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

ABBAGIRI TANDA-1 (4D3A9B1c) MICRO WATERSHED

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

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

Nagpur
Date:20-09-2019

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

The land resource inventory of Abbagiri Tanda-1 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 877 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 96 per cent is covered by soils and 4 per cent is by water bodies. The salient findings from the land resource inventory are summarized briefly below.

- *The soils belong to 16 soil series and 52 soil phases (management units) and 8 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 28 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area is suitable for agriculture.*
- *About 27 per cent of the soils are very shallow to moderately shallow (<25-75 cm), 49 per cent of the soils are moderately deep to deep (75-150 cm) and 3 per cent soils are very deep (>150 cm).*
- *About 6 per cent area in the microwatershed has sandy soils, 57 per cent soils are loamy and 16 per cent clayey soils at the surface*
- *About 32 per cent area has non-gravelly (<15% gravel) soils and 46 per cent has gravelly to extremely gravelly (15-80%) soils).*
- *About 74 per cent area is very low to low (<50-100 mm/m), 2 per cent area has medium (101-150 mm/m) and 3 per cent area is very high (>200 mm/m) in available water capacity.*

- *About 4 per cent in the microwatershed has nearly level (0-1% slope) lands, 69 per cent has very gently sloping (1-3% slope) lands and 6 per cent area is gently sloping (3-5% slope)*
- *An area of about 59 per cent is moderately (e2) eroded and 19 per cent area is slightly (e1) eroded.*
- *An area of about 21 per cent soils are strongly acid (pH 5.0-5.5), an area of about 21 per cent soils are moderately acid (pH 5.5-6.0), an area of about 13 per cent soils are slightly acid (pH 6.0-6.5) in soil reaction, an area of 10 per cent is neutral (pH 6.5-7.3), 5 per cent soils are slightly alkaline (pH 7.3-7.8), 7 per cent soils are moderately alkaline (pH 7.8-8.4) and 2 per cent is strongly alkaline (pH 8.4-9.0).*
- *The Electrical Conductivity (EC) of the soils in the entire area of the microwatershed is <2 dsm^{-1} indicating that the soils are non-saline.*
- *Organic carbon is medium (0.5-0.75%) in 17 per cent area and high (>0.75%) in 61 per cent area.*
- *Available phosphorus is medium (23-57 kg/ha) in an area 25 per cent and high (>57 kg/ha) in an area of 54 per cent.*
- *About 43 per cent is low (145 kg/ha) in available potassium, 27 per cent is medium (145-337 kg/ha) and 8 per cent is high (>337 kg/ha).*
- *Available sulphur is low (<10 ppm) in an area of about 63 per cent and medium (10 - 20 ppm) in 15 per cent.*
- *Available boron is low (<0.5 ppm) in about 76 per cent area and medium (0.5-1.0 ppm) in 3 per cent area.*
- *Available iron is deficient (<4.5 ppm) in 11 per cent area and sufficient (>4.5 ppm) in 67 per cent area.*
- *Available zinc is deficient (<0.6 ppm) in 41 per cent area and sufficient (>0.6 ppm) in 38 per cent area..*
- *Available copper and manganese are sufficient in all the soils.*
- *The land suitability for 28 major crops grown in the microwatershed were assessed and the areas that are highly suitable (S1) and moderately suitable (S2) are given below. It is however to be noted that a given soil may be suitable for various crops but what specific crop to be grown may be decided by the farmer looking to his capacity to invest on various inputs, marketing infrastructure, market price and finally the demand and supply position.*

Land suitability for various crops in the microwatershed

Crop	Suitability Area in ha (%)			Crop	Suitability Area in ha (%)	
	Highly suitable (S1)	Moderately suitable (S2)			Highly suitable (S1)	Moderately suitable (S2)
Sorghum	*40 (5)*	*177 (20)*		*Pomegranate*	*-*	*180 (20)*
Maize	*15 (2)*	*202 (23)*		*Guava*	*-*	*158 (18)*
Bajra	*19 (2)*	*316 (36)*		*Jackfruit*	*-*	*158 (18)*
Groundnut	*-*	*471 (54)*		*Jamun*	*-*	*160 (18)*
Sunflower	*22 (3)*	*58 (7)*		*Musambi*	*22 (3)*	*158 (18)*
Cotton	*22 (3)*	*194 (22)*		*Lime*	*22 (3)*	*158 (18)*
Red gram	*-*	*80 (9)*		*Cashew*	*15 (2)*	*233 (27)*
Bengalgram	*22 (3)*	*205 (23)*		*Custard apple*	*79 (9)*	*531 (60)*
Chilli	*18 (2)*	*199 (23)*		*Amla*	*46 (5)*	*557 (64)*
Tomato	*18 (2)*	*199 (23)*		*Tamarind*	*-*	*24 (3)*
Drumstick	*2 (<1)*	*253 (29)*		*Marigold*	*15 (2)*	*202 (23)*
Mulberry	*2 (<1)*	*426 (48)*		*Chrysanthemum*	*15 (2)*	*202 (23)*
Mango	*-*	*2 (<1)*		*Jasmine*	*15 (2)*	*180 (20)*
Sapota	*-*	*158 (18)*		*Crossandra*	*15 (2)*	*180 (20)*

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the 8 identified LMUs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and other horticulture crops.*
- *Maintaining soil-health is vital for crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested for these problematic soils like saline/alkali, highly eroded, sandy soils etc.,*
- *Soil and water conservation treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. That would help in supplementing the farm income, provide fodder and fuel, and generate lot of biomass which in turn would help in maintaining the ecological balance and contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

Soil is a finite natural resource that is central to sustainable agriculture and food security. Over the years, this precious resource is faced with the problems of erosion, salinity, alkalinity, degradation, depletion of nutrients and even decline in availability of land for agriculture. It is a known fact, that it takes thousands of years to form a few centimetres of soil, thus, soil is a precious gift of nature. The area available for agriculture is about 51 per cent of the total geographical area and more than 60 per cent of the people are still dependant on agriculture for their livelihood. However, the capacity of a soil to produce is limited and the limits to the production are set by its intrinsic characteristics, agroclimatic setting, and use and management. There is, therefore, tremendous pressure on land and water resources, which is causing decline in soil-health and stagnation in productivity. As much as 121 m ha of land is reportedly degraded which leads to impaired soil quality. It is imperative that steps are urgently taken to check and reverse land degradation without any further loss of time. The improvements in productivity will have to come from sustainable intensification measures that make the most effective use of land and water resources. Soil erosion alone has degraded about 35 lakh ha. Almost all the uncultivated areas are facing various degrees of degradation, particularly soil erosion; salinity and alkalinity has emerged as a major problem in more than 3.5 lakh ha in the irrigated areas of the State. Nutrient depletion and declining factor productivity is common in both rainfed and irrigated areas. The degradation is continuing at an alarming rate and there appears to be no systematic effort among the stakeholders to contain this process. In recent times, an aberration of weather due to climate change phenomenon has added another dimension leading to unpredictable situations to be tackled by the farmers. In this critical juncture, the challenge before us is not only to increase the productivity per unit area which is steadily declining and showing a fatigue syndrome, but also to prevent or at least reduce the severity of degradation. If the situation is not reversed at the earliest, then the sustainability of the already fragile crop production system and the overall ecosystem will be badly affected in the state.

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

detailed site-specific farm level database on various land resources for all the villages/watersheds in a time bound manner that would help to protect the valuable soil and land resources and also to stabilize the farm production.

Therefore, the land resource inventory required for farm level planning is the one which investigates all the parameters which are critical for productivity *viz.,* soils, site characteristics like slope, erosion, gravelliness and stoniness, climate, water, topography, geology, hydrology, vegetation, crops, land use pattern, animal population, socio-economic conditions, infrastructure, marketing facilities and various schemes and developmental works of the government etc. From the data collected at farm level, the specific problems and potentials of the area can be identified and highlighted, conservation measures required for the area can be planned on a scientific footing, suitability of the area for various uses can be worked out and finally viable and sustainable land use options suitable for each and every land holding can be prescribed.

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

The land resource inventory aims to provide site-specific database for Abbagiri Tanda-1 microwatershed in Koppal Taluk and District, Karnataka State for the Karnataka Watershed Development Department. The database was generated by using cadastral map of the village as a base along with high resolution IRS LISS IV and Cartosat-1 merged satellite imagery. Later, an attempt will be made to uplink this LRI data generated at 1:7920 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 Abbagiri Tanda-1 Microwatershed is located in the central part of northern Karnataka in Koppal Taluk, Koppal District, Karnataka State (Fig.2.1). It comprises parts of Irakallagada, Yalamager, Karadigudda, Abbigeri, Kukanapalli, Vanabellary and Hosahalli villages. It lies between $15^0$26' –$15^0$28' North latitudes and $76^0$14' –$76^0$16' East longitudes, covering an area of about 877 ha. It is about 17 km southwest of Koppal town and is surrounded by Irakallagada village on thenorth and northwest, Yalamageri village on the west, Karadigudda village on the south, Abbigeri village on the south, Kukanapalli and Vanabellary villages on the east and Hosahalli village on the northern side of the microwatershed.

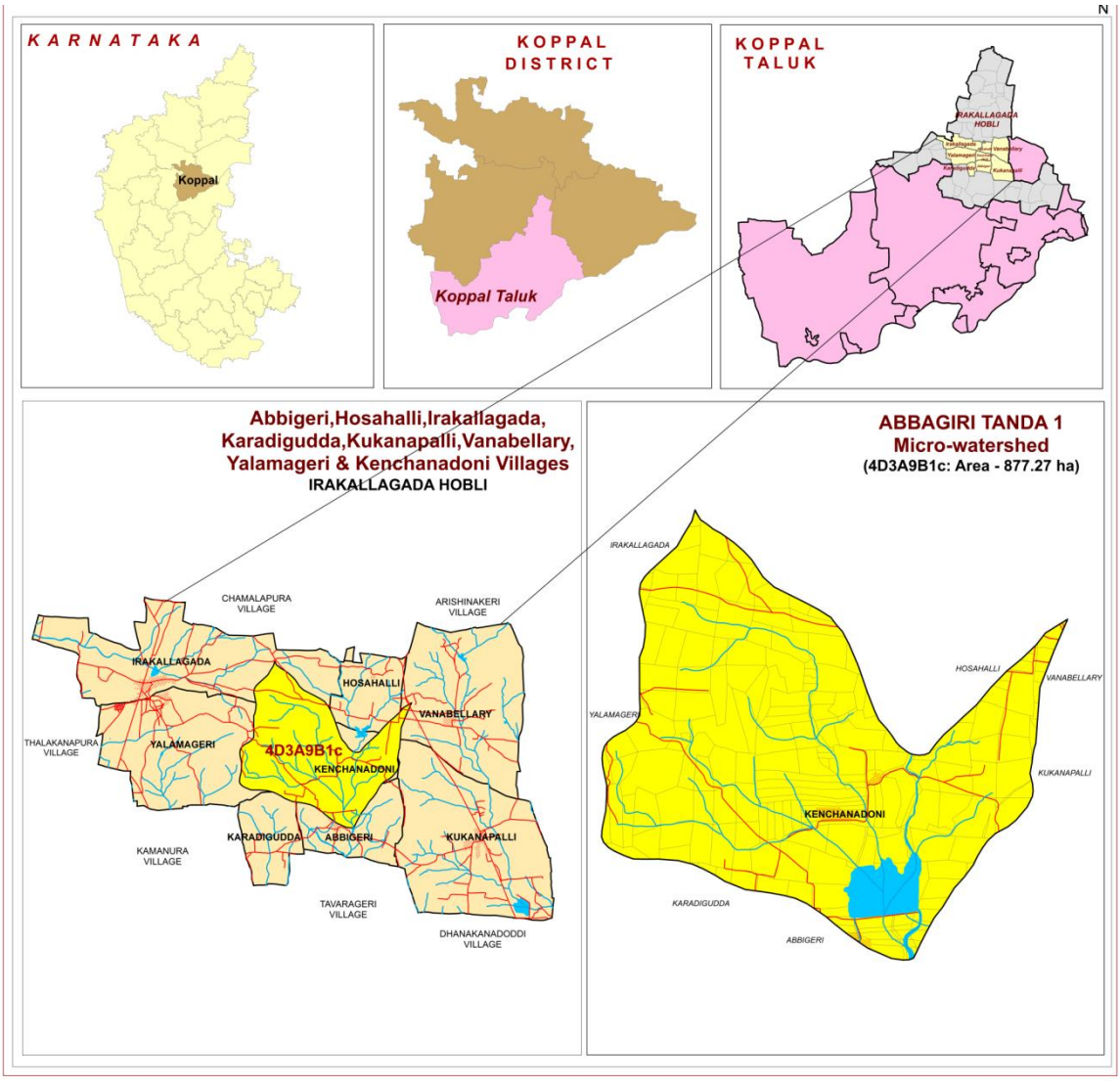

Fig.2.1 Location map of Abbagiri Tanda-1 Microwatershed

2.2 Geology

Major rock formation observed in the microwatershed are granite gneiss (Figs.2.2). They 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 Abbigiri Tanda-1 village.

Fig.2.2 Granite and granite gneiss rocks

2.3 Physiography

Physiographically, the area has been identified as granite gneiss 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 450 to 800 m in the gently sloping uplands. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

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

2.5 Climate

The district falls under semiarid tract of the state and is categorized as drought - prone with total annual rainfall of 662 mm (Table 2.1) Of this, a maximum of 424 mm precipitation takes place during south–west monsoon period from June to September, north-east monsoon contributes about 161 mm and prevails from October to early December and the remaining 77 mm received during the rest of the year. The winter season is from December to February. During April and May, the temperatures reach up to 45°C and in December and January, the temperatures will go down to 16°C. Rainfall distribution is shown in Figure 2.3. The average Potential Evapo Transpiration (PET) is 145 mm and varies from a low of 101 mm in December and 193 mm in the months of May. The PET is always higher than precipitation in all the months except in the month of September. Generally, the Length of crop Growing Period (LGP) is <90 days and starts from 2nd week of August to 2nd week of November.

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

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

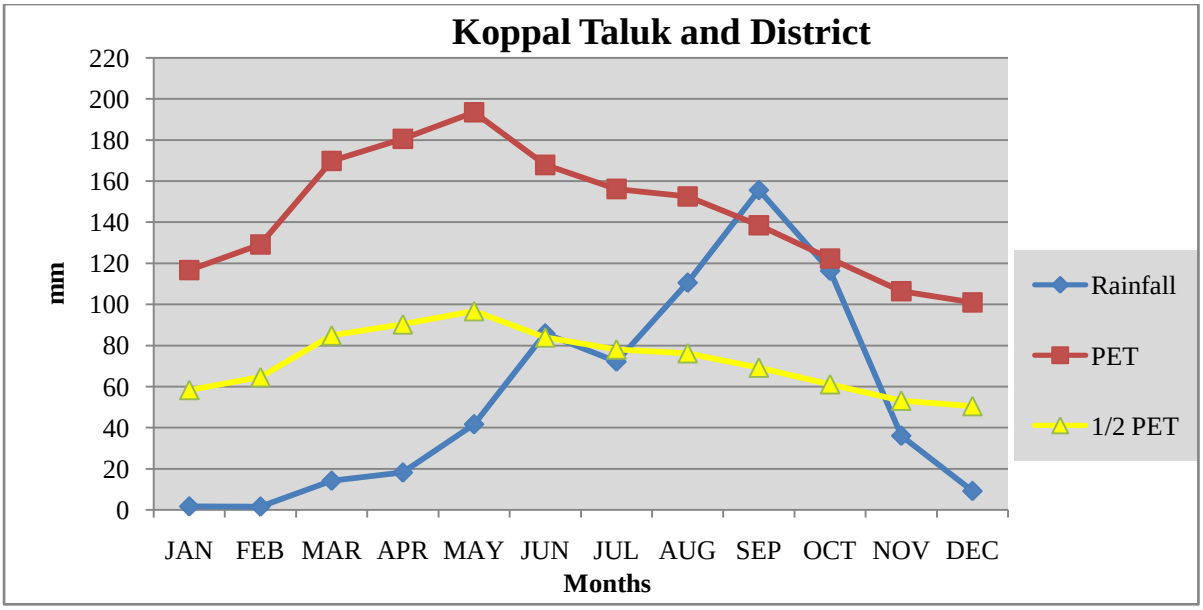

Fig. 2.3 Rainfall distribution in Koppal Taluk and District

2.6 Natural Vegetation

The natural vegetation is sparse comprising few tree species, shrubs and herbs. The mounds, ridges and boulders occupy sizeable areas which are under thin to moderately thick forest vegetation. Still, there are some remnants of the past forest cover which can be seen in patches in some ridges and hillocks in the microwatershed (Fig 2.4).

Apart from the continuing deforestation, the presence of large population of goats, sheep and other cattle in the microwatershed is causing vegetative degradation of whatever little vegetation left in the area. The uncontrolled grazing has left no time for the regeneration of the vegetative cover. This leads to the accelerated rate of erosion on the hill slopes, resulting in the formation of deep gullies in the foot slopes and eventually resulting in the heavy siltation of few tanks and reservoirs in the microwatershed.

Fig 2.4 Natural vegetation of Abbagiri Tanda-1 microwatershed

2.7 Land Utilization

About 91 per cent area (Table 2.2) in Koppal district is cultivated at present and about 17 per cent of the area is sown more than once. An area of about 3 per cent is currently barren. Forests occupy a small area of about 5 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and bouldery areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, bajra, cotton, safflower, sunflower, red gram, horse gram, onion, mulberry, pomegranate, sugarcane, bengalgram, marigold and groundnut (Fig 2.5). 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 Abbagiri Tanda-1 Microwatershed is presented in Fig.2.6. Simultaneously, enumeration of existing wells (bore wells and open wells) and other soil and water conservation structures in the microwatershed is made and their location in different survey numbers is marked on the cadastral map. Map showing the location of wells in Abbagiri Tanda-1 Microwatershed is given Fig.2.7.

Table 2.2 Land Utilization in Koppal District

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

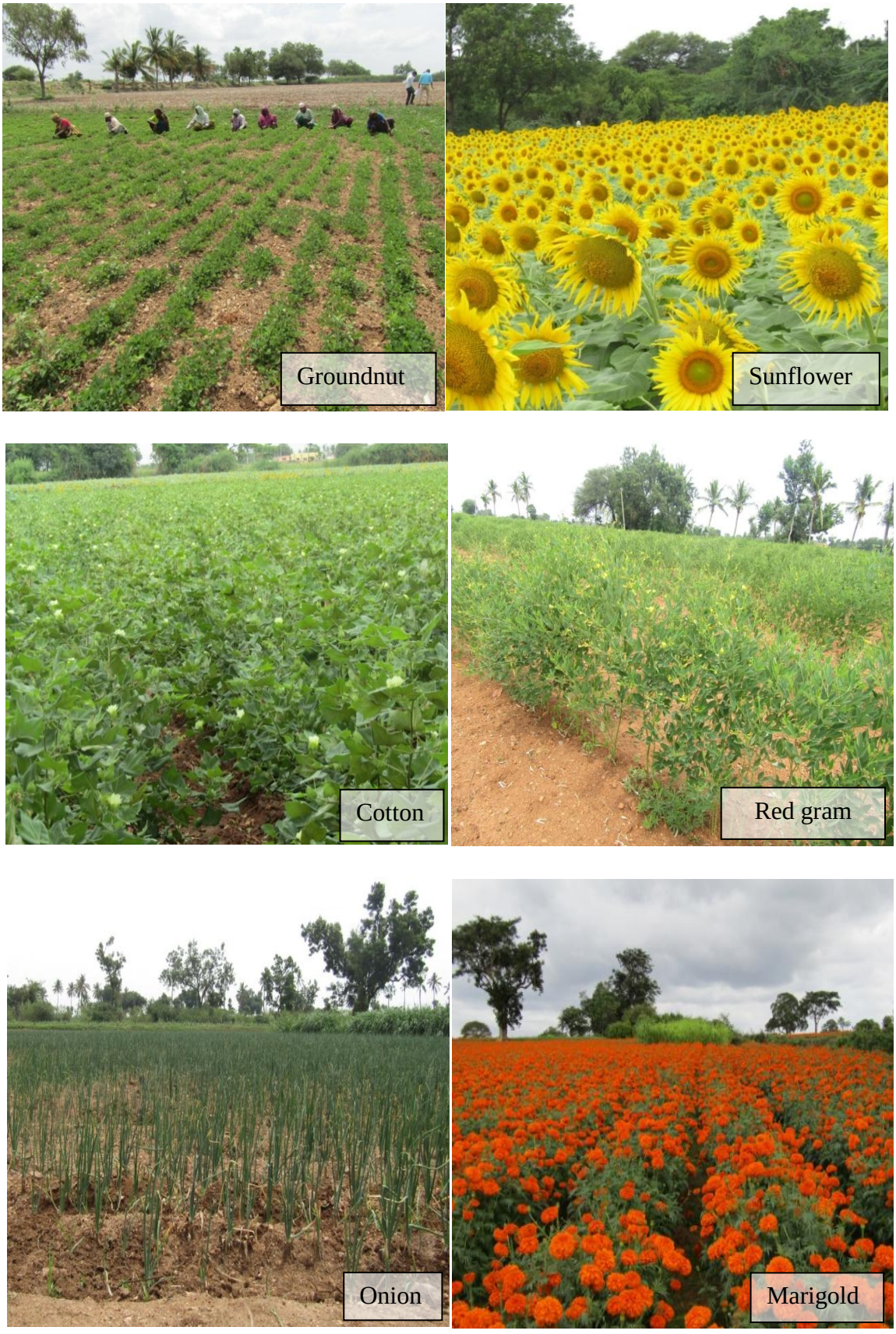

Fig.2.5 Different crops and cropping systems in Abbagiri Tanda-1 Microwatershed

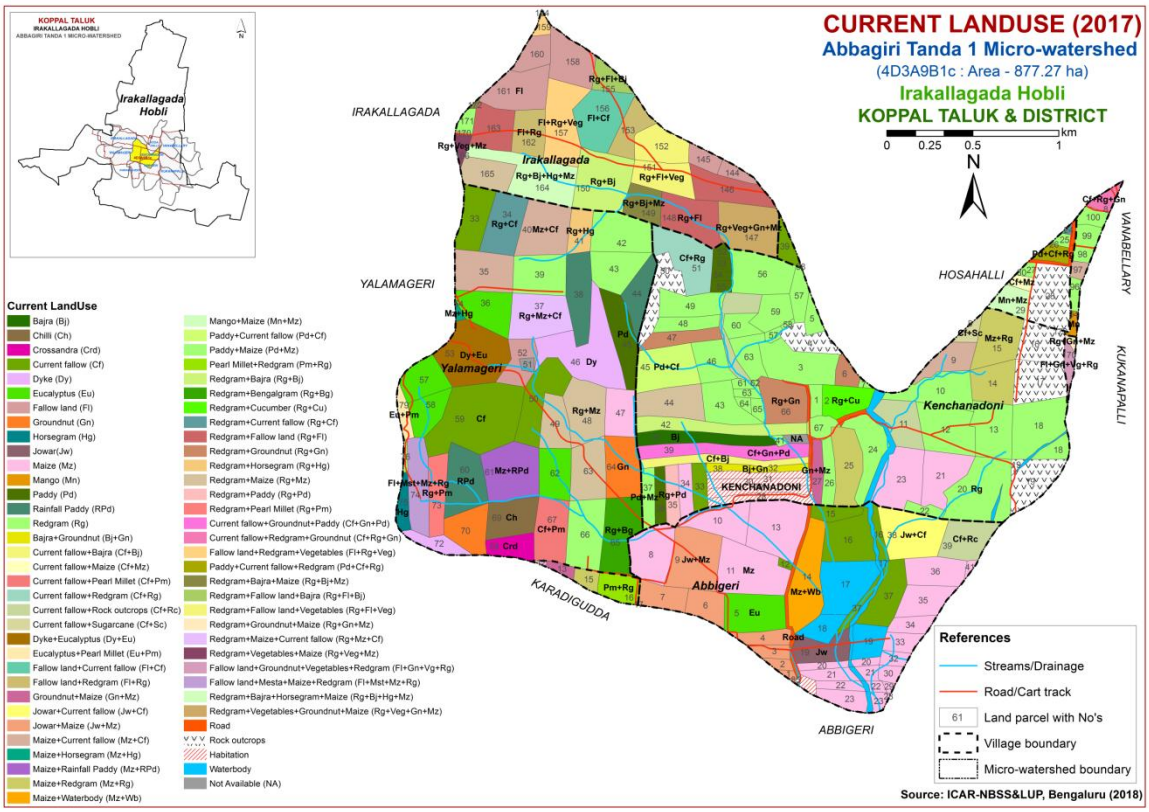

Fig.2.6 Current Land Use – Abbagiri Tanda-1 Microwatershed

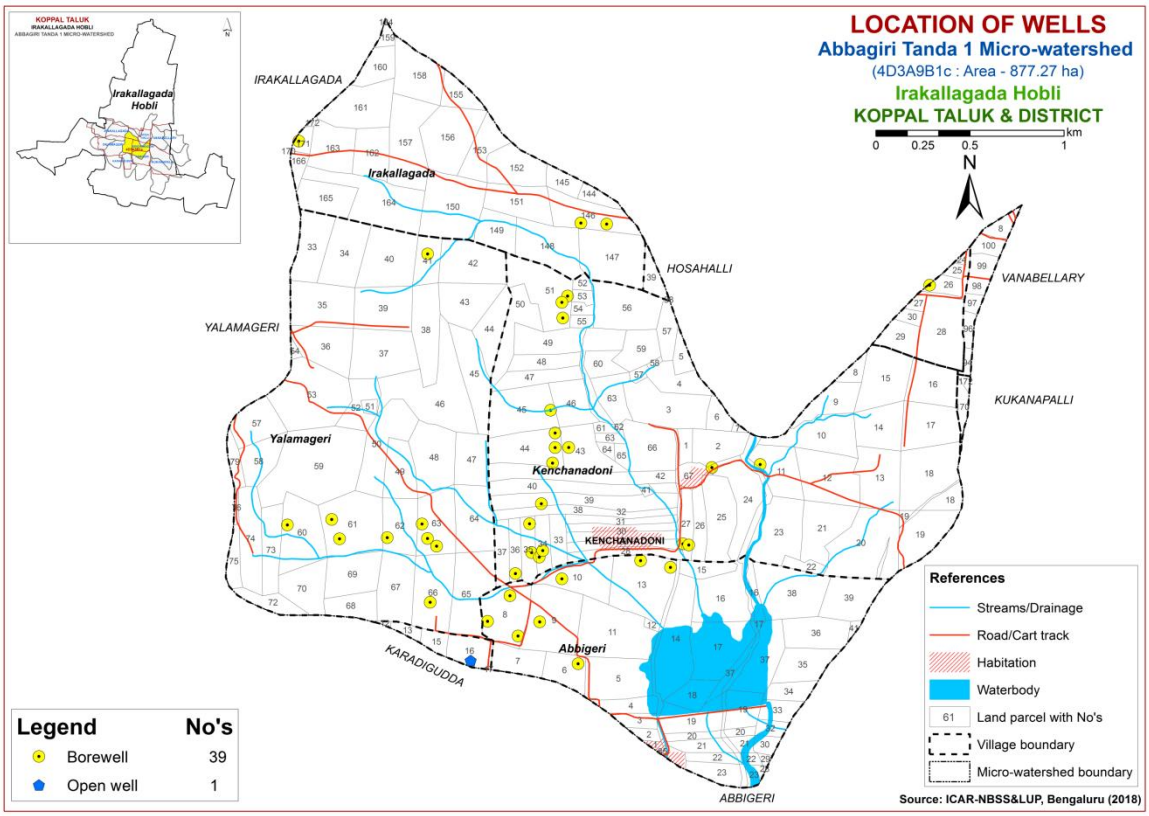

Fig.2.7 Location of wells - Abbagiri Tanda-1 Microwatershed

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 Abbagiri Tanda-1 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 (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 877 ha area. The methodology followed for carrying out land resource inventory was as per the guidelines given in Soil Survey Manual (IARI, 1971; Soil Survey Staff, 2006; Natarajan *et al.,* 2015) which is briefly described below.

