cent of the households possess Goat.

The results indicate that, average own labour men available in the micro watershed was 1.80, average own labour (women) available was 1.43, average hired labour (men) available was 9.37 and average hired labour (women) available was 6.77. The results indicate that, 97.22 per cent of the households opined that the hired labour was adequate and 5.88 per cent of the households opined that the hired labour was inadequate.

The results indicate that, households of the Kanakapura-2 micro-watershed possess 17.74 ha (36.01 %) of dry land and 31.51 ha (63.99 %) of irrigated land. Marginal farmers possess 3.30 ha (85.80 %) of dry land and 0.55 ha (14.20 %) of irrigated land. Small farmers possess 5.65 ha (52.11 %) of dry land and 5.19 ha (47.89 %) of irrigated land. Semi medium farmers possess 5.90 ha (58.47 %) of dry land and 4.19 ha (41.53 %) of irrigated land. Medium farmers possess 2.89 ha (16.56 %) of dry land and 14.56 ha (83.44 %) of irrigated land. Large farmers possess 7.03 ha (100 %) of irrigated land.

The results indicate that, the average value of dry land was Rs. 504,122.95 and the average value of irrigated land was Rs. 617,861.06. In case of marginal famers, the average land value was Rs. 937,974.69 for dry land and Rs. 1,644,808.15. In case of small famers, the average land value was Rs. 293,858.52 for dry land and Rs. 859,130.44 for irrigated land. In case of semi medium famers, the average land value was Rs. 297,937.75 for dry land and Rs. 375,690.75 for irrigated land. In case of medium farmers,

the average land value was Rs. 977,437.48 for irrigated land. In case of large farmers, the average land value was Rs. 138,937.50 for irrigated land.

The results indicate that, there were 16 functioning and 11 de-functioning bore wells in the micro watershed. The results indicate that, bore well was the major irrigation source in the micro water shed for 44.44 per cent of the farmers. The results indicate that, the depth of bore well was found to be 45.72 meters. The results indicate that marginal, small, semi medium, medium farmers and large farmers had an irrigated area of 2.60 ha, 1.64 ha, 6.34 ha, 1.62 ha and 18.68 ha respectively.

The results indicate that, farmers have grown Bajra (4.37 ha), Bengal gram (6.48 ha), Navane (1.68 ha), Pearl millet (9.66 ha), Groundnut (1.67 ha), maize (18.43 ha), Sesamum (1.32 ha), Red gram (2.19 ha) and Cowpea (0.40 ha). The results indicate that, the cropping intensity in Kanakapura-2 micro-watershed was found to be 75.02 per cent.

The results indicate that, the total cost of cultivation for Bajra was Rs. 26117.90. The gross income realized by the farmers was Rs. 23737.72. The net income from Bajra cultivation was Rs. -2380.18. Thus the benefit cost ratio was found to be 1: 0.91. The results indicate that, the total cost of cultivation for bengal gram was Rs. 7938.92. The gross income realized by the farmers was Rs. 74236.52. The net income from bengal gram cultivation was Rs. 22418.17. Thus the benefit cost ratio was found to be 1: 1.43.

The results indicate that, the total cost of cultivation for Navane was Rs. 318503.50. The gross income realized by the farmers was Rs. 18516.95. The net income from Navane cultivation was Rs. -1751.47. Thus the benefit cost ratio was found to be 1: 0.91.

The results indicate that, the total cost of cultivation for groundnut was Rs. 72585.96. The gross income realized by the farmers was Rs. 58850.69. The net income from groundnut cultivation was Rs. -13735.27. Thus the benefit cost ratio was found to be 1: 0.81. The results indicate that, the total cost of cultivation for Sesamum was Rs. 76069.80. The gross income realized by the farmers was Rs. 42048.81. The net income from Sesamum cultivation was Rs. -34020. Thus the benefit cost ratio was found to be 1: 0.55.