3.1 Base Maps

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

3.2 Image Interpretation for Physiography

False Colour Composites (FCC) of Cartosat-I and LISS-IV merged satellite data covering the microwatershed area was visually interpreted using image interpretation elements and all the available collateral data with local knowledge. The delineated physiographic boundaries were transferred on to a cadastral map overlaid on satellite imagery. Physiographically, the area has been identified as granite gneiss landscape and is divided into landforms such as uplands, summits and very gently sloping based on slope. They were further subdivided into physiographic/ image interpretation units based on image characteristics. The image interpretation legend for Physiography is given below.

Image Interpretation Legend for Physiography

G- Granite gneiss landscape

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

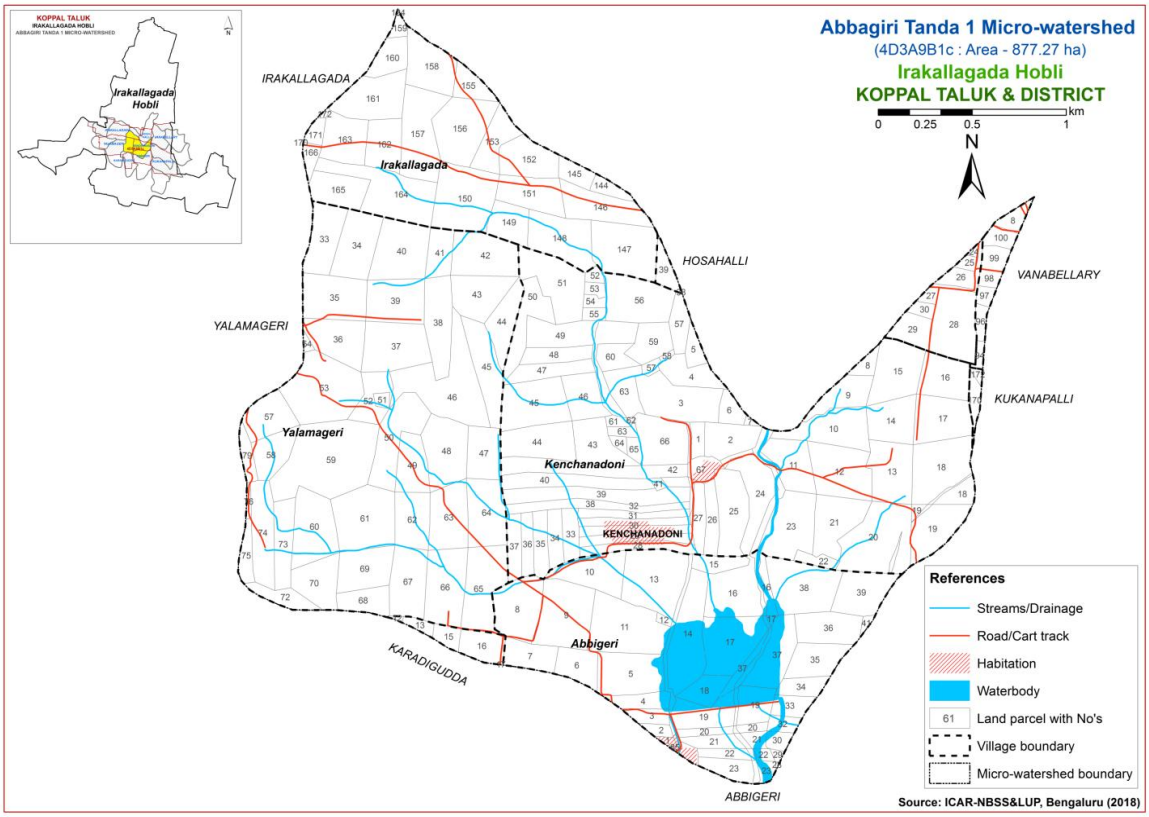

Fig 3.1 Scanned and Digitized Cadastral map of Abbagiri Tanda-1 Microwatershed

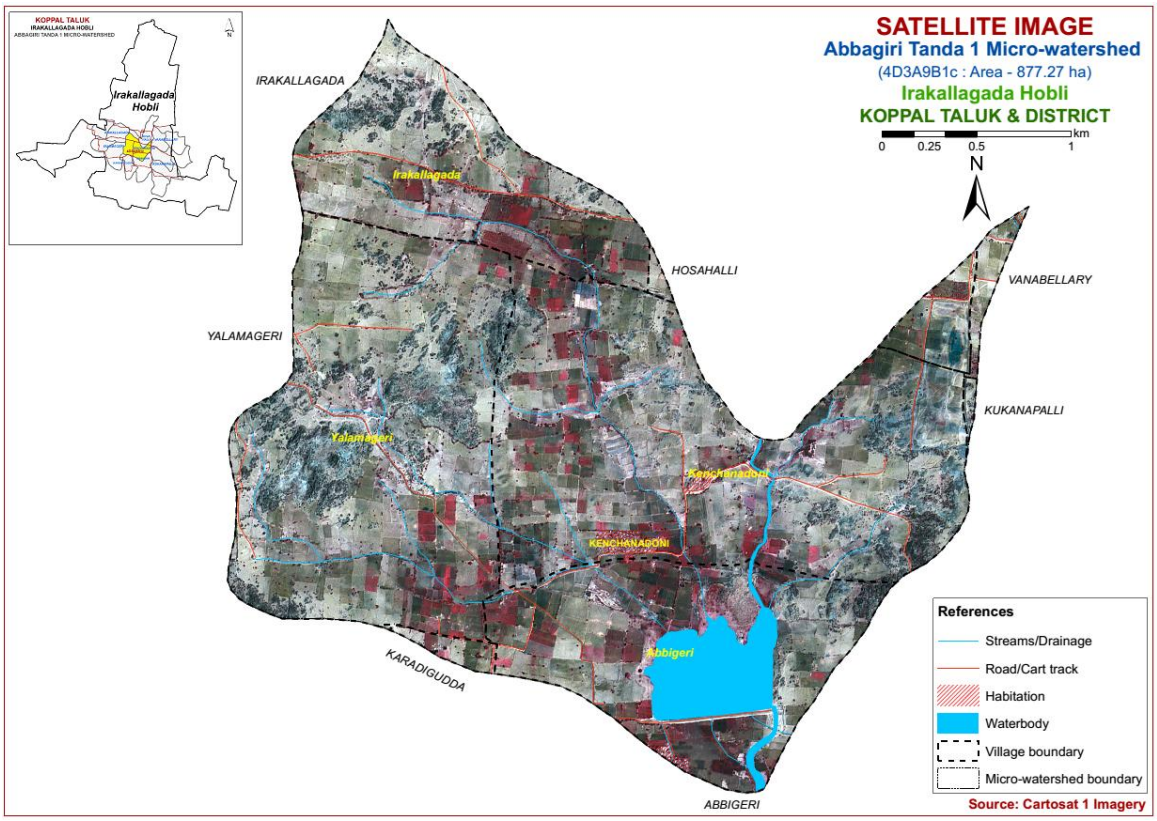

Fig.3.2 Satellite Image of Abbagiri Tanda-1 Microwatershed

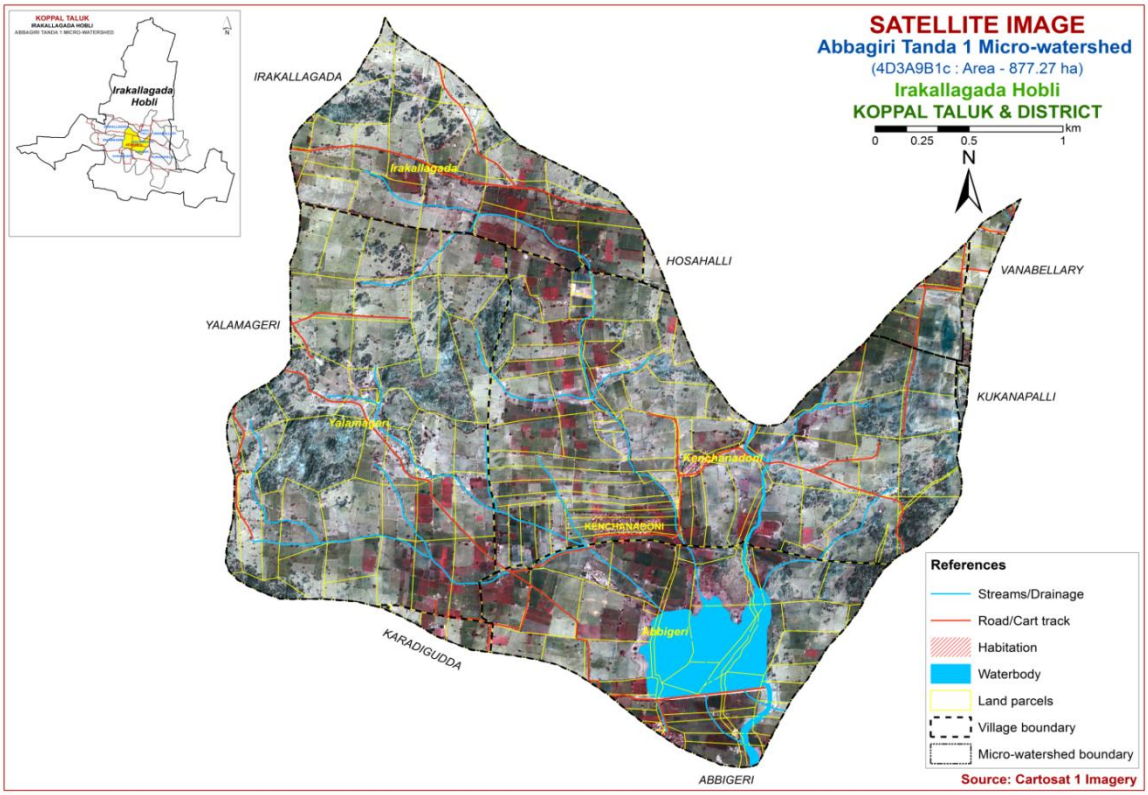

Fig.3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Abbagiri Tanda-1 Microwatershed

3.3 Field Investigation

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

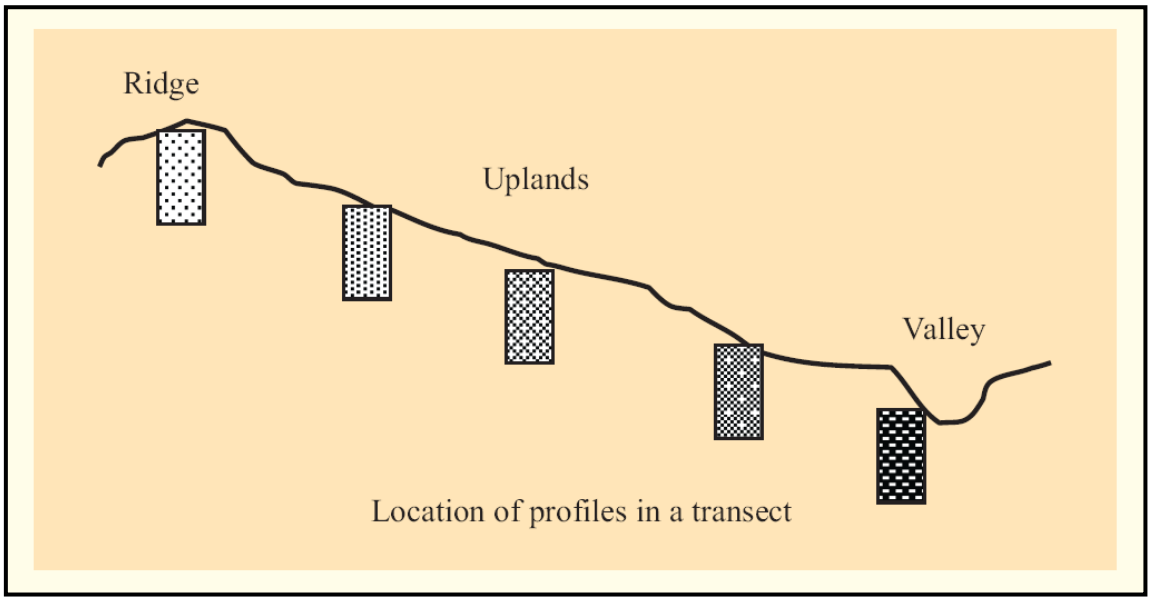

Fig: 3.4. Location of profiles in a transect

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

Based on the soil characteristics, the soils were grouped into different soil series. Soil series is the most homogeneous unit having similar horizons and properties and behaves similarly for a given level of management. Soil depth, texture, colour, kind of horizon and horizon sequence, amount and nature of gravel present, calcareousness, nature of substratum etc, were used as the major differentiating characteristics for

identifying soil series occurring in the area. The differentiating characteristics used for identifying the soil series are given in Table 3.1. Based on the above characteristics, 16 soil series were identified in Abbagiri Tanda-1 Microwatershed.

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

Sl. No	Soil Series	Depth (cm)	Colour (moist)	Texture	Gravel (%)	Horizon sequence	Calcareou-sness
Soils of granite gneiss Landscape							
1	Belagatti (BGT)	<25	10 YR3/1, 3/2, 4/2	gc	>35	Ap-Crk	es
2	Harve (HRV)	25-50	2.5YR 3/4, 3/6 5YR 3/3, 4/4, 3/4	gscl	>35	Ap-Bt-Cr	-
3	Abbigeri (ABR)	25-50	2.5YR 3/3, 3/4	gsc	>35	Ap-Bt-Cr	-
4	Lakkur (LKR)	50-75	2.5YR 2.5/3, 2.5/4, 3/4, 3/6	gsc	40-60	Ap-Bt-Bc-Cr	-
5	Kutegoudanahundi (KGH)	50-75	7.5YR3/2,3/3,3/4	gscl	15-35	Ap-Bt-Cr	-
6	Kethanapura (KTP)	50-75	2.5YR3/4, 3/6	gsc	15-35	Ap-Bt-Cr	-
7	Mukhadahalli (MKH)	50-75	5YR3/3,3/4,4/3, 5/4,6/6 2.5YR3/4	gsc	>35	Ap-Bt-Cr	-
8	Hooradhahalli (HDH)	75-100	2.5YR2.5/4,3/4,3/6	gsc-gc	>35	Ap-Bt-Cr	
9	Bisarahalli (BSR)	75-100	5 YR 3/3, 3/4	gsc	15-35	Ap-Bt-Cr	-
10	Bidanagere (BDG)	75-100	5YR3/3,3/4,4/3,5/4 2.5YR3/4	gc	35-60	Ap-Bt-Cr	-
11	Jedigere (JDG)	100-150	5YR 4/6, 3/4, 7.5YR 3/4, 4/6	sc-c	<15	Ap-Bt-BC-Cr	-
12	Balapur (BPR)	100-150	2.5YR2.5/4,3/4	gsc-gc	>35	Ap-Bt-Cr	-
13	Nagalapur (NGP)	100-150	5YR2.5/2,3/2, 2.5YR3/6,4/6	gsc	>35	Ap-Bt-Cr	-
Soils of Low Land Series							
14	Honnenahalli (HNH)	50-75	7.5YR3/3,4/310YR3/3	sc	-	Ap-Bw-Cr	-
15	Kavalakkeri (KLR)	>150	10YR2/1,3/1, 3/2 7.5YR2.5/1,3/2	sc	-	Ap-Bw	e-es
16	Huliyapura (HLP)	75-100	7.5YR3/3,4/6 10YR4/6	scl	-	Ap-Bw-C	-

3.4 Soil Mapping

The area under each soil series was further separated into soil phases and their boundaries delineated on the cadastral map based on the variations observed in the texture of the surface soil, slope, erosion, presence of gravel, stoniness etc. A soil phase is a subdivision of soil series based mostly on surface features that affect its use and

management. The soil mapping units are shown on the map (Fig.3.5) in the form of symbols. During the survey many soil profile pits, few minipits and a few auger bores representing different landforms occurring in the microwatershed were studied. In addition to the profile study, spot observations in the form of minipits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map. The soil map shows the geographic distribution and area extent of mapping units representing 16 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 52 phases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one phase will have similar management needs and have to be treated accordingly.

3.5 Laboratory Characterization

Soil samples for each series were collected from representative master profiles for laboratory characterization by following the methods outlined in the Laboratory Manual (Sarma *et al*, 1987). Surface soil samples collected in the year 2017 from Abbagiri Tanda-1 farmer's fields (87 samples) for fertility status (major and micronutrients) at 320 m grid interval were analyzed in the laboratory (Katyal and Rattan, 2003). By linking the soil fertility data to the survey numbers through GIS, soil fertility maps were generated using Kriging method for the microwatershed.

3.6 Land Management Units (LMUs)

The 52 soil phases identified and mapped in the microwatershed were regrouped into 8 Land Management Units (LMU's) for the purpose of preparing a Proposed Crop Plan for sustained development of the microwatershed. The database (soil phases) generated under LRI was utilized for identifying Land Management Units (LMU's) based on the management needs. One or more than one soil site characteristic having influence on the management have been choosen for identification and delineation of LMUs. For Abbagiri Tanda-1 Microwatershed, five soil and site characteristics, namely soil depth, soil texture, slope erosion and gravel content have been considered for defining LMUs. The Land Management Units are expected to behave similarly for a given level of management.

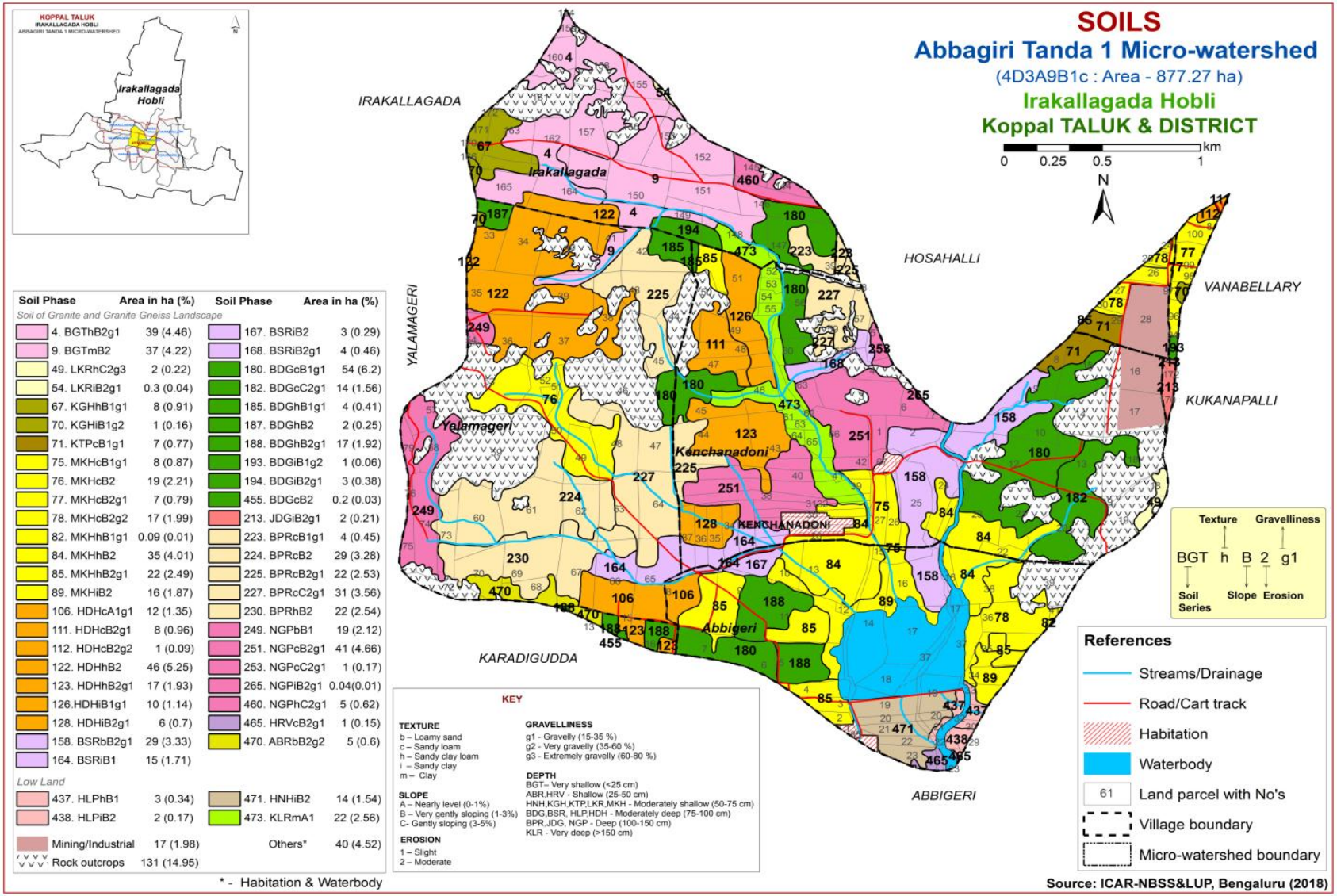

Fig 3.5 Soil Phase or Management Units- Abbagiri Tanda-1 Microwatershed

Table 3.2 Soil map unit description of Abbagiri Tanda-1 Microwatershed

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
Soils of granite and granite gneiss landscape				
	BGT	Belagatti soils are very shallow (<25 cm), well drained, have very dark gray to very dark grayish brown, calcareous black gravelly clay soils occurring on very gently to gently sloping uplands under cultivation		**76 (8.68)**
4		BGThB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	39 (4.46)
5		BGTmB2	Clay surface, slope1-3%, moderate erosion	37 (4.22)
	HRV	Harve soils are shallow (25-50 cm), well drained, have dark red to dark reddish brown, red gravelly sandy clay loam soils occurring on nearly level to gently sloping uplands under cultivation		**1 (0.15)**
465		HRVcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	1 (0.15)
	ABR	Abbigere soils are shallow (25-50 cm), well drained, have dark reddish brown red gravelly sandy clay soils occurring on very gently sloping uplands under cultivation.		**5 (0.6)**
470		ABRbB2g2	Loamy sand surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	5 (0.6**)**
	LKR	Lakkur soils are moderately shallow (50-75 cm), well drained, have dark reddish brown to dark red, red gravelly sandy clay soils occurring on very gently to moderately sloping uplands under cultivation		**2 (0.26)**
49		LKRhC2g3	Sandy clay loam surface, slope 3-5%, moderate erosion, extremely gravelly (35-60%)	2 (0.22)
54		LKRiB2g1	Sandy clay surface, slope1-3%, moderate erosion, gravelly (15-35%)	0.32 (0.04)
	KGH	Kutegoudanahundi soils are moderately shallow (50-75 cm), well drained, have brown to dark brown, red gravelly sandy clay loam soils occurring on very gently to gently sloping uplands under cultivation		**9 (1.07)**
67		KGHhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	8 (0.91)
70		KGHiB1g2	Sandy clay surface, slope 1-3%, slight erosion, very gravelly (35-60%)	1 (0.16)
	KTP	Kethanapura soils are moderately shallow (50-75 cm), well drained, have dark reddish brown red gravelly sandy clay soils occurring on very gently sloping uplands under cultivation		**7 (0.77)**
71		KTPcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	7 (0.77)
	MKH	Mukhadahalli soils are moderately shallow (50-75 cm), well drained, have dark brown to reddish brown red gravelly		**124 (14.24)**

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
		sandy clay soils occurring on gently very gently to gently sloping uplands under cultivation		
75		MKHcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	8 (0.87)
76		MKHcB2	Sandy loam surface, slope 1-3%, moderate erosion	19 (2.21)
77		MKHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	7 (0.79)
78		MKHcB2g2	Sandy loam surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	17 (1.99)
82		MKHhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	0.10 (0.01)
84		MKHhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	35 (4.01)
85		MKHhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	22 (2.49)
89		MKHiB2	Sandy clay surface, slope 1-3%, moderate erosion	16 (1.87)
	HDH	Hooradhahalli soils are moderately deep (75-100 cm), well drained, have dark red to dark reddish brown, red gravelly sandy clay to clay soils occurring on nearly level to moderately sloping uplands under cultivation		**100 (11.42)**
106		HDHcA1g1	Sandy loam surface, slope 0-1%, slight erosion, gravelly (15-35%)	12 (1.35)
111		HDHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	8 (0.96)
112		HDHcB2g2	Sandy loam surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	1 (0.09)
122		HDHhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	46 (5.25)
123		HDHhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	17 (1.93)
126		HDHiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	10 (1.14)
128		HDHiB2g1	Sandy clay surface, slope1-3%, moderate erosion, gravelly (15-35%)	6 (0.7)
	BSR	Bisarahalli soils are moderately deep (75-100 cm), well drained, have dark reddish brown, red gravelly sandy clay soils occurring on very gently sloping uplands under cultivation		**51 (5.79)**
158		BSRbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	29 (3.33)
164		BSRiB1	Sandy clay surface, slope 1-3%, slight erosion	15 (1.71)
167		BSRiB2	Sandy clay surface, slope 1-3%, moderate erosion	3 (0.29)

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
168		BSRiB2g1	Sandy clay surface, slope1-3%, moderate erosion, gravelly (15-35%)	4 (0.46)
	BDG	Bidanagere soils are moderately deep (75-100 cm), well drained, have dark reddish brown, red gravelly clay soils occurring on nearly level to gently sloping uplands under cultivation		**95 (10.81)**
180		BDGcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	54 (6.2)
182		BDGcC2g1	Sandy loam surface, slope 3-5%, moderate erosion, gravelly (15-35%)	14 (1.56)
185		BDGhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	4 (0.41)
187		BDGhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	2 (0.25)
188		BDGhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	17 (1.92)
193		BDGiB1g2	Sandy clay surface, slope 1-3%, slight erosion, very gravelly (35-60%)	1 (0.06)
194		BDGiB2g1	Sandy clay surface, slope1-3%, moderate erosion, gravelly (15-35%)	3 (0.38)
455		BDGcB2	Sandy loam surface, slope 1-3%, moderate erosion	0.22 (0.03)
	JDG	Jedigere soils are deep (100-150 cm), well drained, have dark brown to dark reddish brown red sandy clay to clay soils occurring on nearly level to very gently sloping uplands under cultivation		**2 (0.21)**
213		JDGiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	2 (0.21)
	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		**108 (12.36)**
223		BPRcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	4 (0.45)
224		BPRcB2	Sandy loam surface, slope 1-3%, moderate erosion	29 (3.28)
225		BPRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	22 (2.53)
227		BPRcC2g1	Sandy loam surface, slope 3-5%, moderate erosion, gravelly (15-35%)	31 (3.56)
230		BPRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	22 (2.54)
	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		**66 (7.58)**

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
		cultivation		
249		NGPbB1	Loamy sand surface, slope 1-3%, slight erosion	19 (2.12)
251		NGPcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	41 (4.66)
253		NGPcC2g1	Sandy loam surface, slope 3-5%, moderate erosion, gravelly (15-35%)	1 (0.17)
265		NGPiB2g1	Sandy clay surface, slope1-3%, moderate erosion, gravelly (15-35%)	0.05 (0.01)
460		NGPhC2g1	Sandy clay loam surface, slope 3-5%, moderate erosion, gravelly (15-35%)	5 (0.62)
	HNH	Honnenahalli soils are moderately deep (50-75 cm), moderately well drained, have brown to dark brown sandy clay soils occurring on nearly level to very gently sloping lowlands under cultivation		**14 (1.54)**
471		HNHiB2	Sandy clay surface, slope 1-3%, moderate erosion	14 (1.54)
	KLR	Kavalakkeri soils are very deep (>150 cm), moderately well drained, have black to dark reddish brown, calcareous sandy clay soils occurring on nearly level to very gently sloping low lands under cultivation		**22 (2.56)**
473		KLRmA1	Clay surface, slope 0-1%, slight erosion	22 (2.56)
	HLP	Huliyapura soils are moderately deep (75-100 cm), well drained, have dark yellowish brown to dark brown, sandy clay loam soils occurring on very gently sloping lowlands under cultivation		**5 (0.51)**
437		HLPhB1	Sandy clay loam surface, slope 1-3%, slight erosion	3 (0.34)
438		HLPiB2	Sandy clay surface, slope 1-3%, moderate erosion	2 (0.17)
994		Mining/Industrial area		**17 (1.98)**
999	Rock outcrops	Rock lands, both massive and bouldery with little or no soil		**131 (14.95)**
1000	Others	Habitation and water body		**40 (4.52)**

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

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Abbagiri Tanda-1 Microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss landscapes based on geology. In all, 16 soil series are identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. The soil formation is dominantly influenced by the parent material, climate, time and relief.

A brief description of each of the 16 soil series identified followed by 52 soil phases (management units) mapped (Fig. 3.5) are furnished below. The physical and chemical characteristics of soil series identified in Abbagiri Tanda-1 microwatershed is given in Table 4.1 along with soil classification. The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

4.1 Soils of Granite gneiss landscape

In this landscape, 16 soil series was identified and mapped. Of these, MKH series occupies maximum area of 124 ha (14%) followed by BPR 108 ha (12%), HDH 100 ha (11%), BDG 95 ha (11%), BGT 76 ha (9%), GNP 66 ha (8%), BSR 51 ha (6%), KLR 22 ha (3%), HNH 14 ha (2%), KGH 9 ha (2%), KTP 7 ha (<1%), ABR 5 ha (<1%), HLP 5 ha (<1%), LKR 2 ha (<1%) and JDG 2 ha (<1%). The mining/industrial, rock outcrops and others (habitation and water body) occupy an area of 17 ha (2%), 131 ha (15%) and 40 ha (5%) respectively. Brief description along with the soil phases identified and mapped is given below.

4.1.1 Belagatti (BGT) Series: Belagatti soils are very shallow (< 25 cm), well drained, have dark gray to dark grayish brown, calcareous gravelly clay soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands. The Belagatti series has been classified as a member of the clayey, mixed (calcareous), isohyperthermic family of Lithic Ustorthents.

The thickness of the soil is less than 25 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. The texture is clay with more than 35 per cent gravelly and the available water capacity is very low (<50 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Belagatti (BGT) Series

4.1.2 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 (<50mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Harve (HRV) Series

4.1.3 Abbigere Series (ABR): Abbigere soils are shallow (25-50 cm), well drained, have dark reddish brown gravelly red gravelly sandy clay soils. They have developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Abbigere series has been classified as a member of the clayey-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 3 to 4. The texture is sandy clay with 20 to 35 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 2.5 to 4 and chroma 2 to 3. Its texture is sandy clay to clay with gravel content of more than 35 per cent. The available water capacity is very low (<50 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Abbigere (ABR) Series

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

The thickness of the solum ranges from 51 to 74 cm. The thickness of A horizon ranges from 12 to 18 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from loamy sand to sandy clay loam with 15 to 50 per cent gravel. The thickness of B horizon ranges from 39 to 58 cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay with 40 to 60 per cent gravel. The available water capacity is low (50-100 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Lakkur (LKR) Series

4.1.5 Kutegoudanahundi (KGH) Series: Kutegoudanahundi soils are moderately shallow (50-75 cm), well drained, have brown to dark brown, gravelly sandy clay loam soils. They have developed from granite gneiss and occur on very gently to gently sloping uplands. The Kutegoudanahundi series has been classified as a member of the Fine-loamy, mixed, isohyperthermic family of Typic Haplustalfs.

The thickness of the solum ranges from 50 to 74 cm. The thickness of A horizon ranges from 12 to 22 cm. Its colour is in 7.5 YR and 10 YR hue with value and chroma 3 to 4. The texture varies from loamy sand to sandy loam with 15 to 30 per cent gravel. The thickness of B horizon ranges from 40 to 62 cm. Its colour is in 7.5 YR hue with value and chroma 3 to 4. Its texture is sandy clay loam with gravel content of 15 to 35 per cent. The available water capacity is medium (100-150 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Kutegoudanahundi (KGH) Series

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

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

Landscape and soil profile characteristics of Kethanapura (KTP) Series

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

The thickness of the solum ranges from 51 to 72 cm. The thickness of A horizon ranges from 12 to 17 cm. Its colour is in 5 YR and 7.5 YR hue with value 3 to 4 and chroma 2 to 4. The texture varies from loamy sand to sandy loam with 20 to 45 per cent gravel. The thickness of B horizon ranges from 40 to 68 cm. Its colour is in 2.5 YR and 5 YR hue with value and chroma 3 to 6. Texture is sandy clay loam to sandy clay with 35 to 50 per cent gravel. The available water capacity is low (50-100 mm/m). Eight soil phases were identified and mapped.

Landscape and soil profile characteristics of Mukhadahalli (MKH) Series

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

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

Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

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

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

Landscape and soil profile characteristics of Bisarahalli (BSR) Series

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

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

Landscape Soil Profile Characteristics of Bidanagere (BDG) Series

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

The thickness of the solum ranges from 117 to 145 cm. The thickness of A horizon ranges from 13 to 21 cm. Its colour is in hue 5 YR and 7.5 YR with value 2 to 4 and chroma 2 to 6. Its texture is dominantly sandy clay and sand clay loam. The thickness of B horizon ranges from 104 to 124 cm. Its colour is in hue 10 YR and 7.5 YR with value 2 to 4 and chroma 3 to 6. Its texture is dominantly clay. The available water capacity is very high (>200mm/m). Only one soil phase was identified and mapped.

Landscape and Soil Profile Characteristics of Jedigere (JDG) Series

4.1.12 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 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). Eight soil phases were identified and mapped.

Landscape Soil Profile Characteristics of Balapur (BPR) Series

4.1.13 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). Five soil phases were identified and mapped.

Landscape Soil Profile Characteristics of Nagalapur (NGP) Series

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

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 18 to 29 cm. Its colour is in 7.5 and 10YR hue with value 3 to 4 and chroma 2 to 4. The texture is sandy clay. The thickness of B horizon ranges from 131-155 cm. Its colour is in 7.5YR and 10 YR hue with value 2 to 4 and chroma 1 to 4. Its texture is sandy clay to clay. The available water capacity is very high (>200mm/). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Kavalakkeri (KLR) Series

4.1.15 Honnenahalli (HNH) Series: Honnenahalli soils are moderately deep (50 to 75 cm), well drained, have brown to dark brown, sandy clay soils. They have developed from weathered granite gneiss and occur on nearly level to very gently sloping lowlands. The Honnenahalli series has been classified as a member of the fine-loamy, mixed, isohyperthermic family of Typic Haplustepts.

The thickness of the solum ranges from 52 to 74 cm. The thickness of A horizon ranges from 12 to 21 cm. Its colour is in 7.5 YR and 10 YR hue with value 3 and chroma 3 to 4. The texture varies from sandy clay loam to sandy loam with 5 to 10 per cent gravel. The thickness of B horizon ranges from 45 to 62 cm. Its colour is in 7.5 YR and 10 YR hue with value 3 and chroma 3 to 4. Its texture is sandy clay. The available water capacity is medium (100-150 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Honnenahalli (HNH) Series

4.1.16 Huliyapura (HLP) Series: Huliyapura soils are moderately deep (75-100 cm), well drained, have dark- strong brown to dark yellowish brown, sandy clay loam soils. They have developed from weathered granite gneiss and occur on very gently sloping low lands under cultivation. The Huliyapura series has been classified as a member of the fine-loamy, mixed, isohyperthermic family of Typic Haplustepts**.**

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

Landscape and soil profile characteristics of Huliyapura (HLP) Series

Table: 4.1 Physical and Chemical Characteristics of Soil Series identified in Abbagiri Tanda-1 Microwatershed

Series Name: Belagatti (BGT), **Pedon:** A2/RM-5
Location: $15^0$19'10.8"N, $75^0$57'48.1"E, Kavalura village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey mixed (calcareous), isohyperthermic Lithic Ustorthents

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
0-23	Ap	36.14	20.34	43.52	10.87	6.93	5.97	8.42	3.94	40	c	29.53	17.97

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-23	8.4			0.157	0.12	18.24			0.73	0.50		44.84	1.03		1.11

Contd...

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: Abbigeri (ABR)**, Pedon:** R-11
Location: $15^0$26'14.0"N, $76^0$16'39.0"E Abbigeri village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey- 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
0-10	Ap	81.18	8.29	10.53	24.31	11.90	19.33	16.07	9.56	20	ls	7.13	3.91
10-25	Bt1	54.32	7.39	38.29	26.64	11.34	5.83	6.24	4.27	40	sc	14.71	11.30
25-40	Bt2	53.84	7.99	38.17	22.10	14.32	6.43	6.85	4.15	50	sc	16.45	12.00

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-10	6.13	-	-	0.02	0.81	-	1.56	0.50	0.04	0.01	2.12	3.60	0.34	58.76	0.36
10.-25	6.32	-	-	0.03	0.79	-	5.63	2.41	0.12	0.01	8.17	10.60	0.28	77.07	0.10
25-40	6.27	-	-	0.03	0.64	-	5.41	2.24	0.08	0.01	7.74	12.40	0.32	62.44	0.09

Contd..

Soil Series: Lakkur (LKR), **Pedon:** RM-8.
Location: $15^0$04'26.3"N, $75^0$37'84.1"E, (4D4A3I1f), Belhatti village, Shirahatti taluk, Gadag distrtict
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Typic Rhodustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-21	Ap	74.00	8.34	17.66	9.62	11.57	15.76	23.13	13.92	20	sl	-	-
21-35	Bt	54.37	10.48	35.14	16.33	8.64	9.69	11.59	8.11	40	sc	-	-
35-56	Bc	48.37	13.46	38.17	10.96	7.69	9.17	11.28	9.27	60	sc	-	-

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-21	8.18	-	-	0.30	0.56	0.94	-	-	0.31	0.55	0.86	12.19	0.69	100.00	4.51
21-35	8.17	-	-	0.30	0.52	1.29	-	-	0.19	0.84	1.03	22.18	0.63	100.00	3.79
35-56	7.95	-	-	0.46	0.48	1.99	-	-	0.24	0.58	0.82	22.94	0.60	100.00	2.53

Contd...

Series Name: Kutegoudanahundi (KGH) **Pedon:** R1
Location: $15^0$24'57"N, $76^0$19'29" E Lambani tanda village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine-loamy, 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
0-12	Ap	79.84	7.93	12.23	30.70	15.50	14.08	12.26	7.29	20	sl	10.46	4.79
12-35	Bt1	64.49	9.69	25.82	33.88	10.92	8.06	7.45	4.18	25	scl	16.40	9.12
35-58	Bt2	62.27	9.51	28.22	35.38	8.90	7.06	3.27	7.67	30	scl	19.13	11.05
58-72	Bc	62.77	7.40	29.83	32.76	11.50	7.63	6.82	4.07	40	scl	19.86	10.16

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	6.66			0.089	0.83		6.39	1.56	0.21	0.08	8.23	8.22	0.67	100	0.93
12-35	7.39			0.061	0.73				0.25	0.07		14.95	0.58	100	0.49
35-58	7.56			0.064	0.69				0.27	0.08		16.34	0.58	100	0.52
58-72	7.92			0.146	0.47				0.36	0.12		17.72	0.59	100	0.69

Contd..

Series Name: Kethanapura (KTP), **Pedon:** R-9
Location: $15^0$25'28.81"N, $76^0$22'00.76" E Jabbaragudda village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Rhodic Paleustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-18	Ap	83.64	10.52	5.84	25.61	22.36	15.24	13.52	6.91	10	ls	7.92	2.58
18-38	Bt1	46.06	5.63	48.31	21.58	9.54	3.53	4.15	7.26	30	sc	19.62	14.48
38-73	Bt2	52.31	6.91	40.78	24.56	12.74	5.96	5.55	3.49	30	sc	17.73	11.95

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	6.42	-		0.07	1.24	-	2.95	0.93	0.57	0.02	4.48	4.41	0.75	100.00	0.05
18-38	6.63	-	-	0.09	0.70	-	11.71	3.53	0.98	0.08	16.31	16.59	0.34	98.30	0.50
38-73	6.88	-	-	0.15	0.48	-	11.36	3.30	0.72	0.13	15.50	15.75	0.39	98.42	0.80

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...

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-14	Ap	70.11	9.29	20.60	22.31	15.97	11.98	9.83	10.03	20	scl	13.22	7.81
14-57	Bt1	47.27	7.52	45.20	27.04	8.28	4.61	2.10	5.24	25	sc	16.39	13.31
57-80	Bt2	41.93	8.67	49.40	21.95	6.83	4.76	4.66	3.73	30	c	21.41	15.41
80-99	Bt3	49.02	9.87	41.11	19.90	10.78	6.84	6.42	5.08	40	sc	21.82	14.24

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-14	6.59	-	-	0.12	0.73	-	4.47	1.77	0.06	0.53	6.82	8.80	0.43	77.55	6.00
14-57	7.02	-	-	0.04	0.48	-	5.85	2.31	0.06	0.20	8.43	14.70	0.33	57.32	1.36
57-80	7.00	-	-	0.05	0.28	-	11.74	2.26	0.08	0.22	14.31	15.60	0.32	91.73	1.44
80-99	6.90	-	-	0.06	0.18	-	13.70	2.16	0.08	0.14	16.08	16.50	0.40	97.44	0.83

Contd...

Series: Bidanagere (BDG), **Pedon**: RM-3
Location: $13^0$22'11"N, $76^0$38'03"E, (4D3D8G1a), Tharabenahalli village, Chikkanayakanahalli Taluk, Tumakuru District.
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic 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
0-20	Ap	81.19	11.25	7.56	12.54	15.07	17.90	21.94	13.75	50	ls	-	-
20-35	Bt1	57.45	11.45	31.10	12.76	11.02	10.92	12.45	10.31	50	scl	-	-
35-92	Bt2	44.63	7.85	47.52	12.40	9.61	8.37	7.75	6.51	60	c	-	-

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-20	6.24	-	-	0.06	0.60	0.00	1.61	0.26	0.10	0.01	1.98	3.76	0.50	52.56	0.35
20-35	5.99	-	-	0.02	0.40	0.00	4.25	0.46	0.08	0.28	5.07	8.02	0.26	63.18	3.46
35-92	6.70	-	-	0.03	0.20	0.00	5.45	0.31	0.10	0.22	6.09	9.90	0.21	61.48	2.24

Contd..

Series Name: Jedigere (JDG) **Pedon:** R5
Location: $15^0$29'06"N, $76^0$10'38" E Chennahalu village, Yelburga Taluk and Koppal District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Typic Haplustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-14	Ap	70.63	8.33	21.04	16.26	23.58	13.41	11.59	5.79	-	scl	13.46	6.17
14-39	Bt1	49.95	11.56	38.49	10.61	17.40	10.30	7.42	4.22	-	sc	23.07	13.70
39-62	Bt2	45.88	11.44	42.68	10.72	16.70	9.28	6.80	2.37	-	sc	25.24	15.20
62-94	Bt3	42.89	8.51	48.61	9.48	14.54	8.35	6.80	3.71	-	c	25.30	14.07
94-118	Bt4	45.24	11.90	42.86	10.66	15.53	8.59	6.63	3.83	-	sc	23.52	13.58

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-14	6.11			0.078	0.83		5.58	2.49	0.18	0.19	8.45	9.41	0.44	90	2.06
14-39	6.87			0.123	0.67		12.01	5.62	0.32	0.29	18.24	18.22	0.47	100	1.59
39-62	7.65			0.121	0.50				0.42	0.43		21.68	0.50	-	1.99
62-94	8.21			0.188	0.28				0.34	0.41		21.09	0.43	-	1.93
94-118	8.23			0.189	0.24				0.33	0.36		17.62	0.41	-	2.02

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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

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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

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Series Name: Honnenahalli (HNH), **Pedon:** R-9
Location: $15^0$31'26"N, $76^0$15'55.0"E Hosura village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine-loamy, mixed, isohyperthermic Typic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-20	Ap	45.73	27.63	26.65	18.85	8.75	5.25	5.77	7.11	15	scl	16.95	8.71
20-35	Bw1	53.87	20.02	26.11	20.95	12.07	8.05	6.81	5.99	15	scl	15.94	8.39
35-50	Bw2	61.98	12.47	25.54	24.38	15.60	9.09	7.33	5.58	15	scl	15.27	9.04
50-70	Bw3	62.35	10.44	27.21	28.81	13.48	8.13	6.28	5.66	10	scl	17.44	9.25

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	7.94	-	-	0.99	1.24	-	14.78	2.59	0.10	0.38	17.85	18.00	0.68	99.15	2.13
20-35	7.68	-	-	0.09	0.81	-	15.03	3.02	0.10	0.32	18.46	18.40	0.70	100.34	1.72
35-50	7.63	-	-	0.06	0.48	-	14.28	2.91	0.10	0.28	17.56	17.50	0.69	100.37	1.61
50-70	7.67	-	-	0.06	0.48	-	13.78	2.29	0.13	0.36	16.56	18.20	0.67	90.99	1.96

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Series Name: Kavalakeri (KLR), **Pedon :** R-5
Location: $15^0$27'55.2"N, $76^0$15'48.0" E Kenchanadoni village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic (calc) Fluventic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-21	Ap	41.67	28.70	29.62	6.62	10.58	5.70	8.00	10.76	-	cl	22.02	15.06
21-40	Bw1	32.23	29.16	38.61	3.76	4.03	3.04	8.24	13.16	-	cl	26.28	19.49
40-70	Bw2	37.41	26.13	36.46	7.52	6.25	4.62	8.61	10.42	-	cl	26.65	18.87
70-106	Bw3	46.43	18.15	35.42	13.93	14.29	5.98	5.98	6.25	-	sc	22.83	17.66
106-137	Bw4	55.64	12.91	31.45	10.59	8.16	12.67	11.46	12.76	-	scl	24.04	12.85
137-162	Bw5	47.16	16.68	36.16	2.88	4.80	5.68	17.12	16.68	-	sc	30.46	16.24

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-21	7.11	-	-	0.33	0.82	8.84	-	-	0.10	0.67	-	19.50	0.66	100.00	3.42
21-40	7.50	-	-	0.32	0.40	6.63	-	-	0.15	0.99	-	23.20	0.60	100.00	4.26
40-70	7.68	-	-	0.33	0.34	8.19	-	-	0.09	1.18	-	21.90	0.60	100.00	5.38
70-106	7.82	-	-	0.23	0.42	6.50	-	-	0.07	1.36	-	21.80	0.62	100.00	6.23
106-137	7.86	-	-	0.23	0.32	3.57	-	-	0.08	0.95	-	17.30	0.55	100.00	5.47
137-162	7.75	-	-	0.31	0.38	3.90	-	-	0.09	1.01	-	22.10	0.61	100.00	4.55

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

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

The 51 soil map units identified in the Abbagiri Tanda-1 microwatershed are grouped under 3 Land capability classes and 8 land capability subclasses (Fig. 5.1). An area of 689 ha (79%) in the microwatershed is suitable for agriculture. About 17 ha (2%) area is mining/industrial, an area of 131 ha (15%) having rock outcrops and about 40 ha (5%) is covered by others (water body & habitation).

An area of about 209 ha (24%) has good lands (Class II) with moderate problems of soil, drainage and erosion and distributed in all parts of the microwatershed except west. Maximum area of about 405 ha (46%) has moderately good lands (Class III) with very severe limitations of soil and erosion and distributed in the major part of the microwatershed. An area of about 76 ha (9%) has fairly good lands (Class IV) with moderate problems of soil and erosion and distributed in the northern part of the microwatershed.

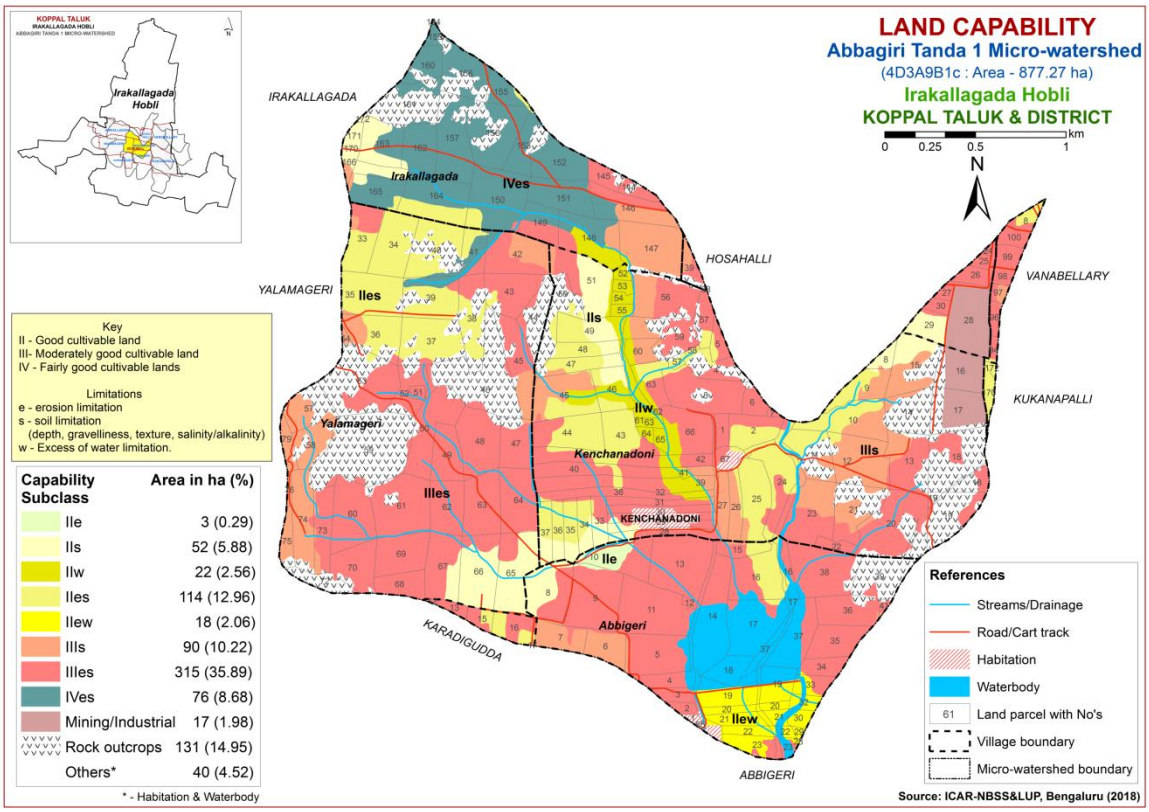

Fig. 5.1 Land Capability map of Abbagiri Tanda-1 Microwatershed

5.2 Soil Depth

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

Very shallow (<25 cm) soils occur in an area of 76 ha (9%) and are distributed in the northern part of the microwatershed. Shallow (25-50 cm) soils occur in an area of 7 ha (<1%) and are distributed in the southern and southwestern part of the microwatershed. Moderately shallow (50-75 cm) soils occur in an area of 157 ha (18%) and are distributed in the northwestern, western, southwestern, southeastern and eastern part of the microwatershed. Moderately deep (75-100 cm) soils occur in an area of 250 ha (29%) and are distributed in all parts of the microwatershed except west. Deep (100-150 cm) soils cover an area of 177 ha (20%) and are distributed in the central, northern, northeastern, eastern and western part of the microwatershed. Very deep (>150 cm) soils cover an area of 22 ha (3%) and are distributed in the central and northern part of the microwatershed.

The most productive lands covering 199 ha (23%) with respect to soil rooting depth where all climatically adapted annual and perennial crops can be grown are deep to very deep (100 - >150 cm depth) soils. The problem soils occupy an area of 83 ha (9%) where only short duration crops can be grown occasionally and the probability of crop failure is very high.