The results indicate that, the total cost of cultivation for maize was Rs. 33731.06. The gross income realized by the farmers was Rs. 43575.50. The net income from maize cultivation was Rs. 9844.44. Thus the benefit cost ratio was found to be 1: 1.29. The results indicate that, the total cost of cultivation for Cowpea was Rs. 39947.49. The gross income realized by the farmers was Rs. 41496. The net income from Cowpea cultivation was Rs. 1548.51. Thus the benefit cost ratio was found to be 1: 1.04.

The results indicate that, the total cost of cultivation for redgram was Rs. 75605.27. The gross income realized by the farmers was Rs. 49810.42. The net income from redgram cultivation was Rs. --25794.85. Thus the benefit cost ratio was found to be

1: 0.66. The results indicate that, 44.44 per cent of the households opined that dry fodder was adequate and 47.22 per cent of the households opined that green fodder was adequate.

The results indicate that the annual gross income was Rs. 2,400 for landless households, for marginal farmers it was Rs. 127,133.33, for small farmers it was Rs. 61,066.67, for semi medium farmers it was Rs. 103,312.50, for medium farmers it was Rs. 59,666.67 and for semi large farmers it was Rs. 445,000. The results indicate that the average annual expenditure is Rs. 32,321.01. For marginal farmers it was Rs. 22,912.85, for small farmers it was Rs. 14,583.33, for semi medium farmers it was Rs. 20,578.13, for medium farmers it was Rs. 23,000 and for large farmers it was Rs. 430,000.

The results indicate that, sampled households have grown 83 coconut trees in their field and 13 in backyard and 2 Lemon trees in backyard. The results indicate that, households have planted 6 Cashew, 110 Teak, 128 neem, 3 tamarind, 10 Pongamia and 8 banyan trees in their field. Also, 3 neem trees in their backyard. The results indicated that, Bajra, Bengalgram, Cow Pea, Groundnut, Maize, Navane, Sesamum and Redgram were sold to the extent of 100 per cent.

The results indicated that, about 41.67 per cent of the farmers sold their produce to local/village merchants and 8.33 per cent of the farmers sold their produce to regulated market, 8.82 per cent of the farmers sold their produce to Cooperative marketing Society and 75 per cent of the farmers sold their produce to Agent/Traders. The results indicated that 100 per cent of the households used tractor as a mode of transportation for their agricultural produce.

The results indicated that, 19.44 per cent of the households have experienced soil and water erosion problems in the farm. The results indicated that, 22.22 per cent have shown interest in soil test.

The results indicated that, 75 per cent of the households used firewood, 16.67 per cent of the households used LPG as a source of fuel and 2.78 per cent of the households used Dung Cake and 5.56 per cent of the households used Biogas as a source of fuel. The results indicated that, piped supply was the source of drinking water for 22.22 per cent of the households and bore well was the source of drinking water for 75 per cent of the households in micro watershed.

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, 38.89 per cent of the households possess sanitary toilet facility. The results indicated that, 88.89 per cent of the sampled households possessed BPL card and 11.11 per cent of the households did not possess PDS card.

The results indicated that, 44.44 per cent of the households participated in NREGA programme. The results indicated that, cereals were adequate for 100 per cent of

the households, pulses were adequate for 47.22 per cent, oilseeds were adequate for 77.78 per cent, vegetables were adequate for 77.78 per cent, milk was adequate for 100 per cent, eggs were adequate for 58.33 per cent and meat was adequate for 52.78 per cent.

The results indicated that, pulses were inadequate for 50 per cent of the households, oilseeds were inadequate for 22.22 per cent, fruits were inadequate for 22.22 per cent and Vegetables was inadequate for 22.22 per cent of the households. The results indicated that, lower fertility status of the soil was the constraint experienced by 22.22 per cent of the households, wild animal menace on farm field (58.33 %), frequent incidence of pest and diseases (63.89 %), inadequacy of irrigation water (22.22 %), high cost of fertilizers and plant protection chemicals (69.44 %), high rate of interest on credit (52.78 %), lack of marketing facilities in the area (33.33 %), lack of transport for safe transport of the agricultural produce to the market (5.56 %), less rainfall (75 %) and source of agri-technology information (27.78 %).