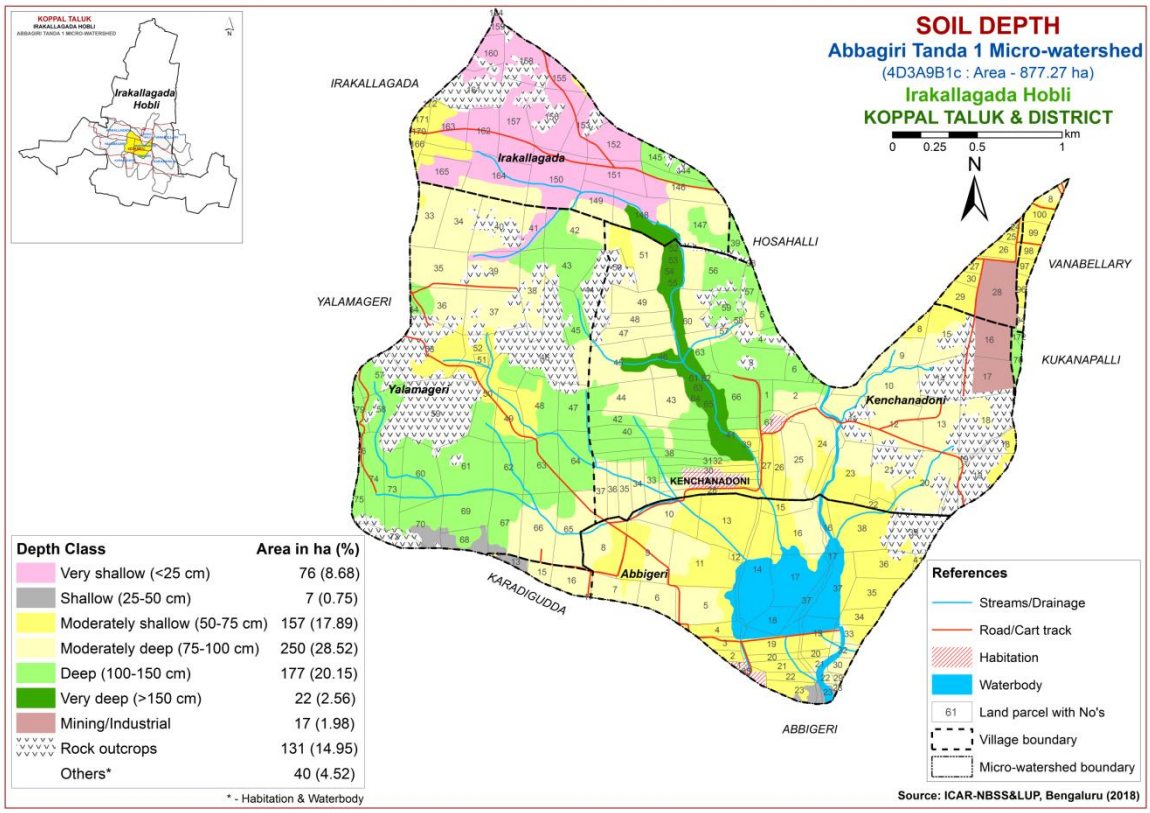

Fig. 5.2 Soil Depth map of Abbagiri Tanda-1 Microwatershed

5.3 Surface Soil Texture

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

An area of about 53 ha (6%) is sandy at the surface and are distributed in the eastern and western part of the microwatershed. Maximum area of about 499 ha (57%) of the microwatershed has loamy soils at the surface and are distributed in the major part of the microwatershed. An area of 137 ha (9%) of the microwatershed has soils that are

clayey and are distributed in the central, northern, northeastern, eastern, southern and southeastern part of the microwatershed. Loamy and clayey soils have high potential for soil-water retention and availability, and nutrient retention and availability, but clay soils have more problems of drainage, infiltration, workability and other physical problems. Sandy soils are problematic where tuber crops can be grown and require frequent irrigation and poor nutrient status.

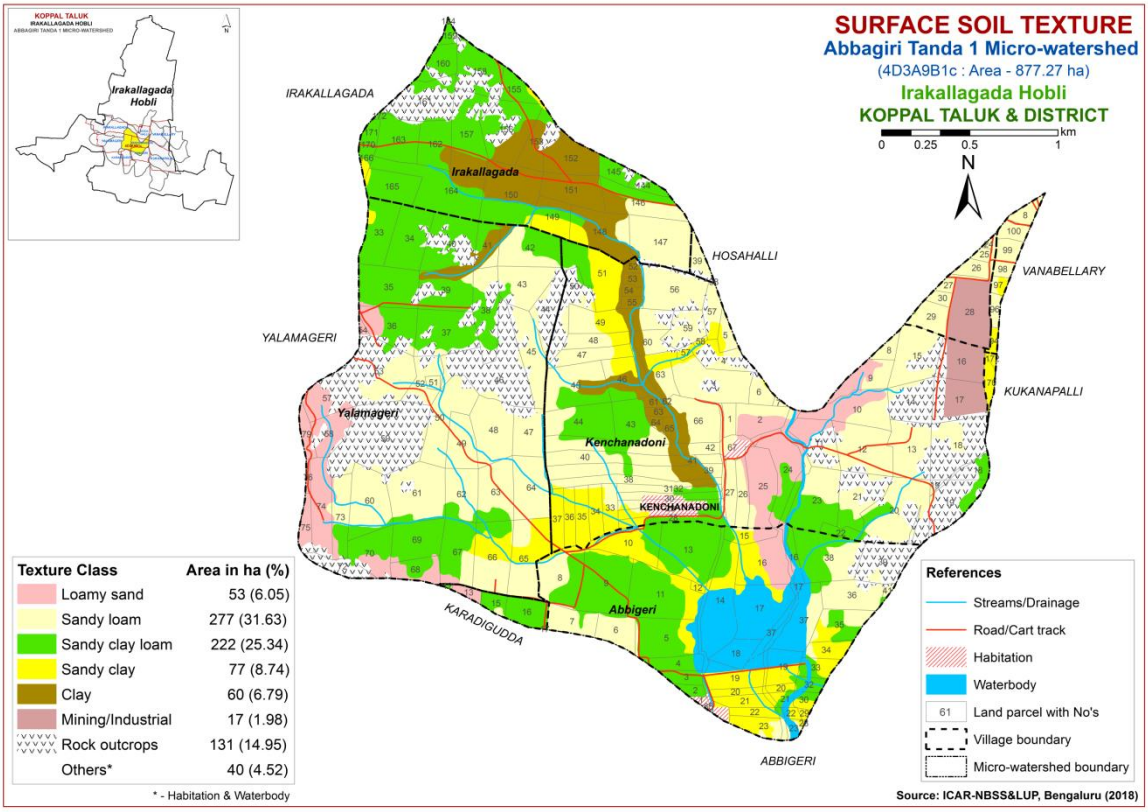

Fig. 5.3 Surface Soil Texture map of Abbagiri Tanda-1 Microwatershed

5.4 Soil Gravelliness

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

An area of about 284 ha (32%) has non gravelly (<15%) soils and occur in all parts of the microwatershed. Maximum area of about 378 ha (43%) has gravelly (15-35%) soils and occur in the major part of the microwatershed. An area of about 25 ha (3%) has very gravelly (35-60%) soils and occur in the northeastern, northwestern, southeastern and southwestern part of the microwatershed and area of about 2 ha (<1%)

has extremely gravelly (60-80%) soils and occur in the eastern part of the microwatershed.

An area of about 284 ha (32%) are most productive lands with respect to gravelliness. They are non-gravelly with less than 15 per cent gravel and have potential for growing both annual and perennial crops. The problem lands cover about 405 ha (46%) that are gravelly to extremely gravelly where only medium or short duration crops can be grown.

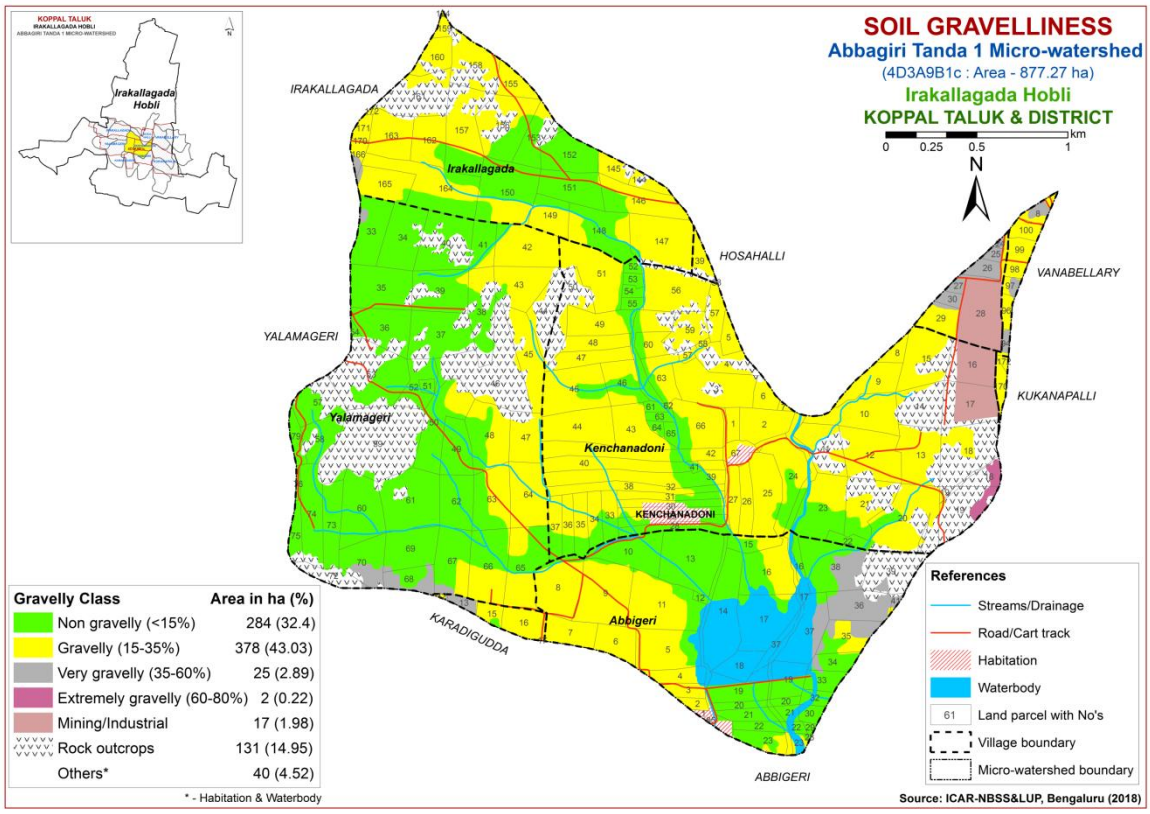

Fig. 5.4 Soil Gravelliness map of Abbagiri Tanda-1 Microwatershed

5.5 Available Water Capacity

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

Maximum area of about 405 ha (46%) has soils that are very low (<50 mm/m) in available water capacity and are distributed in the major part of the microwatershed. An area of about 242 ha (28%) is low (51-100 mm) and occur in all parts of the microwatershed except south. An area of about 20 ha (2%) is medium (101-150 mm/m)

in available water capacity and occur in the southern part of the microwatershed and about 22 ha (3%) area is very high (>200 mm/m) in available water capacity and occur in the central and northern part of the microwatershed.

Maximum area of about 647 ha (74%) 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 22 ha (3%) has soils that have very high potential (>200 mm/m) with regard to available water capacity where all climatically adapted long duration crops can be grown successfully.

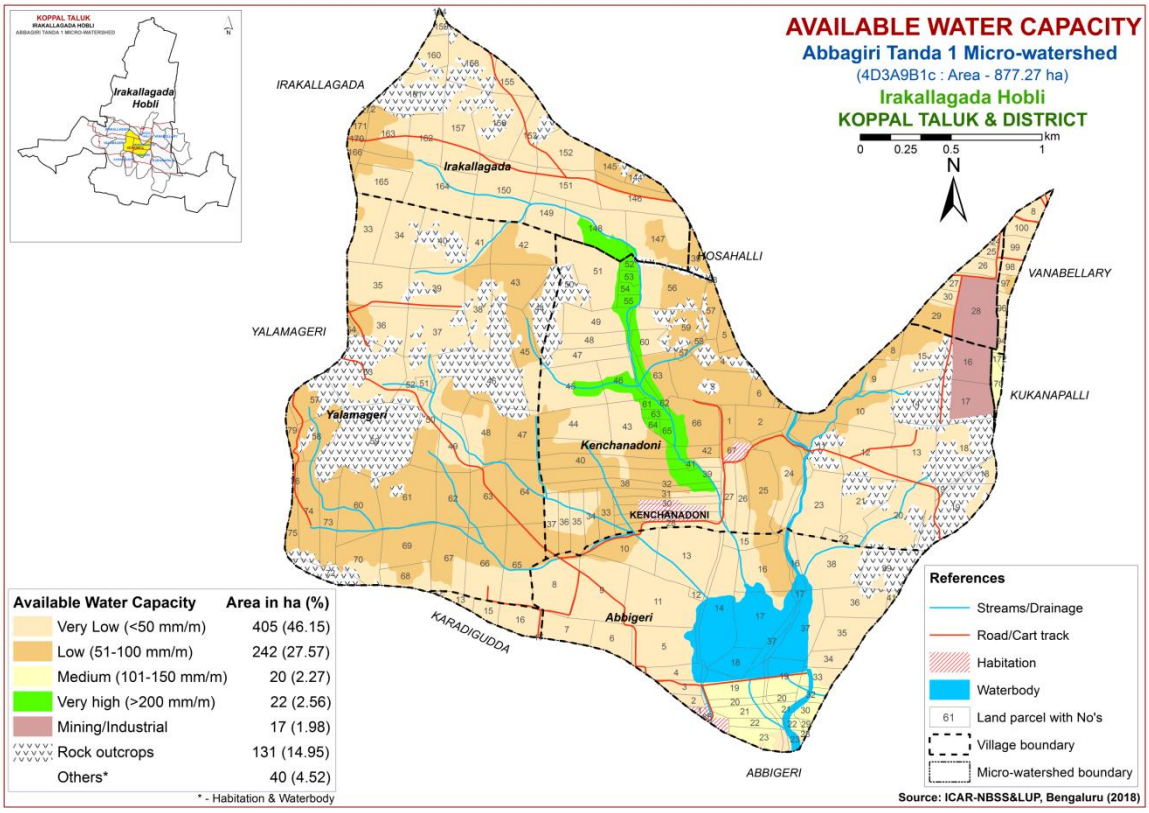

Fig. 5.5 Soil Available Water Capacity map of Abbagiri Tanda-1 Microwatershed

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 four 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 34 ha (4%) of the microwatershed falls under nearly level (0-1% slope) lands and occur in the northern, central and southwestern part of the microwatershed. Maximum area of about 601 ha (69%) under very gently sloping (1-3%

slope) lands and occur in the major part of the microwatershed, thus these areas have high potential in respect of soil slopes. In these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures. Gently sloping (3-5%) lands occur in 54 ha (6%) and are distributed in the eastern, western, northern and northeastern part of the microwatershed. In these areas the soil and water conservation measures should be adopted in order to increase the productivity of soils.

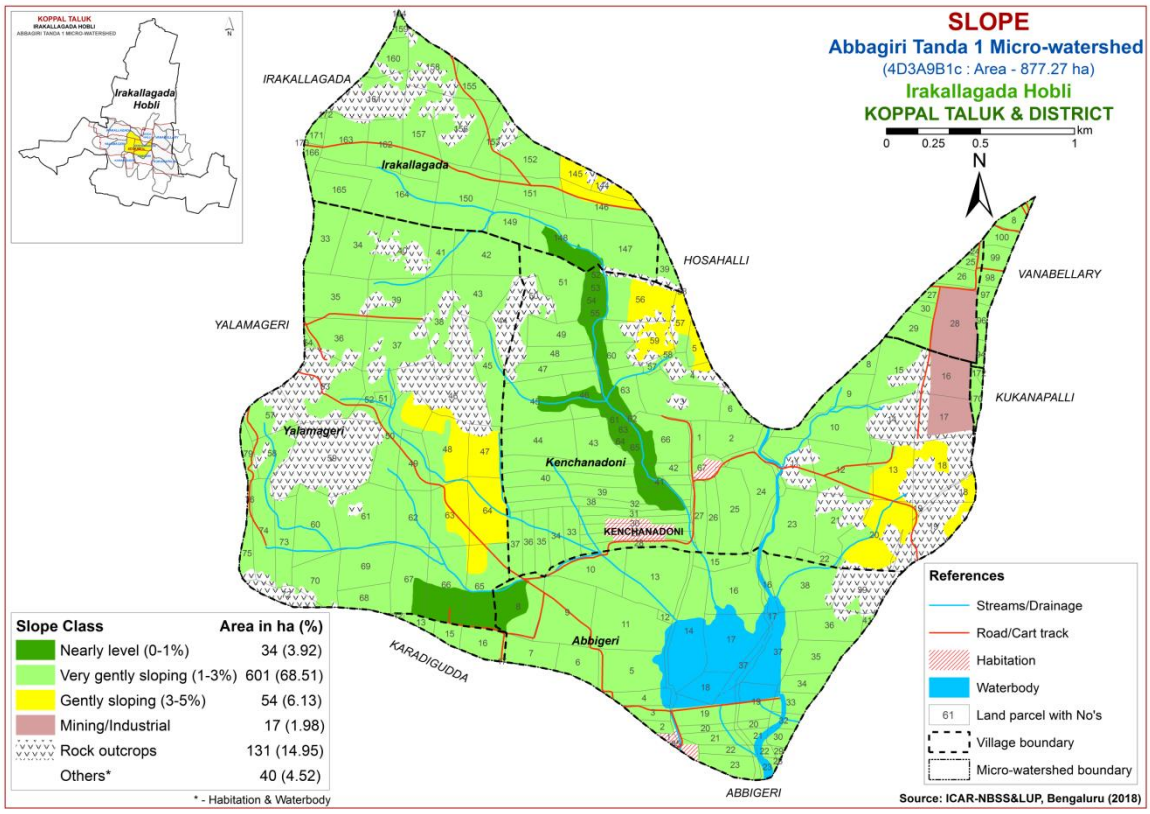

Fig. 5.6 Soil Slope map of Abbagiri Tanda-1 Microwatershed

5.7 Soil Erosion

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

Soils that are slightly eroded (e1 class) cover an area of 167 ha (19%) and are distributed in all parts of the microwatershed. Moderately eroded (e2 class) soils cover a

maximum area of 522 ha (59%) and are distributed in the major part of the microwatershed.

Maximum area of about 522 ha (59%) of the microwatershed is problematic because of moderate erosion. For these areas, taking up of soil and water conservation and other land development measures are needed.

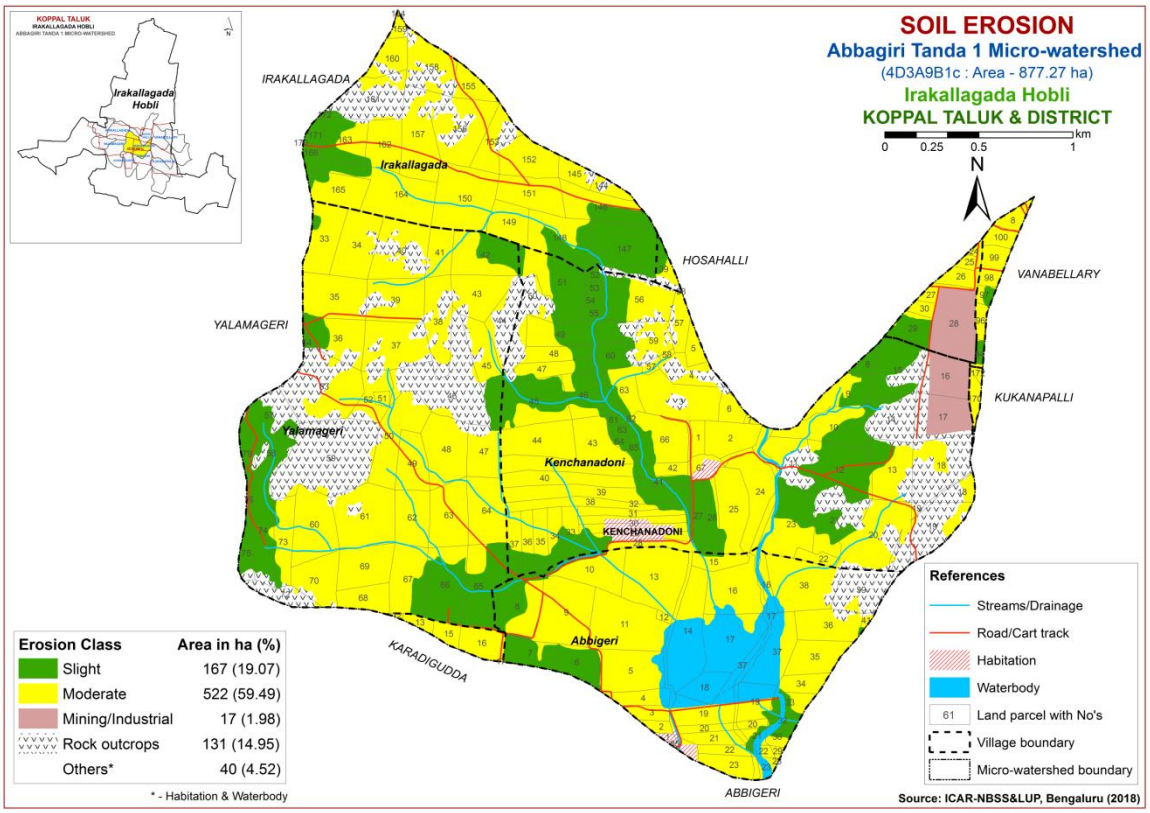

Fig. 5.7 Soil Erosion map of Abbagiri Tanda-1 Microwatershed

Chapter 6

FERTILITY STATUS

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

Soil fertility data generated has been assessed and individual maps for all the nutrients for the microwatershed have been generated using 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 Abbagiri Tanda-1 microwatershed for soil reaction (pH) showed that an area of 182 ha (21%) is strongly acid (pH 5.0-5.5) and are distributed in the central, northern, northwestern, and western part of the microwatershed. An area of 183 ha (21%) is moderately acid (pH 5.5-6.0) and are distributed in all parts of the microwatershed except south and southwest. Slightly acid (pH 6.0-6.5) occur in an area of 114 ha (13%) and are distributed in the central, northern, northwestern, northeastern, southwestern and eastern part of the microwatershed. Neutral (pH 6.5-7.3) occur in an area of 84 ha (10%) and are distributed in the central, northeastern, southwestern and eastern part of the microwatershed. Slightly alkaline (pH 7.3-7.8) occur in an area of 47 ha (5%) and are distributed in the southern, southwestern and southeastern part of the microwatershed. Moderately alkaline (pH 7.8-8.4) occur in an area of 61 ha (7%) and are distributed in the southern part of the microwatershed. Strongly alkaline (pH 8.4-9.0) occur in an area of 17 ha (2%) and are distributed in the southern part of the microwatershed (Fig.6.1). Thus major soils (479 ha) in the microwatershed are under strongly acid to slightly acid fallowed by slightly alkaline to strongly alkaline soils (125 ha) and 84 ha under neutral.

6.2 Electrical Conductivity (EC)

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

6.3 Organic Carbon (OC)

The soil organic carbon content (an index of available Nitrogen) in the soils of the microwatershed is medium (0.5-0.75%) in 151 ha (17%) area and occur in the eastern, northeastern, northwestern and western part of the microwatershed. Maximum area of about 538 ha (61%) is high (>0.75%) in organic carbon and is distributed in the major part of the microwatershed (Fig.6.3).

6.4 Available Phosphorus

The available phosphorus content is medium (23-57 kg/ha) in an area of about 219 ha (25%) and occur in the northwestern, western and southwestern part of the microwatershed and available phosphorus content is high (>57 kg/ha) in a maximum area of 470 ha (54%) and distributed in the major part of the microwatershed (Fig 6.4).

6.5 Available Potassium

Available potassium content is high (>337 kg/ha) in an area of about 74 ha (8%) and are distributed in the northern, northeastern, southwestern and eastern part of the microwatershed. Available potassium content is medium (145-337 kg/ha) in an area of about 235 ha (27%) and are distributed in the northern, southwestern, southern, southeastern and eastern part of the microwatershed (Fig. 6.5). Low (<145 kg/ha) in available potassium content occur a maximum area of 380 ha (43%) and are distributed in the major part of the microwatershed.

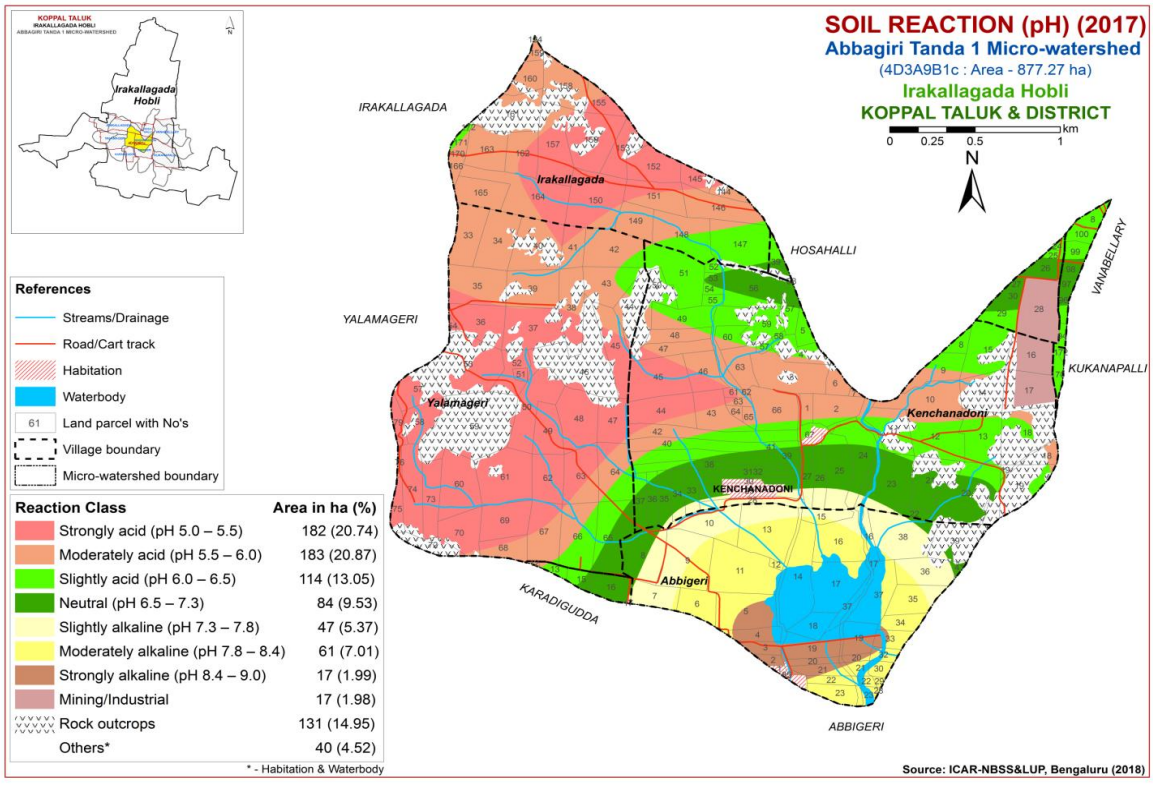

Fig.6.1 Soil Reaction (pH) map of Abbagiri Tanda-1 Microwatershed

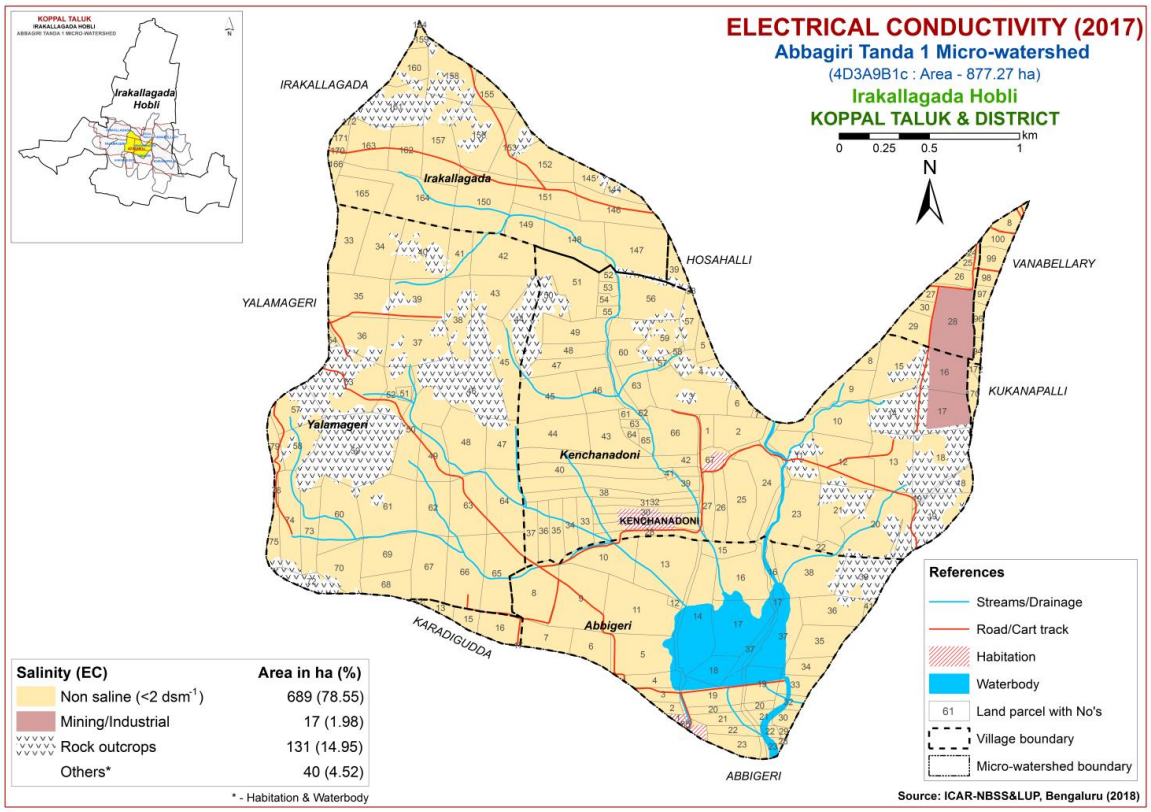

Fig.6.2 Electrical Conductivity (EC) map of Abbagiri Tanda-1 Microwatershed

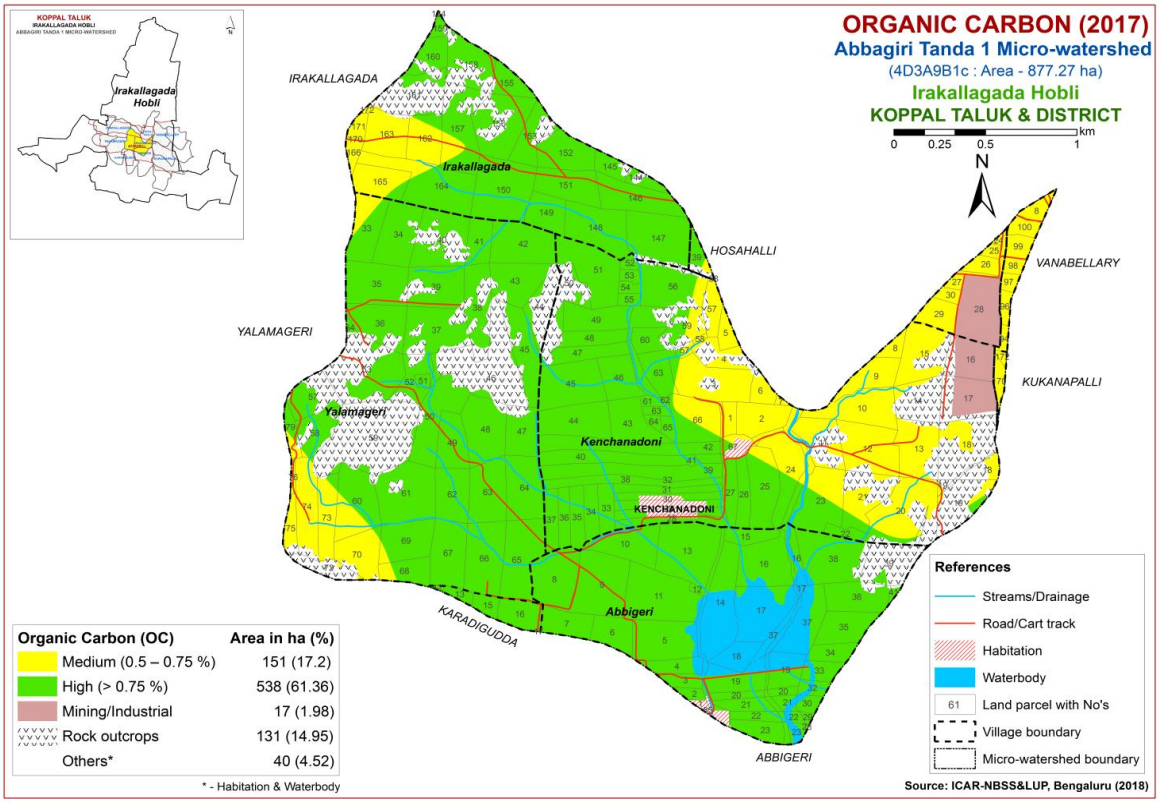

Fig.6.3 Soil Organic Carbon map of Abbagiri Tanda-1 Microwatershed

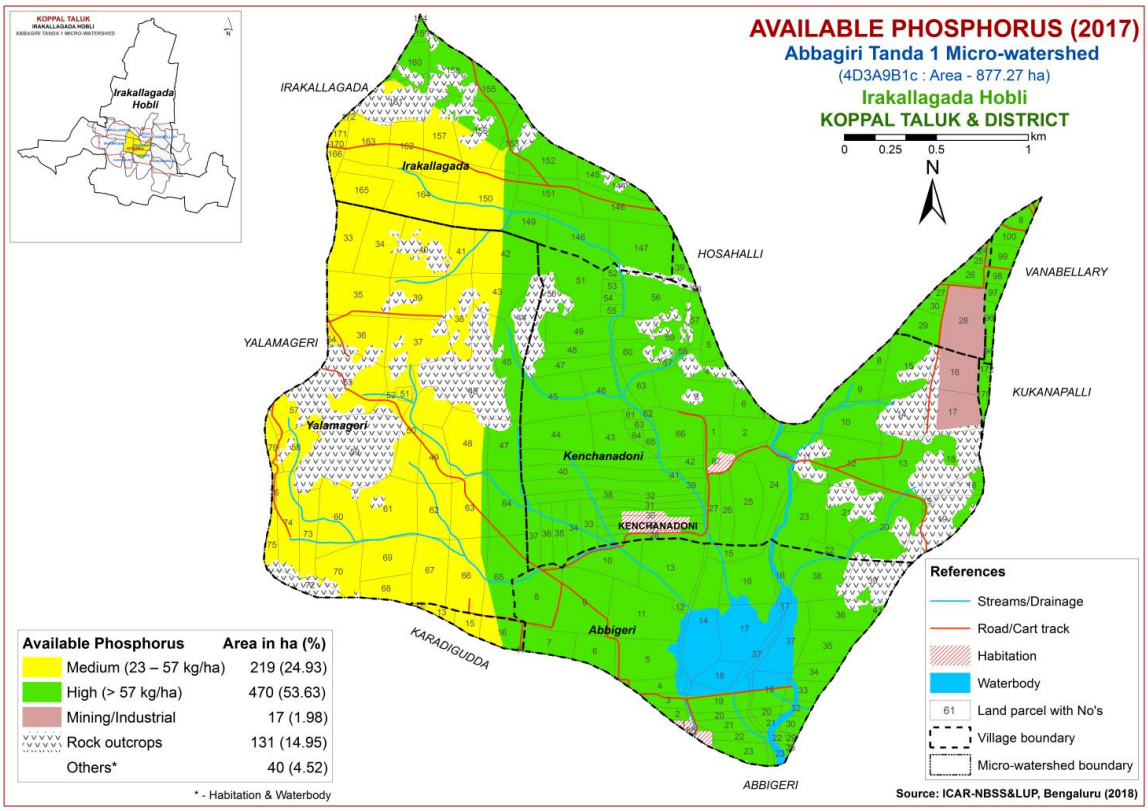

Fig.6.4 Soil Available Phosphors map of Abbagiri Tanda-1 Microwatershed

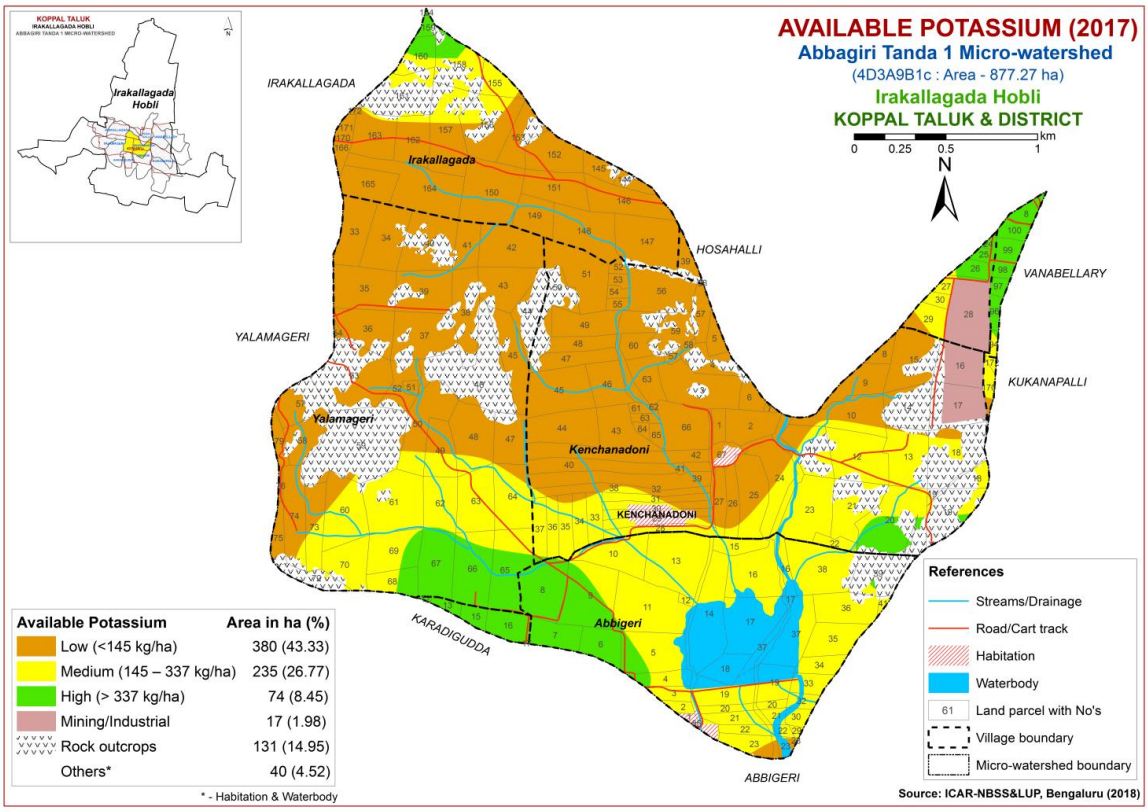

Fig.6.5 Soil Available Potassium map of Abbagiri Tanda-1 Microwatershed

6.6 Available Sulphur

Maximum area of about 554 ha (63%) is low (<10 ppm) in available sulphur content and are distributed in the major part of the microwatershed. Medium (10-20 ppm) in an area of about 136 ha (15%) and is distributed in the southwestern, eastern, northern and northeastern part of the microwatershed (Fig. 6.6).

6.7 Available Boron

Available boron content is low (<0.5 ppm) in major area of 665 ha (76%) in the microwatershed and is distributed in the major part of the microwatershed and an area of about 24 ha (3%) is medium (0.5-1.0 ppm) in available boron and is distributed in the southwestern part of the microwatershed (Fig.6.7). These areas need to be applied with sodium borate @ 10kg/ha as soil application or 0.2% borax as foliar spray to correct the deficiency.

6.8 Available Iron

Available iron content is deficient (<4.5 ppm) in an area of 98 ha (11%) and occur in the southern and southeastern part of the microwatershed and sufficient (>4.5 ppm) in a maximum area of 591 ha (67%) and occur in the major part of the microwatershed (Fig 6.8).

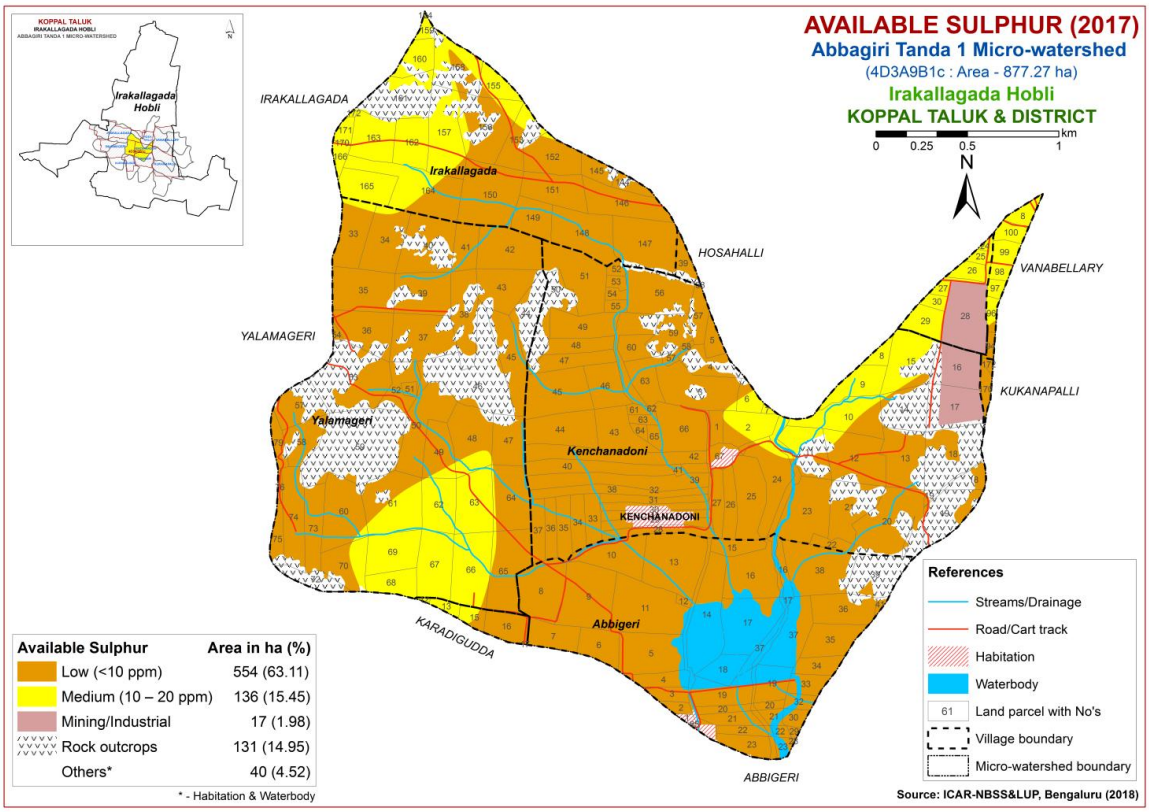

Fig.6.6 Soil Available Sulphur map of Abbagiri Tanda-1 Microwatershed

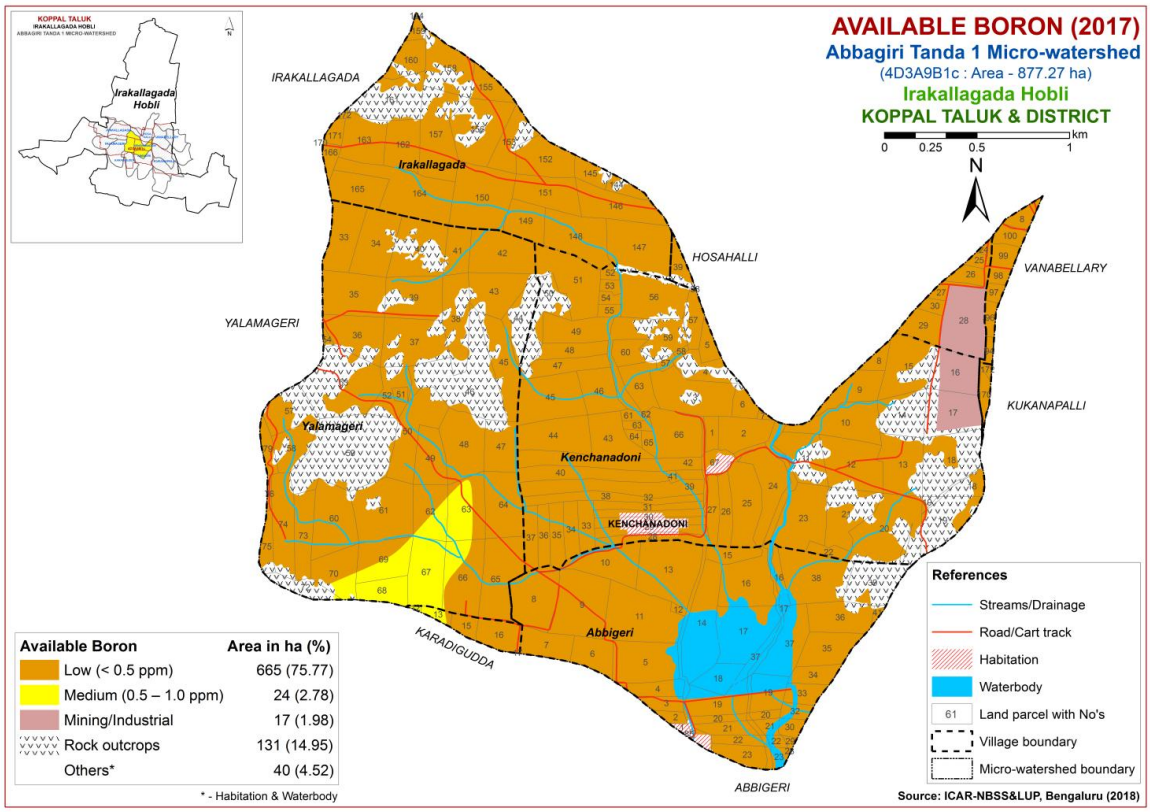

Fig.6.7 Soil Available Boron map of Abbagiri Tanda-1 Microwatershed

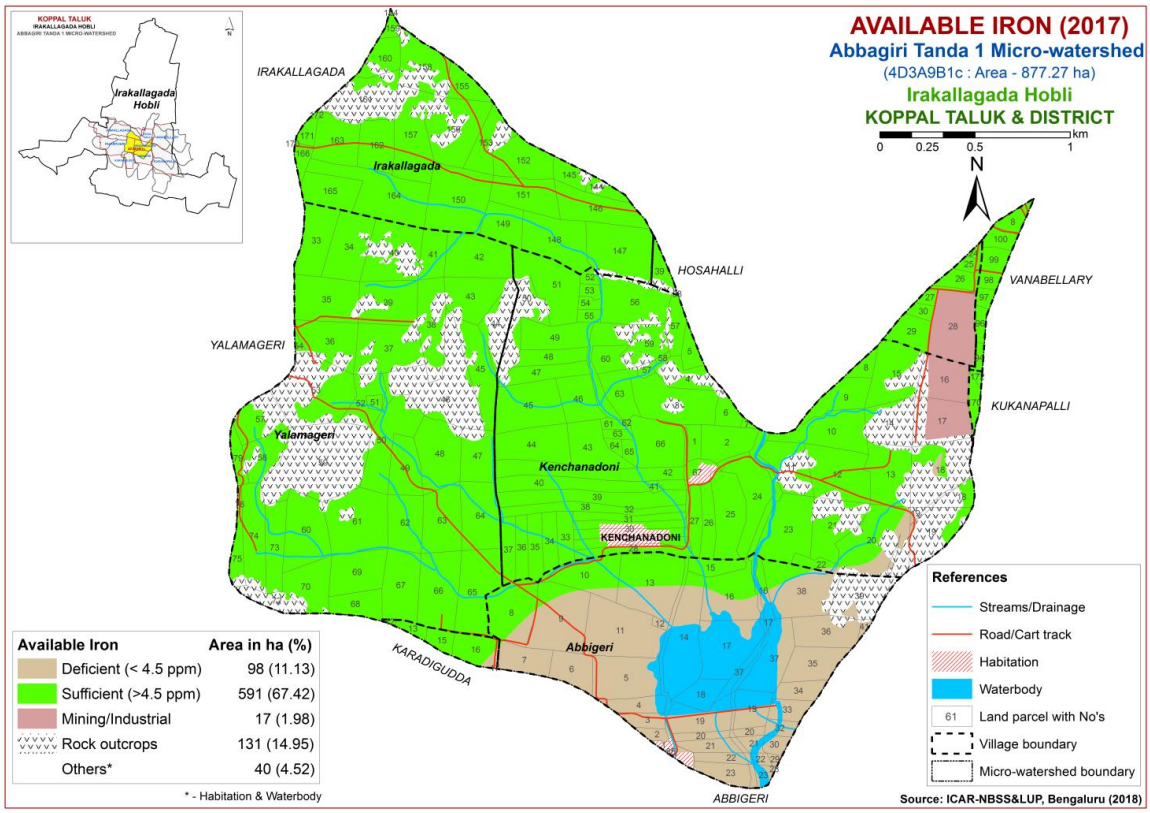

Fig.6.8 Soil Available Iron map of Abbagiri Tanda-1 Microwatershed

6.9 Available Manganese

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

6.10 Available Copper

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

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in an area of 359 ha (41%) and distributed in the central, northern, northwestern, western and southwestern part of the microwatershed and an area of about 330 ha (38%) is sufficient (>0.6 ppm) and distributed in the northern, northeastern, eastern, southern and southeastern part of the microwatershed (Fig 6.11).

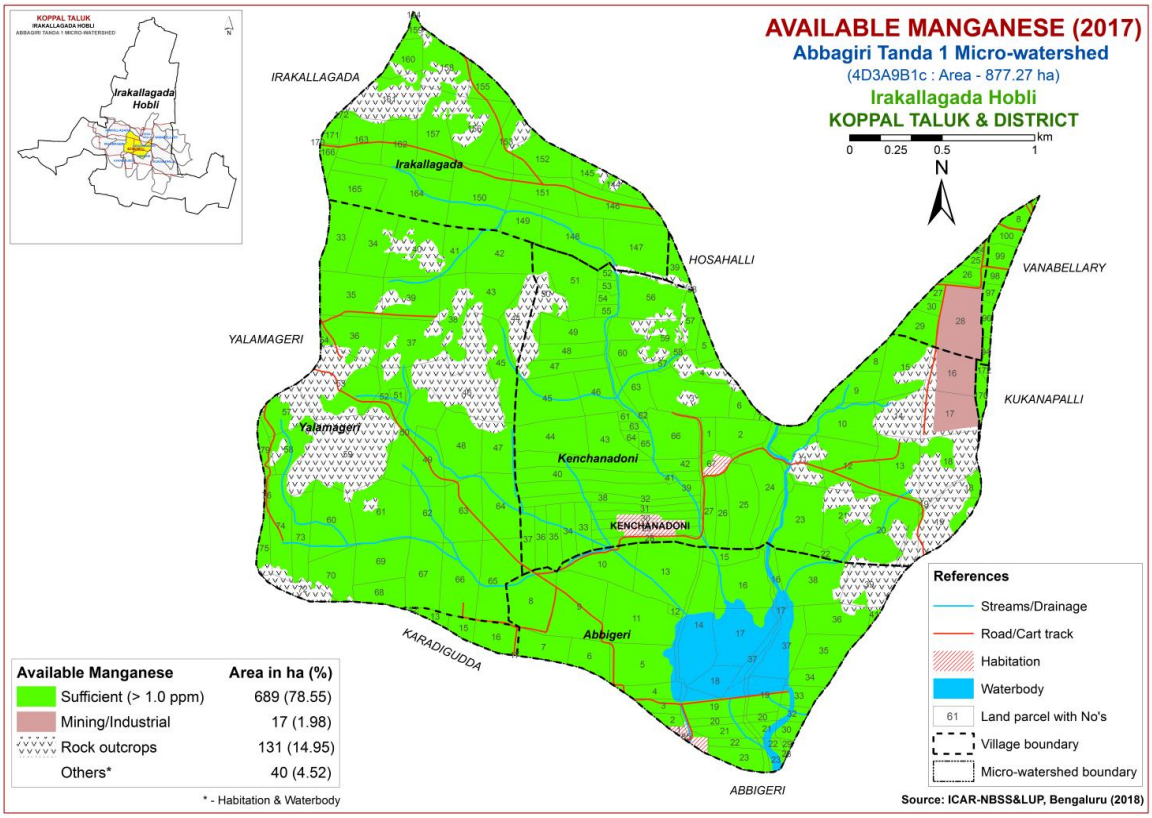

Fig.6.9 Soil Available Manganese map of Abbagiri Tanda-1 Microwatershed

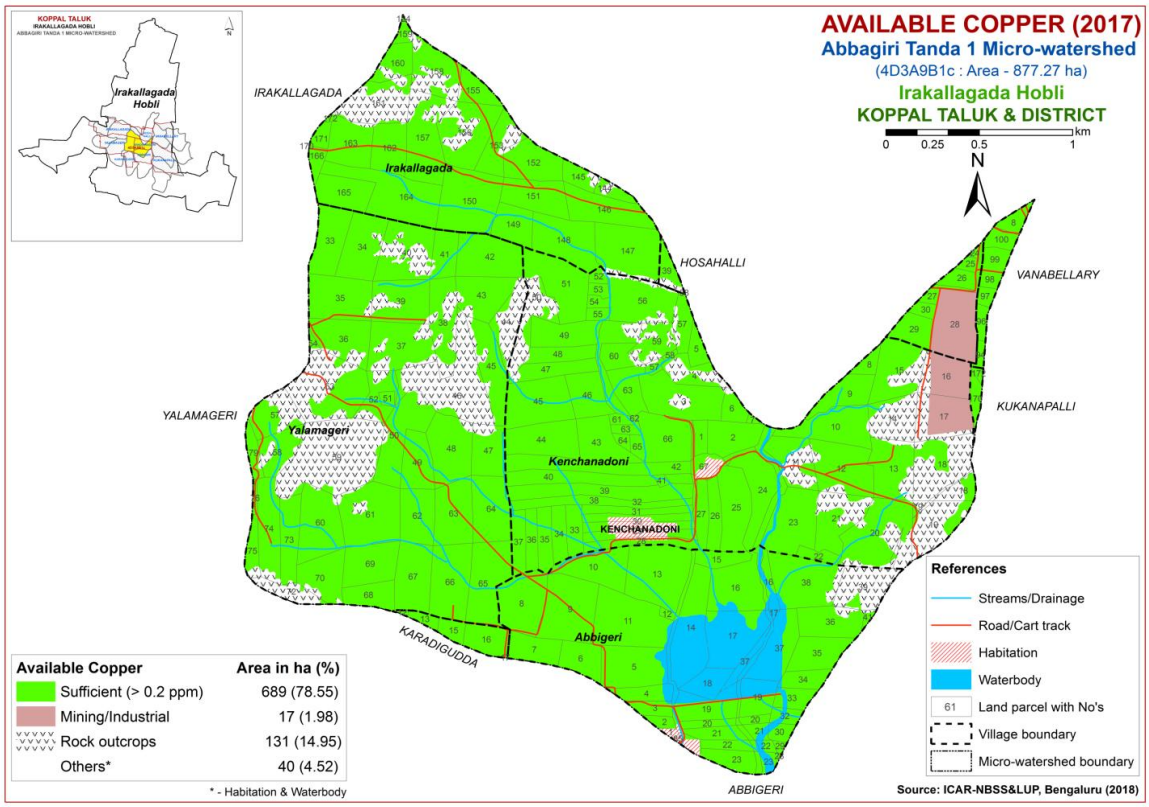

Fig.6.10 Soil Available Copper map of Abbagiri Tanda-1 Microwatershed

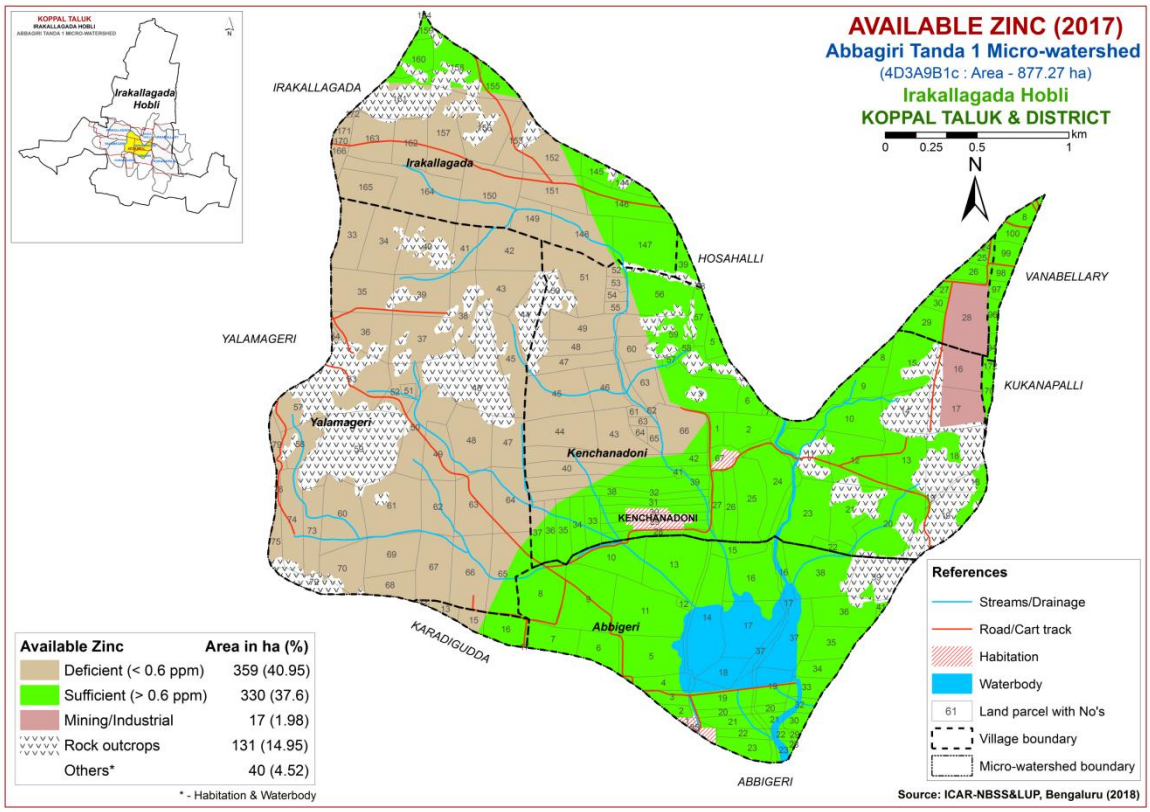

Fig.6.11 Soil Available Zinc map of Abbagiri Tanda-1 Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Abbagiri Tanda-1 Microwatershed were assessed for their suitability for growing food, fodder, fibre and other horticulture crops by following the procedure as outlined in FAO, 1976 and 1983. Crop requirements were developed for each of the crop from the available research data and also by referring to Naidu *et. al.* (2006) and Natarajan *et. al* (2015). The soil and land characteristics (Table 7.1) were matched with the crop requirements (Tables 7.2 to 7.29) to arrive at the crop suitability. The soil and land characteristics table and crop requirements tables are given at the end of the chapter. In FAO land suitability classification, two orders are recognized. Order S- Suitable and Order N- Not suitable. The orders have Classes, subclasses and units. Order-S has three classes, Class S1- Highly Suitable, Class S2- Moderately Suitable and Class S3- Marginally Suitable. Order N has two classes, N1- Currently not Suitable and N2- Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2, S3, N1 and N2 are divided into subclasses based on the kinds of limitations encountered. The limitations that affect crop production are 'c' for erratic rainfall and its distribution and length of growing period (LGP), 'e' for erosion hazard, 'r' for rooting condition, 't' for lighter or heavy texture, 'g' for gravelliness or stoniness, 'n' for nutrient availability, 'l' for topography, 'm' for moisture availability, 'z' for calcareousness and 'w' for drainage. These limitations are indicated as lower case letters to the class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

Using the above criteria, the soil map units of the microwatershed were evaluated and land suitability maps for 28 major agricultural and horticultural crops were generated. The detailed information on the kind of suitability of each of the soil phase for the crops assessed are given village/ survey number wise for the microwatershed in Appendix-III

7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

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

About 40 ha (5%) area is highly suitable (Class S1) for growing sorghum and occur in the central, northern and southwestern part of the microwatershed. An area of about 177 ha (20%) is moderately suitable (Class S2) for growing sorghum and are

distributed in all parts of the microwatershed. They have minor limitations of gravelliness, drainage, texture and rooting depth. Maximum area of about 396 ha (45%) is marginally suitable (Class S3) for growing sorghum and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness and rooting depth. An area of about 78 ha (9%) is currently not suitable (Class N1). They have severe limitations of rooting depth and gravelliness and occur in the northern and eastern part of the microwatershed.

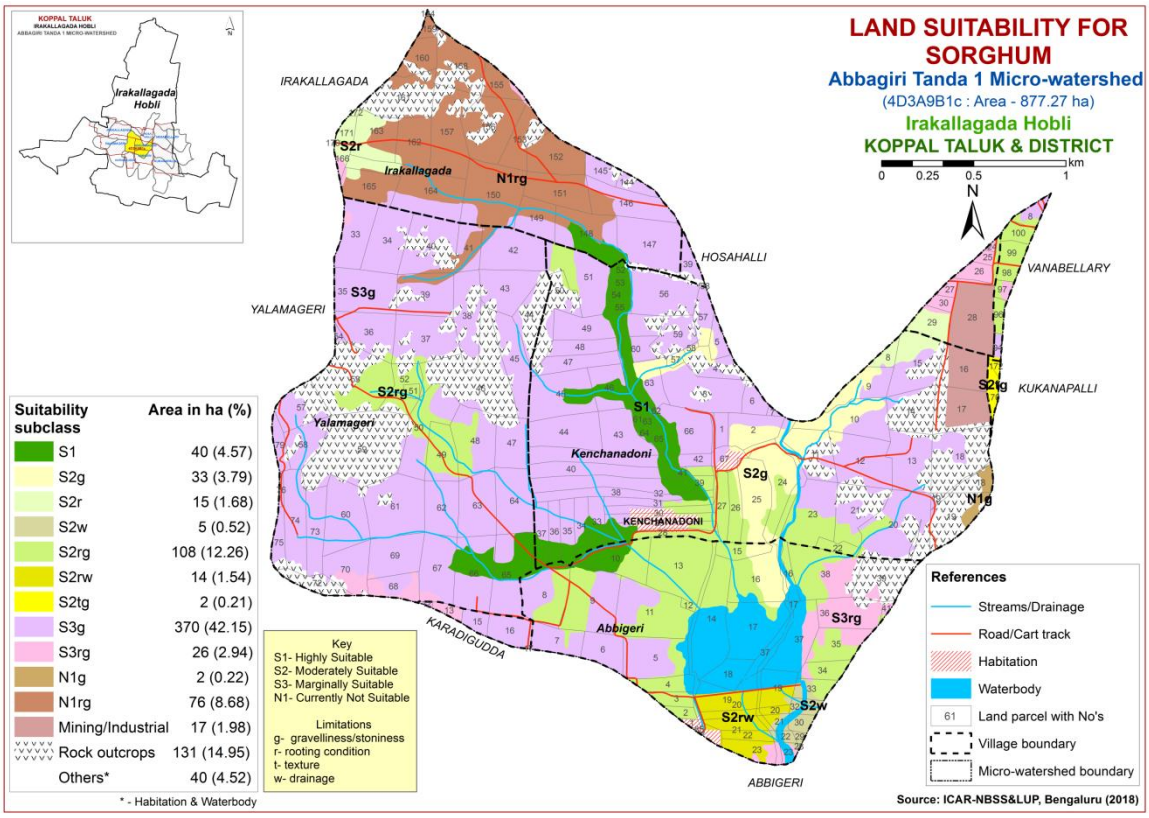

Fig. 7.1 Land Suitability map of Sorghum

7.2 Land Suitability for Maize (*Zea mays*)

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

Highly suitable (Class S1) lands for growing maize occur in an area of 15 ha (2%) and are distributed in the southwestern part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 202 ha (23%) and are distributed in all parts of the microwatershed. They have minor limitations of rooting depth, calcareousness, texture, gravelliness and drainage. Marginally suitable lands (Class S3) for growing maize occupy a maximum area of 396 ha (45%) and occur in the major part of the microwatershed.

They have moderate limitations of rooting depth and calcareousness. An area of about 78 ha (9%) is currently not suitable (Class N1) and are distributed in the eastern and northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

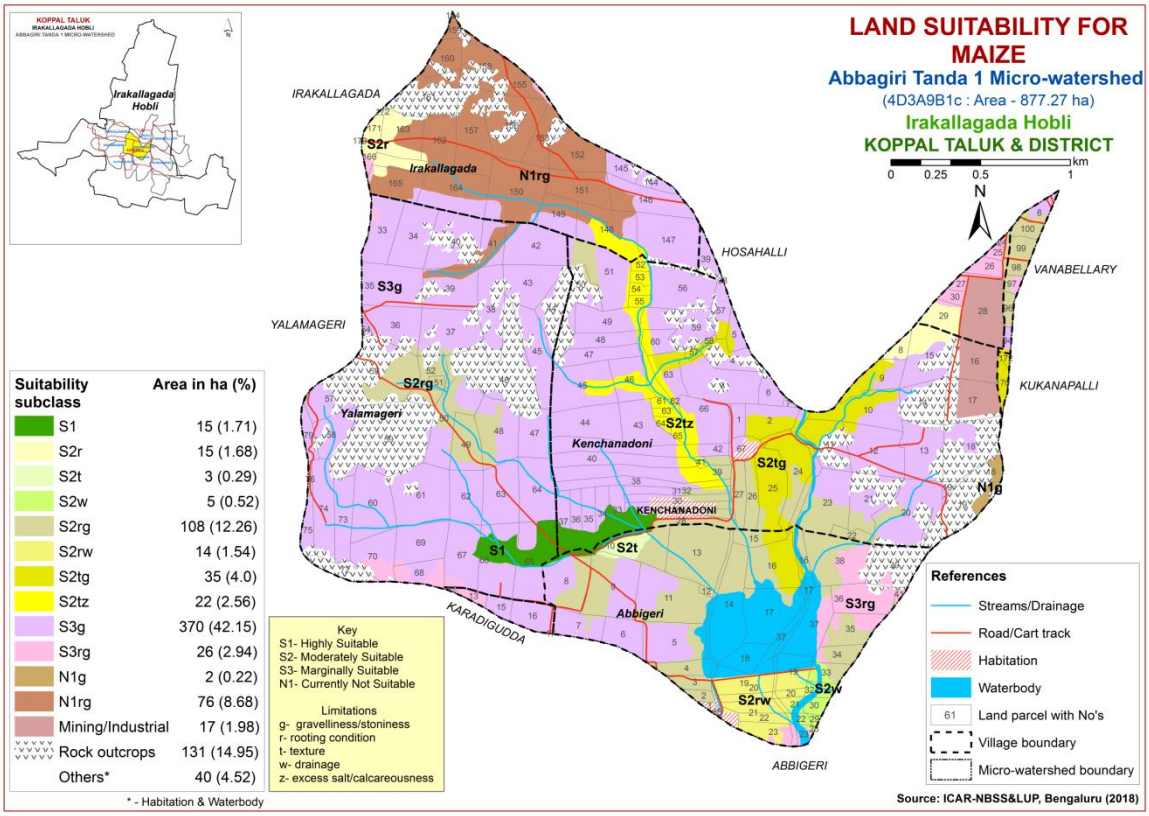

Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

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

Highly suitable (Class S1) lands for growing bajra occur in an area of 19 ha (2%) and are distributed in the eastern and southwestern part of the microwatershed. Maximum area of about 316 ha (36%) is moderately suitable (Class S2) for growing bajra and are distributed in the major part of the microwatershed. They have minor limitations of texture, rooting depth, gravelliness, drainage and calcareousness. Marginally suitable lands (Class S3) occupy an area of 279 ha (32%) and are distributed in all parts of the microwatershed except southeast. They have moderate limitations of rooting depth and gravelliness. An area of about 76 ha (9%) is currently not suitable (Class N1) and are distributed in the northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

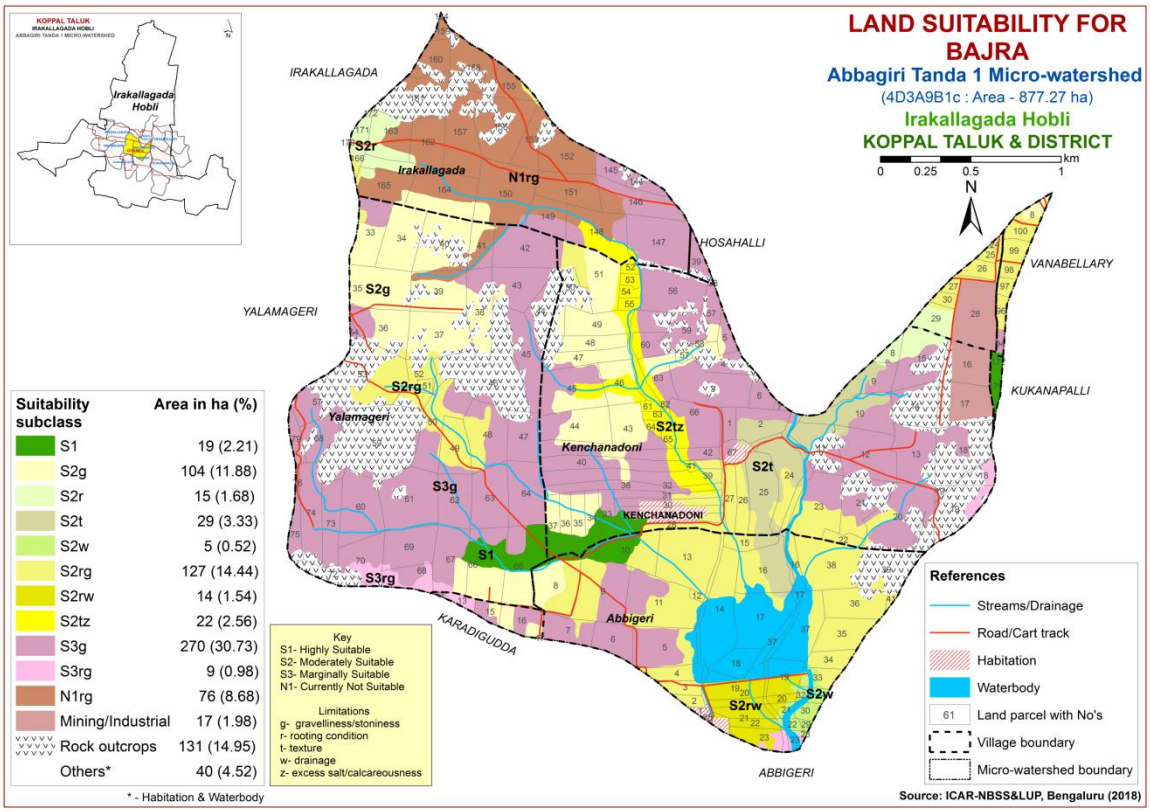

Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

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

There are no highly suitable (Class S1) lands available for growing groundnut in the microwatershed. Moderately suitable (Class S2) lands occur in a maximum area of 471 ha (54%) and are distributed in the major part of the microwatershed. They have minor limitations of rooting depth, texture, gravelliness and drainage. Marginally suitable lands (Class S3) for growing groundnut occupy an area of about 143 ha (16%) with moderate limitations of texture, gravelliness and rooting depth. They are distributed in all parts of the microwatershed except west. An area of about 76 ha (9%) is currently not suitable (Class N1) and are distributed in the northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

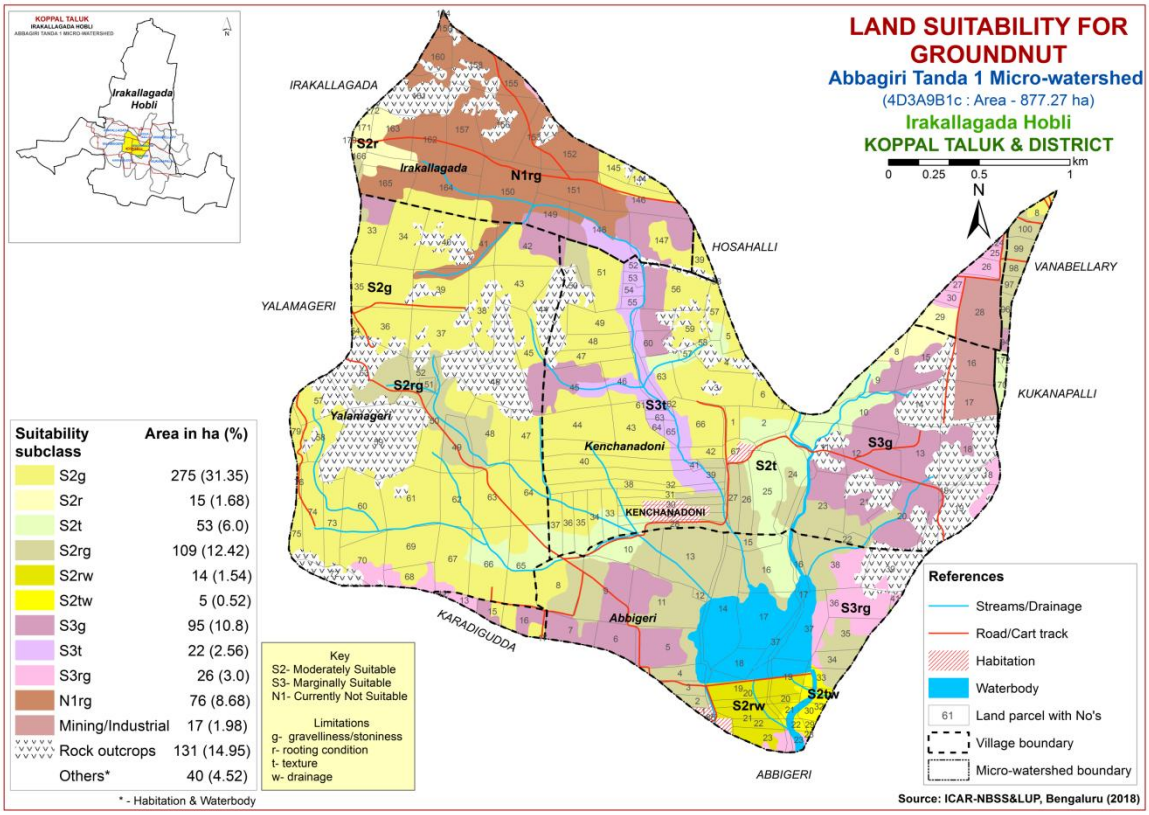

Fig. 7.4 Land Suitability map of Groundnut

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.

Highly suitable (Class S1) lands for growing sunflower occupy an area of 22 ha (3%) and are distributed in the northern and central part of the microwatershed. An area of about 58 ha (7%) is moderately suitable (Class S2) for sunflower and is distributed in the southern, eastern and northeastern part of the microwatershed. They have minor limitations of rooting depth, drainage and calcareousness. Maximum area of about 525 ha (60%) is marginally suitable (Class S3) and is distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. Currently not suitable (Class N1) lands occur in an area of 85 ha (10%) and are distributed in the eastern, southwestern and northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

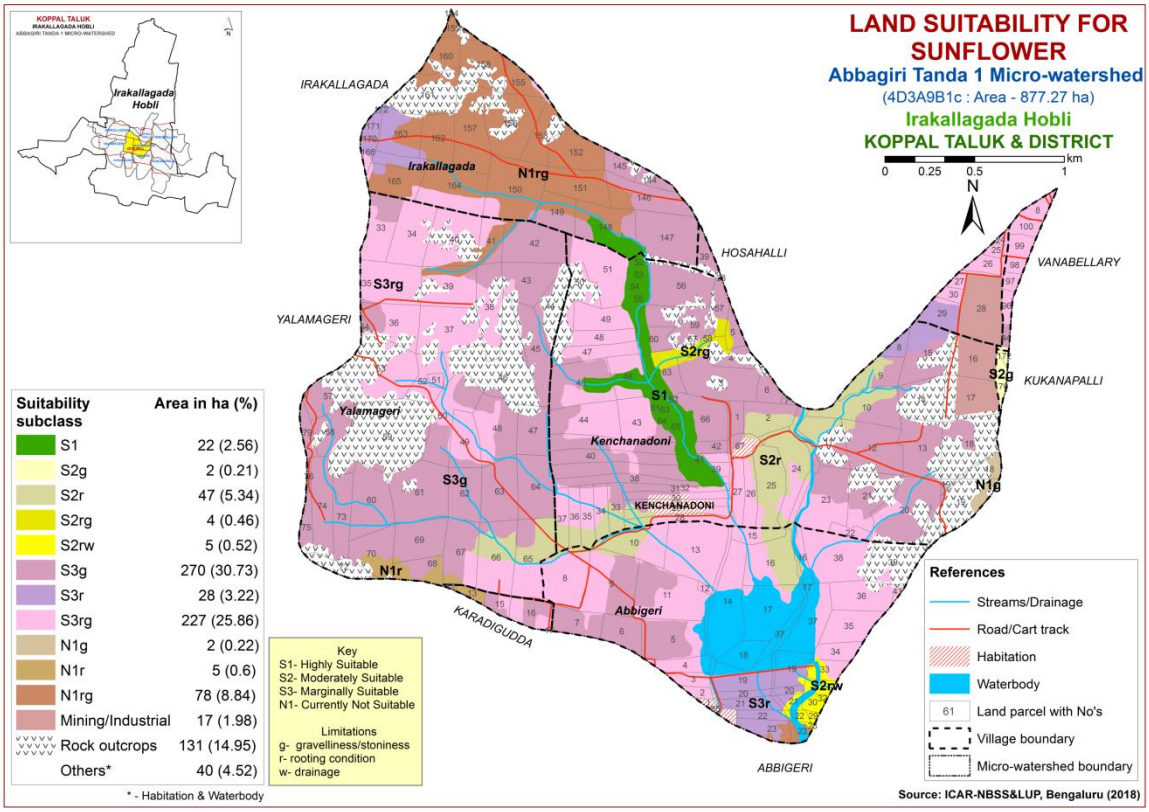

Fig. 7.5 Land Suitability map of Sunflower

7.6 Land Suitability for Cotton (*Gossypium hirsutum*)

Cotton is one of the most important fibre crop grown in the state in about 8.75 lakh ha area in Raichur, Dharwad, Belgaum, Kalaburgi, Bijapur, Bidar, Bellary, Chitradurga and Chamarajnagar districts. The crop requirements for growing cotton (Table 7.7) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cotton was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.6.

Highly suitable (Class S1) lands for growing cotton occur in an area of 22 ha (3%) and are distributed in the northern and central part of the microwatershed. Moderately suitable (Class S2) lands are found to occur in an area of 194 ha (22%). These soils have minor limitations of rooting depth, texture, drainage and gravelliness. They are distributed in all parts of the microwatershed. Marginally suitable (Class S3) lands for cotton occur in a maximum area of 396 ha (45%) with moderate limitations of rooting depth, texture and gravelliness. They are distributed in the major part the microwatershed. Currently not suitable (Class N1) lands occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

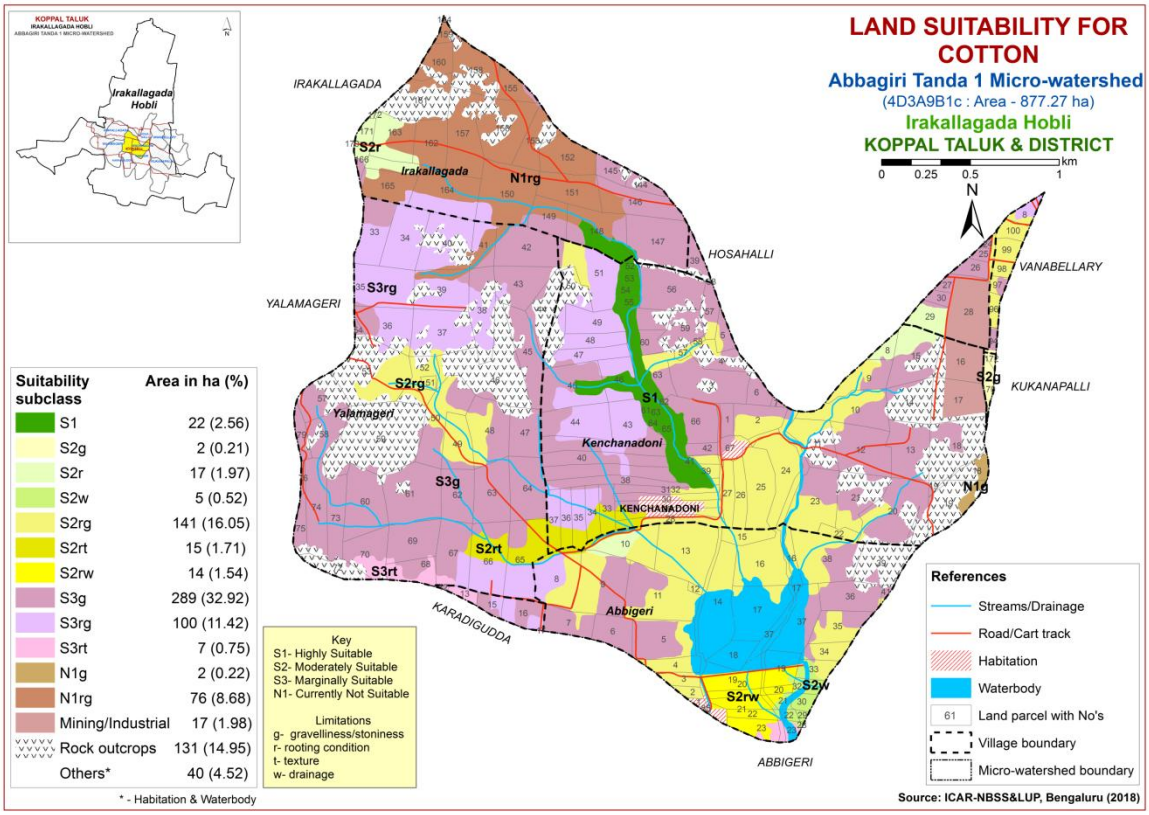

Fig. 7.6 Land Suitability map of Cotton

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

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

No highly suitable (Class S1) lands are available for growing redgram in the microwatershed. An area of about 80 ha (9%) is moderately suitable (Class S2) for growing redgram and are distributed in the central, northern, eastern, southern and southwestern part of the microwatershed. They have minor limitations of rooting depth, texture, drainage, gravelliness and calcareousness. Marginally suitable lands (Class S3) for growing redgram occupy a maximum area of about 526 ha (60%) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and drainage. Currently not suitable (Class N1) lands occur in an area of 85 ha (10%) and are distributed in the eastern, northern and southwestern part of the microwatershed with severe limitations of rooting depth and gravelliness.

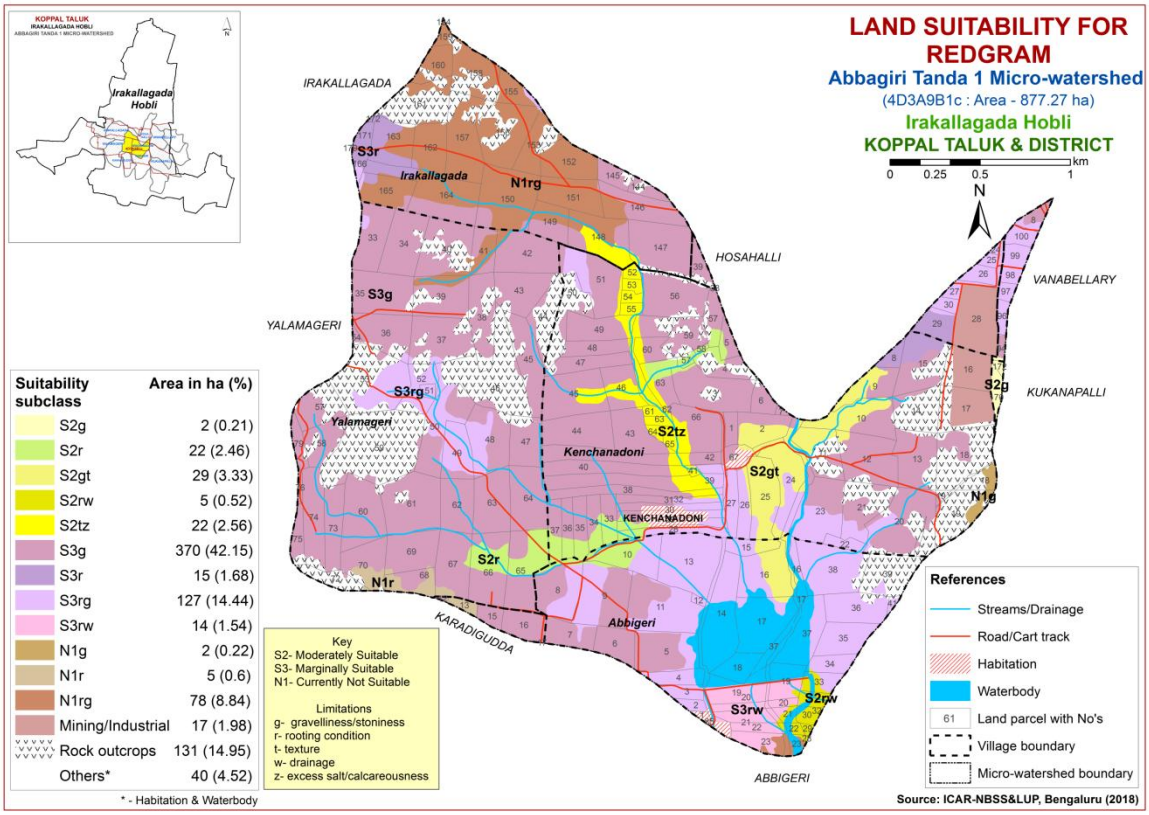

Fig. 7.7 Land Suitability map of Red gram

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

Bengal gram is one of the most important pulse crop grown in about 9.39 lakh ha area in Bijapur, Raichur, Kalaburgi, Dharwad, Belgaum and Bellary districts. The crop requirements for growing Bengal gram (Table 7.9) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing Bengal gram was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.8.

Highly suitable (Class S1) lands for growing bengalgram occupy an area of 22 ha (3%) and are distributed in the northern and central part of the microwatershed. An area of about 205 ha (23%) is moderately suitable (Class S2) for growing bengalgram and are distributed in all parts of the microwatershed except central. They have minor limitations of rooting depth, texture, drainage and gravelliness. Marginally suitable lands (Class S3) for growing bengalgram occupy a maximum area of about 385 ha (44%) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, texture and gravelliness. Currently not suitable (Class N1) lands occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

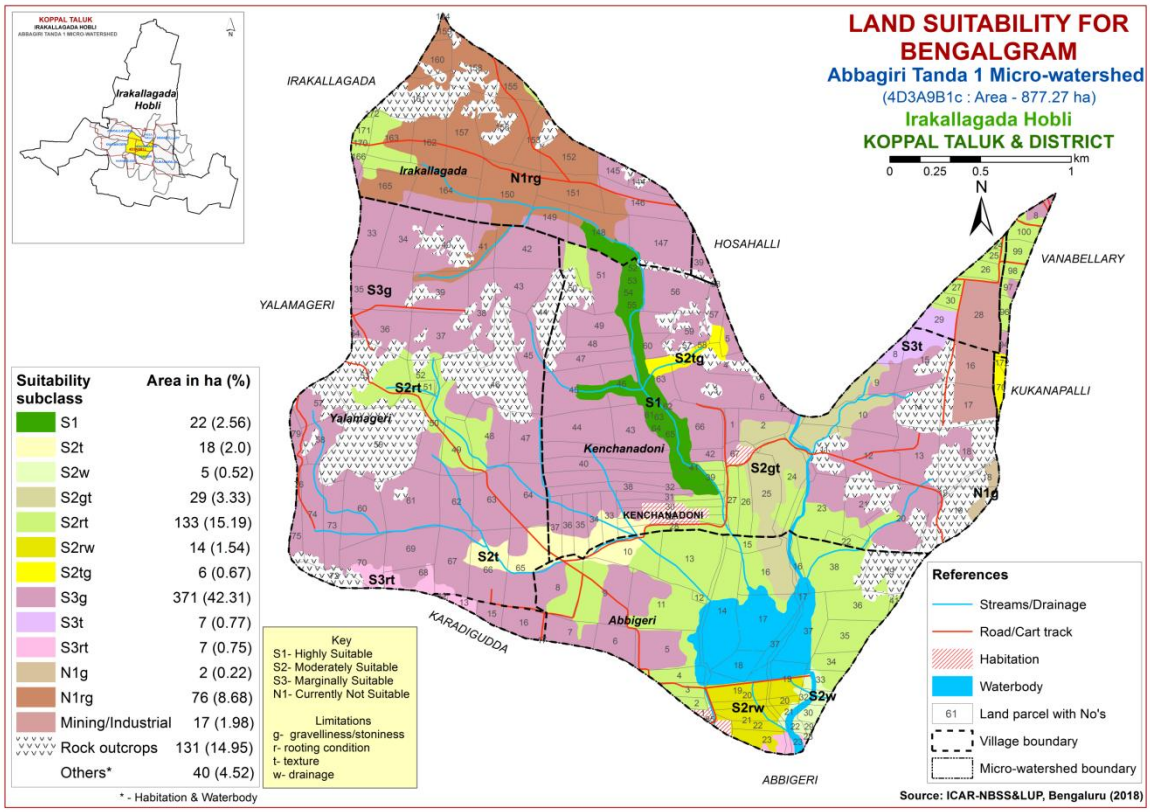

Fig. 7.8 Land Suitability map of Bengal gram

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

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

Highly suitable (Class S1) lands for growing chilli occupy an area of 18 ha (2%) and are distributed in the southwestern part of the microwatershed. An area of about 199 ha (23%) is moderately suitable (Class S2) for growing chilli and are distributed in all parts of the microwatershed. They have minor limitations of texture, drainage, calcareousness, gravelliness and rooting depth. Marginally suitable lands (Class S3) occupy a maximum area of 396 ha (45%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. Currently not suitable (Class N1) lands occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed with severe limitations of gravelliness and rooting depth.

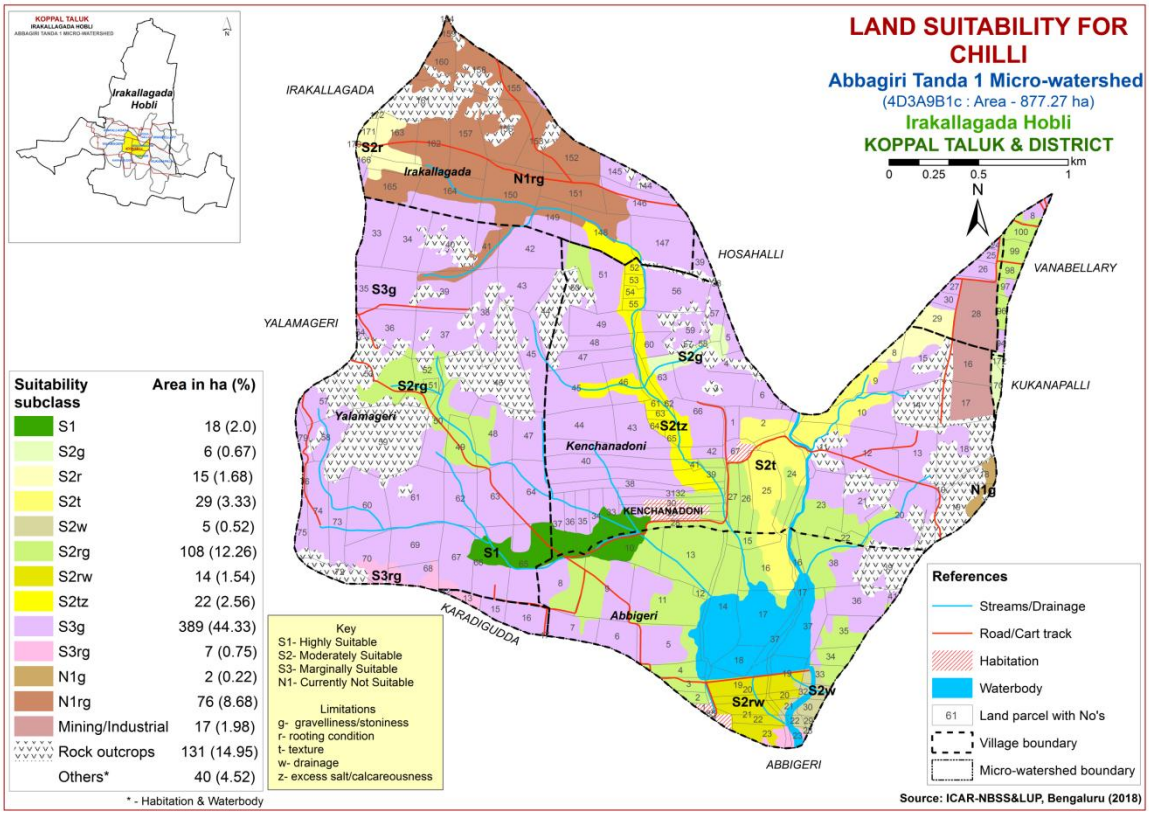

Fig. 7.9 Land Suitability map of Chilli

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.

Highly suitable (Class S1) lands for growing tomato occur in an area of 18 ha (2%) and are distributed in the southwestern part of the microwatershed. An area of 199 ha (23%) is moderately suitable (Class S2) and is distributed in all parts of the microwatershed. They have minor limitations of texture, drainage, calcareousness, gravelliness and rooting depth. An area of 396 ha (45%) is marginally suitable for tomato (Class S3) and is distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. Currently not suitable (Class N1) lands occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed with severe limitations of gravelliness and rooting depth.

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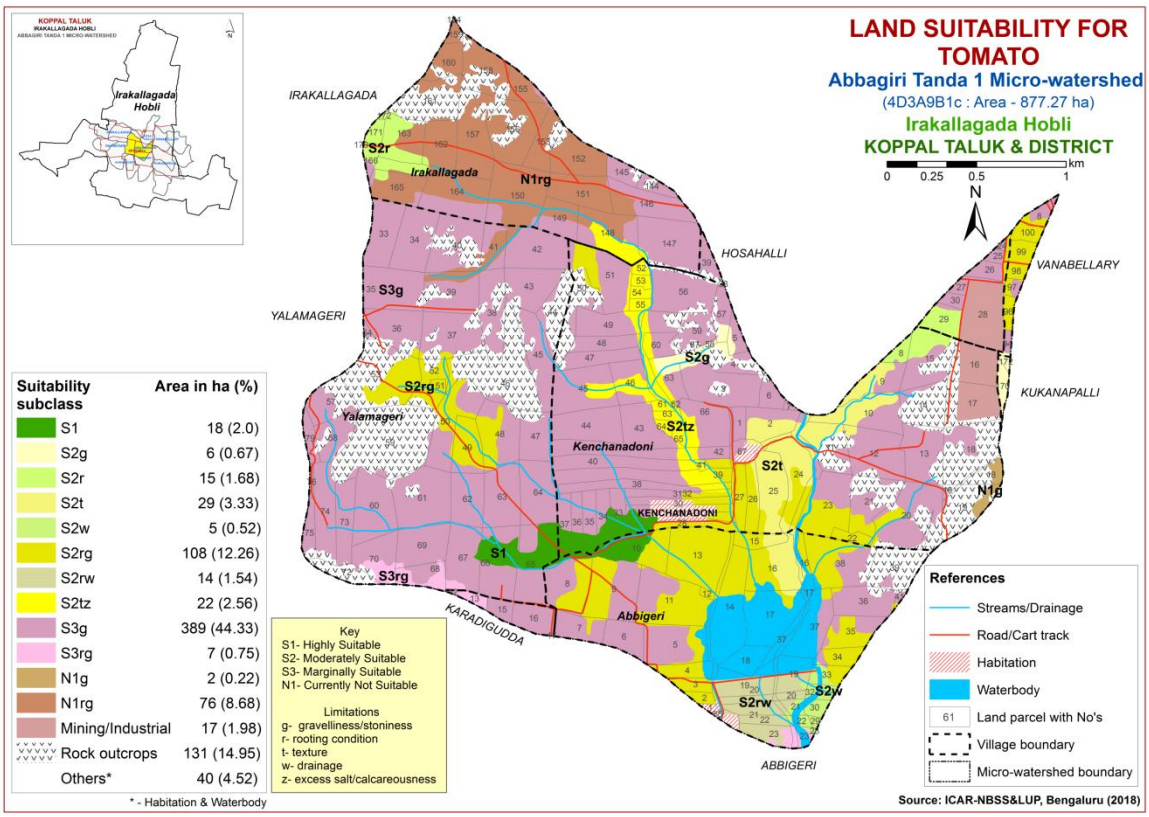


Fig. 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Drumstick (*Moringa oleifera)*

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

Highly suitable (Class S1) lands for growing drumstick occur in an area of 2 ha (<1%) and are distributed in the southwestern part of the microwatershed. An area of about 253 ha (29%) is moderately suitable (Class S2) for drumstick and is distributed in all parts of the microwatershed. They have minor limitations of rooting depth, texture, calcareousness, gravelliness and drainage. Marginally suitable lands (Class S3) for growing drumstick occupy a maximum area of about 353 ha (40%) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, drainage and gravelliness. Currently not suitable (Class N1) lands for growing drumstick occur in an area of 83 ha (9%) and are distributed in the southwestern and northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

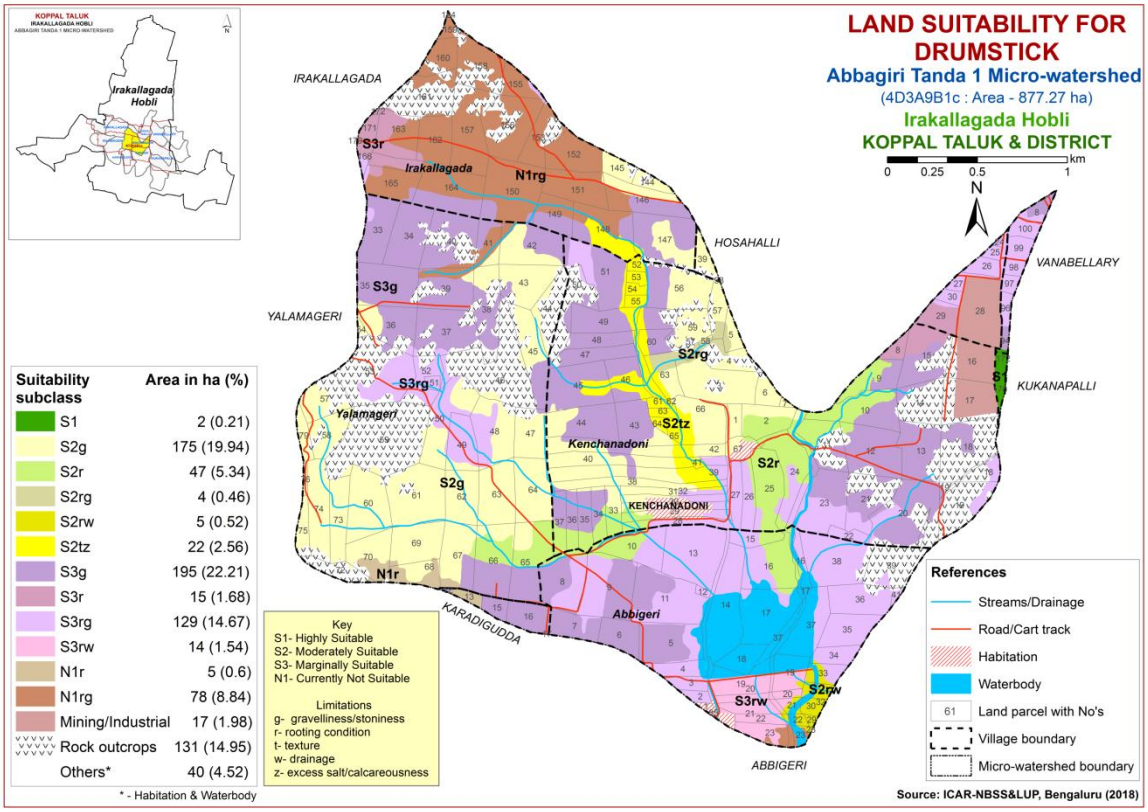


Fig. 7.11 Land Suitability map of Drumstick

7.12 Land Suitability for Mulberry (*Morus nigra*)

Mulberry is the most important leaf crop grown for rearing silkworms in about 1.66 lakh ha in all the districts of the state. The crop requirements for growing mulberry (Table 7.13) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mulberry was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.12.

Highly suitable (Class S1) lands for growing mulberry occur in an area of 2 ha (<1%) and are distributed in the eastern part of the microwatershed. Moderately suitable (Class S2) lands occur in a maximum area of 426 ha (48%) and are distributed in the major part of the microwatershed with minor limitations of gravelliness, drainage and rooting depth. An area of about 180 ha (20%) is marginally suitable (Class S3) for growing mulberry and are distributed in all parts of the microwatershed. They have moderate limitations of rooting depth, texture, drainage, gravelliness and calcareousness. Currently not suitable (Class N1) lands for growing mulberry occur in an area of 82 ha (9%) and are distributed in the northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

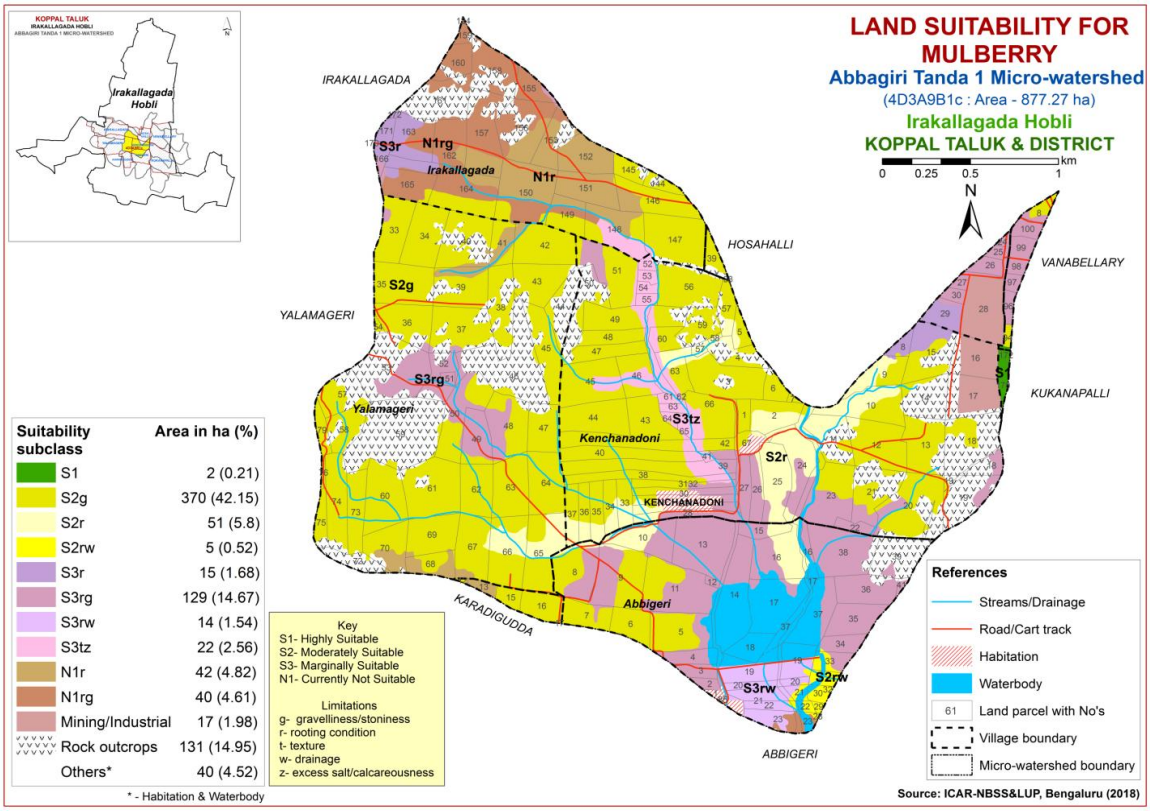


Fig. 7.12 Land Suitability map of Mulberry

7.13 Land Suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in about 1.73 lakh ha in almost all the districts of the State. The crop requirements (Table 7.14) for growing mango were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mango was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.13.

There are no highly suitable (Class S1) lands available for growing mango in the microwatershed. An area of 2 ha (<1%) is moderately suitable (Class S2) for growing mango with minor limitation of rooting depth and gravelliness. They are distributed in the eastern part of the microwatershed. Maximum area of 448 ha (51%) is marginally suitable (Class S3) for growing mango with moderate limitations of texture, calcareousness, drainage, gravelliness and rooting depth. They are distributed in the major part of the microwatershed. An area of about 239 ha (27%) is currently not suitable (Class N1) for growing mango and are distributed in all parts of the microwatershed except central. They have severe limitations of rooting depth and gravelliness.

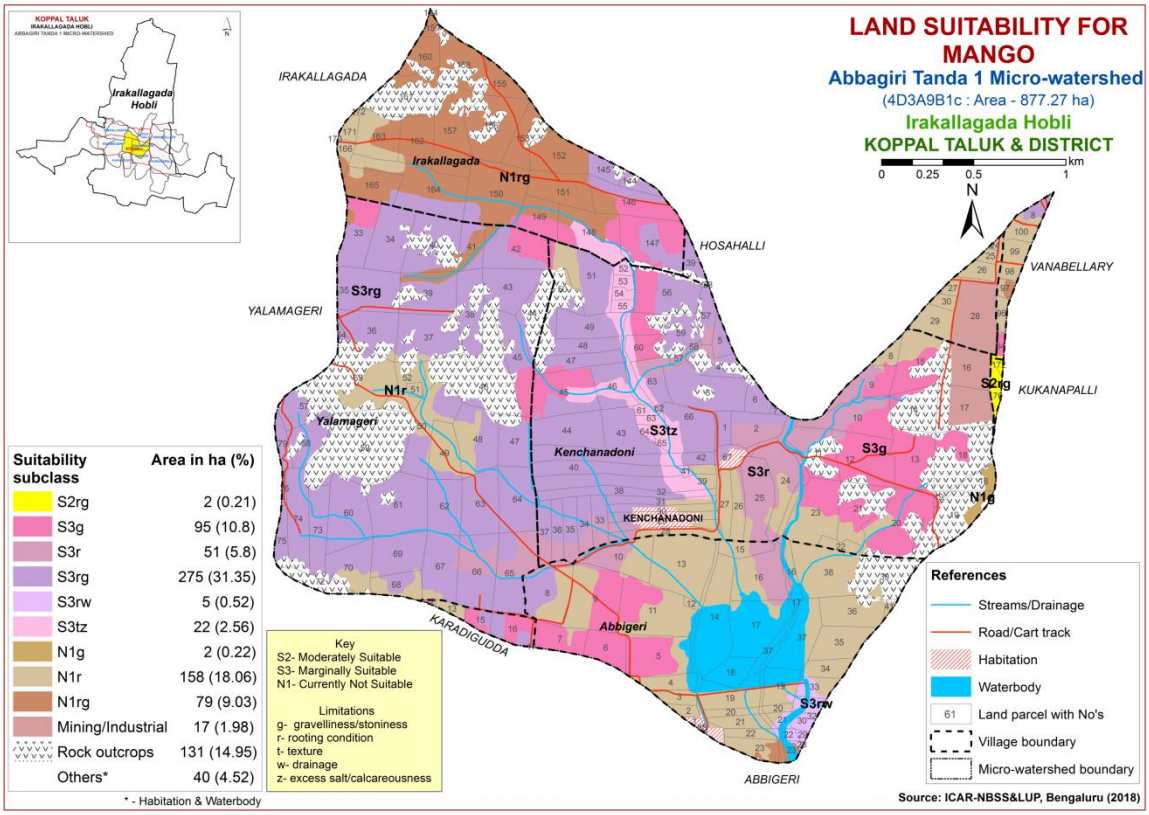


Fig. 7.13 Land Suitability map of Mango

7.14 Land suitability for Sapota (*Manilkara zapota*)

Sapota is one of the most important fruit crop grown in an area of about 29373 ha in almost all the districts of the state. The crop requirements (Table 7.15) for growing sapota were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing sapota was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.14

No highly (Class S1) suitable lands available for growing sapota in the microwatershed. Moderately suitable (Class S2) lands occur in an area of 158 ha (18%) and are distributed in all parts of the microwatershed except west. They have minor limitations of rooting depth, drainage and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 447 ha (51%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 85 ha (10%) is currently not suitable (Class N1) for growing sapota and occur in the eastern, northern and southwestern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

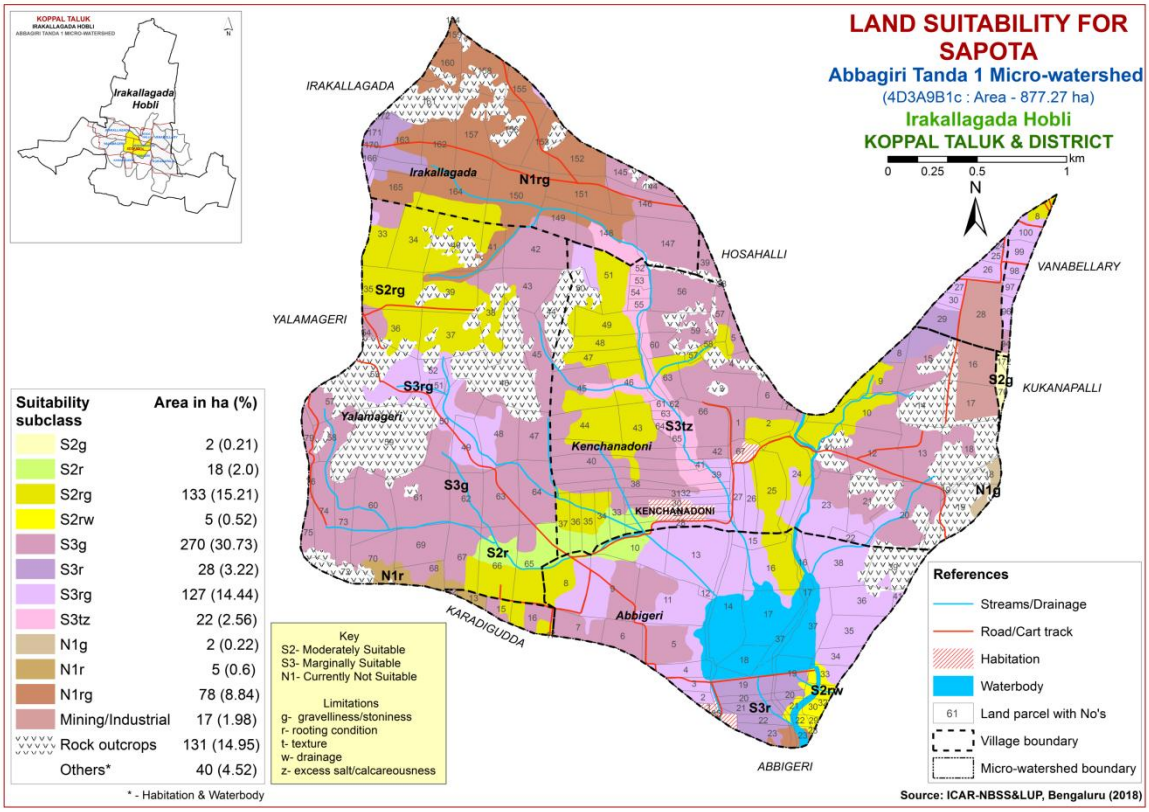


Fig. 7.14 Land Suitability map of Sapota

7.15 Land Suitability for Pomegranate (*Punica granatum*)

Pomegranate is one of the commercially grown fruit crop in about 18488 ha in Karnataka mainly in Bijapur, Bagalkot, Koppal, Gadag and Chitradurga districts. The crop requirements for growing pomegranate (Table 7.16) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing pomegranate was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.15.

There are no highly suitable (Class S1) lands for growing pomegranate. An area of about 180 ha (20%) is moderately (Class S2) suitable for growing pomegranate with minor limitations of texture, rooting depth, drainage, calcareousness and gravelliness. They occur in all parts of the microwatershed except west. Marginally suitable (Class S3) lands cover a maximum area of about 427 ha (49%) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 83 ha (9%) is currently not suitable (Class N1) for growing pomegranate with severe limitations of rooting depth and gravelliness and occur in the northern and southwestern part of the microwatershed.

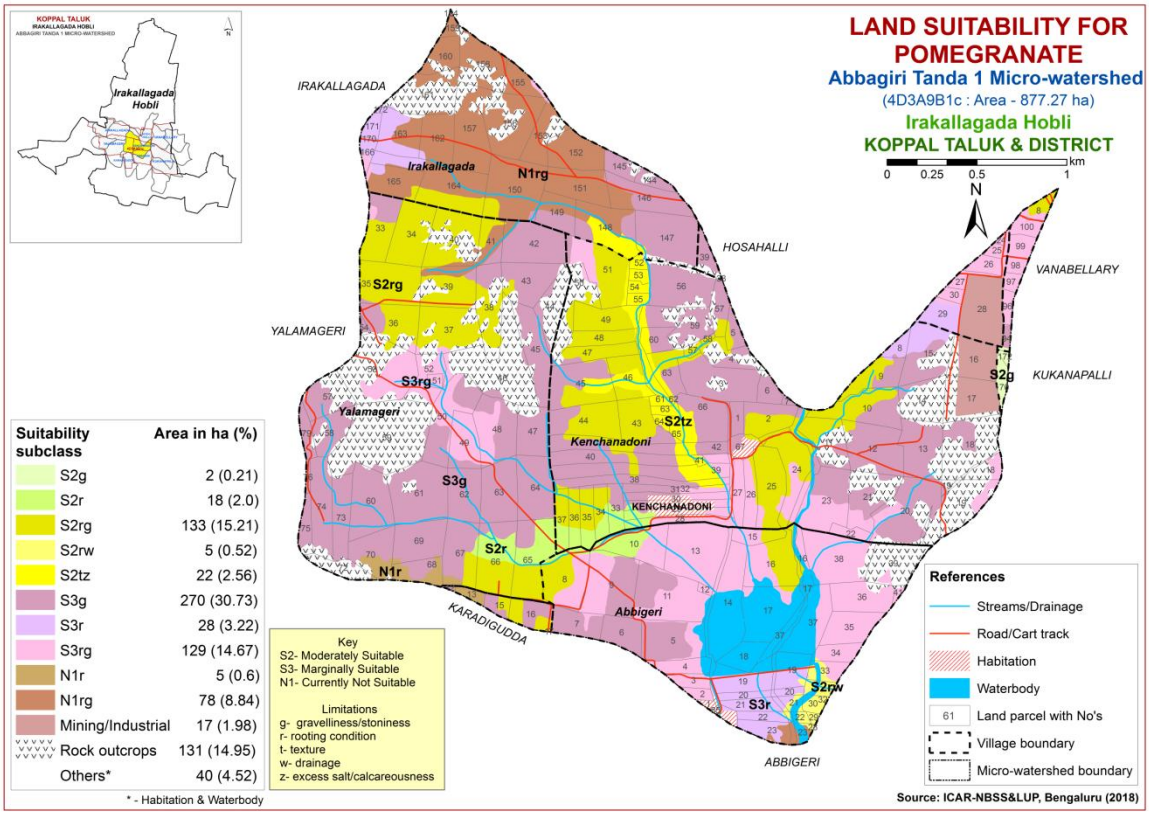


Fig. 7.15 Land Suitability map of Pomegranate

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.

There are no highly suitable (Class S1) lands for growing guava in the microwatershed. An area of 158 ha (18%) is moderately (Class S2) suitable for growing guava with minor limitations of texture, rooting depth, drainage and gravelliness. They occur in all parts of the microwatershed. Maximum area of 447 ha (51%) is marginally (Class S3) suitable for growing guava with moderate limitations of texture, rooting depth, gravelliness and calcareousness. They occur in the major part of the microwatershed. An area of about 85 ha (10%) is currently not suitable (Class N1) for growing guava with severe limitations of rooting depth and gravelliness. They occur in the northern, eastern and southwestern part of the microwatershed.

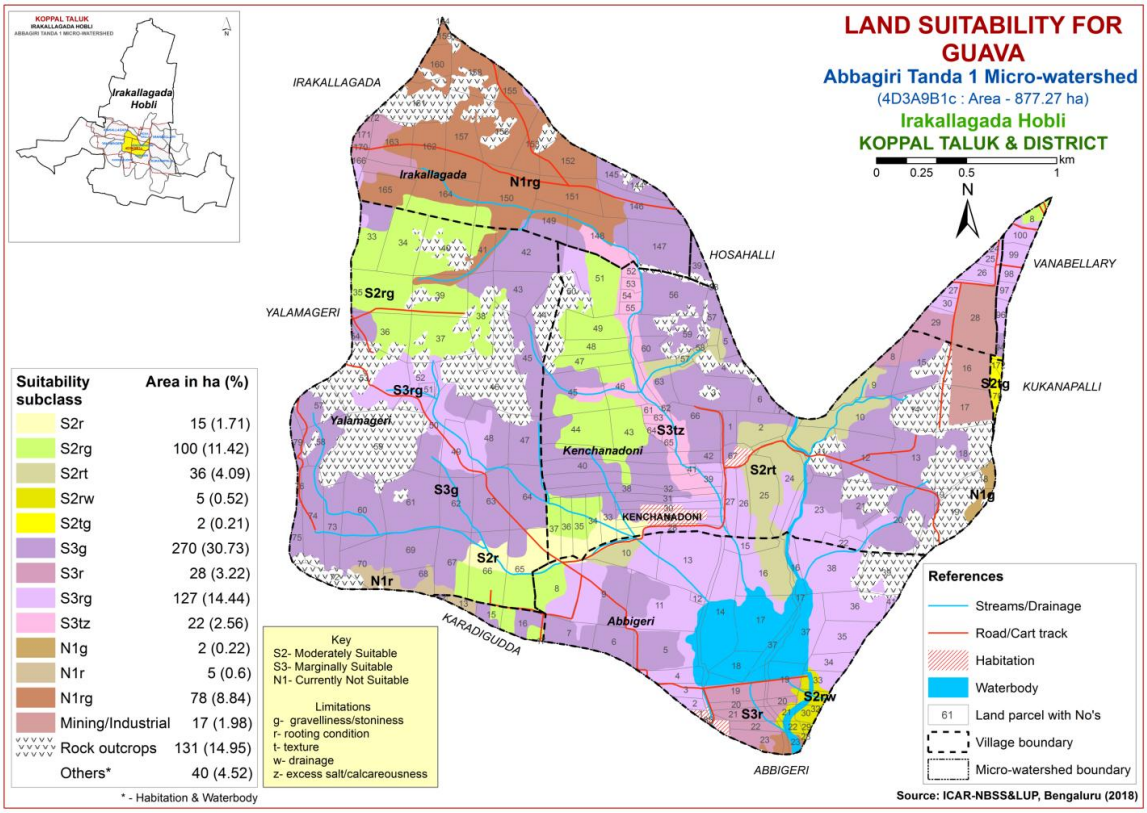


Fig. 7.16 Land Suitability map of Guava

7.17 Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

Jackfruit is one of the most important fruit crop grown in 5368 ha in all the districts of the state. The crop requirements (Table 7.18) for growing jackfruit were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jackfruit was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in figure 7.17.

No highly (Class S1) suitable lands available for growing jackfruit in the microwatershed. Moderately suitable (Class S2) lands occur in an area of 158 ha (18%) and are distributed in all parts of the microwatershed except western side. They have minor limitations of rooting depth, texture, drainage and gravelliness. Maximum area of about 447 ha (51%) is marginally suitable (Class S3) for growing jackfruit and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, gravelliness and calcareousness. An area of about 85 ha (10%) is currently not suitable (Class N1) for growing jackfruit and occur in the eastern, southwestern and northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

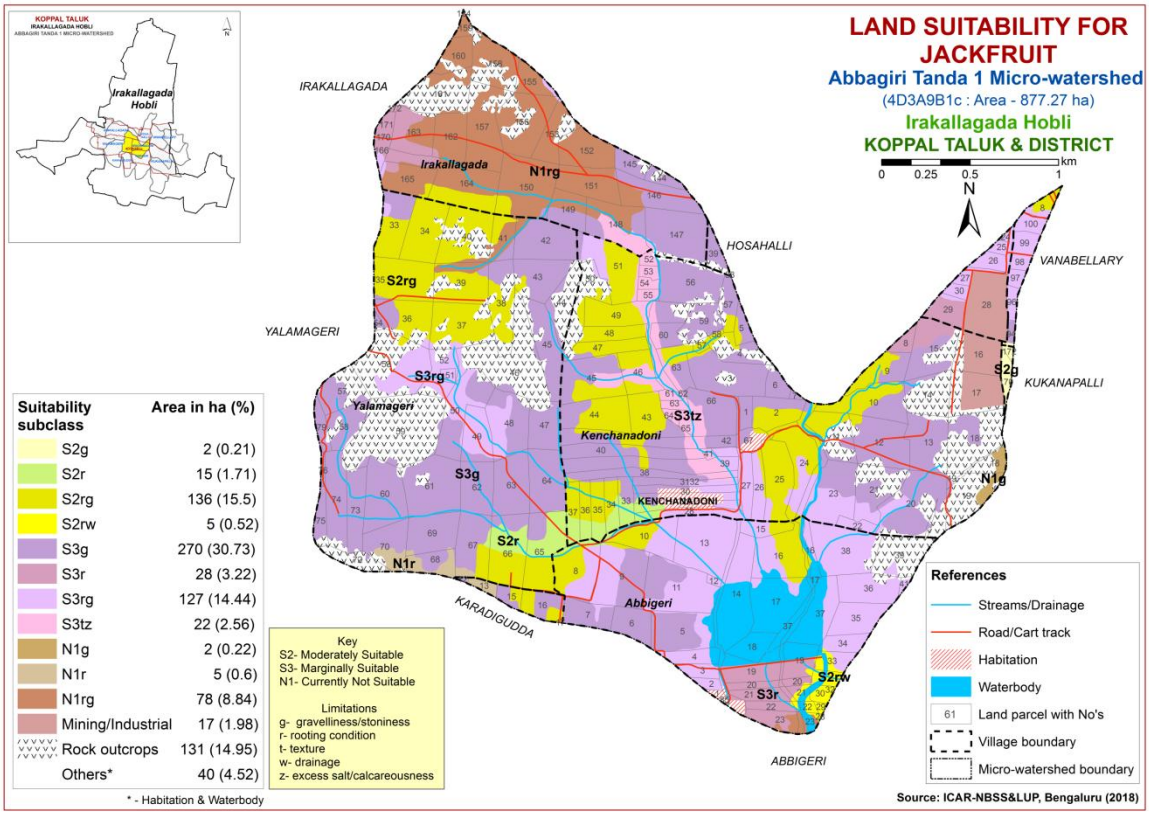


Fig. 7.17 Land Suitability map of Jackfruit

7.18 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the state. The crop requirements (Table 7.19) for growing jamun were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jamun was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.18.

No highly (Class S1) suitable lands available for growing jamun in the microwatershed. Moderately suitable (Class S2) lands occur in an area of 160 ha (18%) and are distributed in all parts of the microwatershed except south and west. They have minor limitations of rooting depth, texture, calcareousness and gravelliness. Maximum area of about 444 ha (51%) is marginally suitable (Class S3) for growing jamun and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and drainage. An area of about 85 ha (10%) is currently not suitable (Class N1) for growing jamun and occur in the eastern, northern and southwestern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

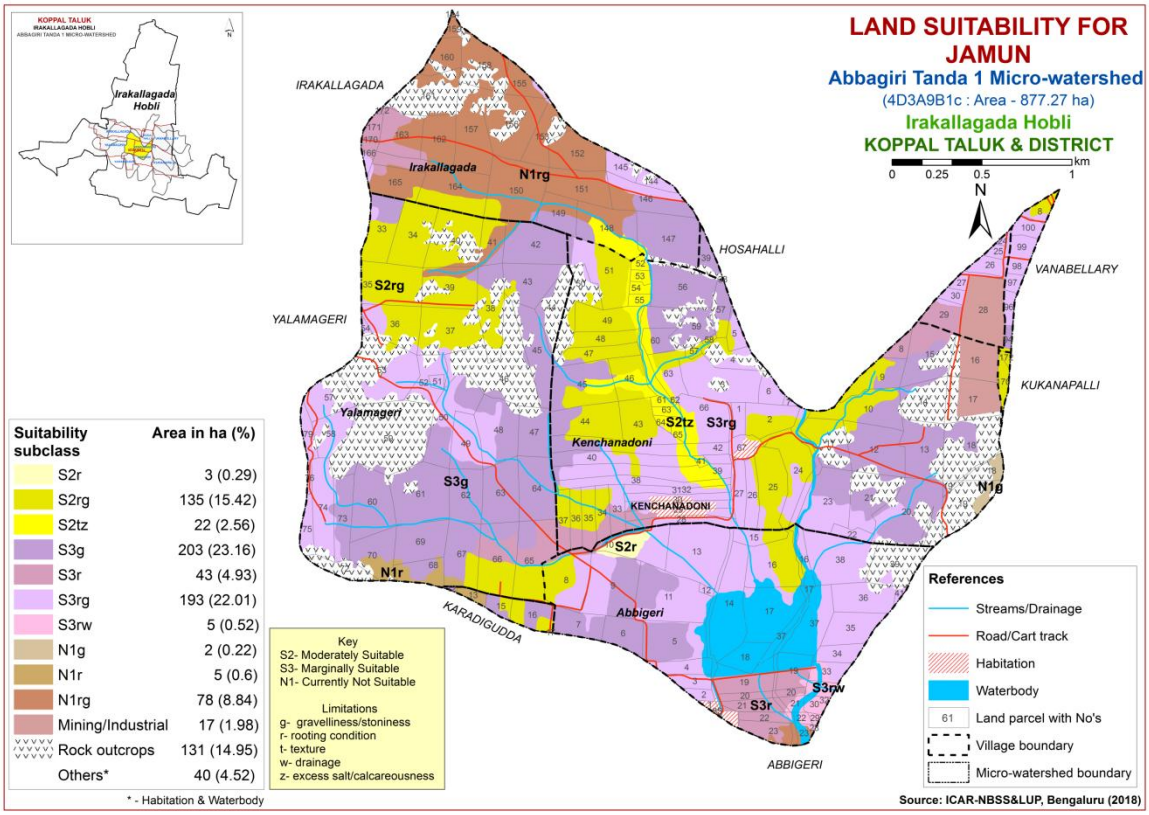


Fig. 7.18 Land Suitability map of Jamun

7.19 Land Suitability for Musambi (*Citrus limetta*)

Musambi is one of the most important fruit crop grown in an area of 5446 ha in almost all the districts of the state. The crop requirements (Table 7.20) for growing musambi were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing musambi was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.19.

Highly suitable (Class S1) lands for growing musambi occur in an area of 22 ha (3%) and are distributed in the central and northern part of the microwatershed. An area of about 158 ha (18%) is moderately suitable (Class S2) for growing musambi and are distributed in all parts of the microwatershed. They have minor limitations of drainage, rooting depth, texture and gravelliness. Maximum area of about 425 ha (48%) is marginally suitable (Class S3) and is distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 85 ha (10%) is currently not suitable (Class N1) for growing musambi and occur in the eastern, northern and southwestern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

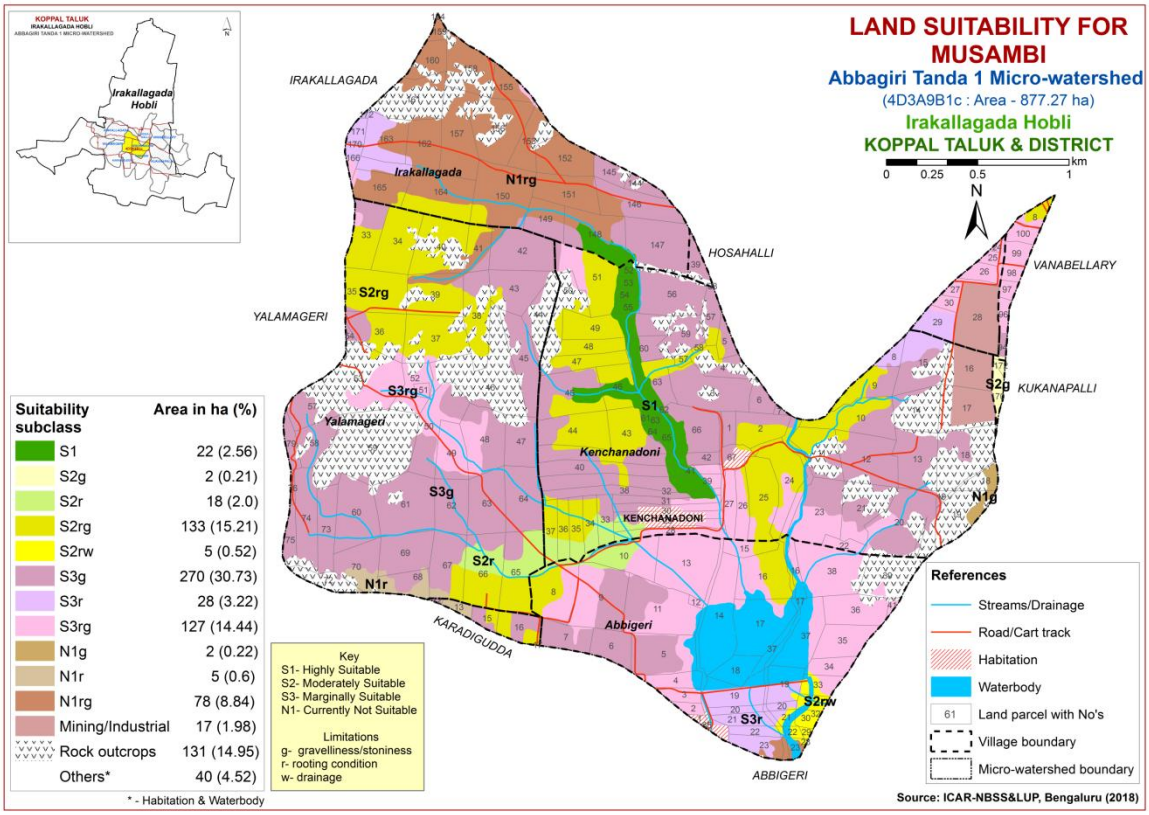


Fig. 7.19 Land Suitability map of Musambi

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 (Table 7.21) for growing lime (Table 7.15) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing lime was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.20.

Highly suitable (Class S1) lands for growing lime occur in an area of 22 ha (3%) and are distributed in the central and northern part of the microwatershed. An area of about 158 ha (18%) is moderately suitable (Class S2) for growing lime and are distributed in all parts of the microwatershed. They have minor limitations of drainage, rooting depth, texture and gravelliness. Maximum area of about 425 ha (48%) is marginally suitable (Class S3) and is distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 85 ha (10%) is currently not suitable (Class N1) for growing lime and occur in the eastern, northern and southwestern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

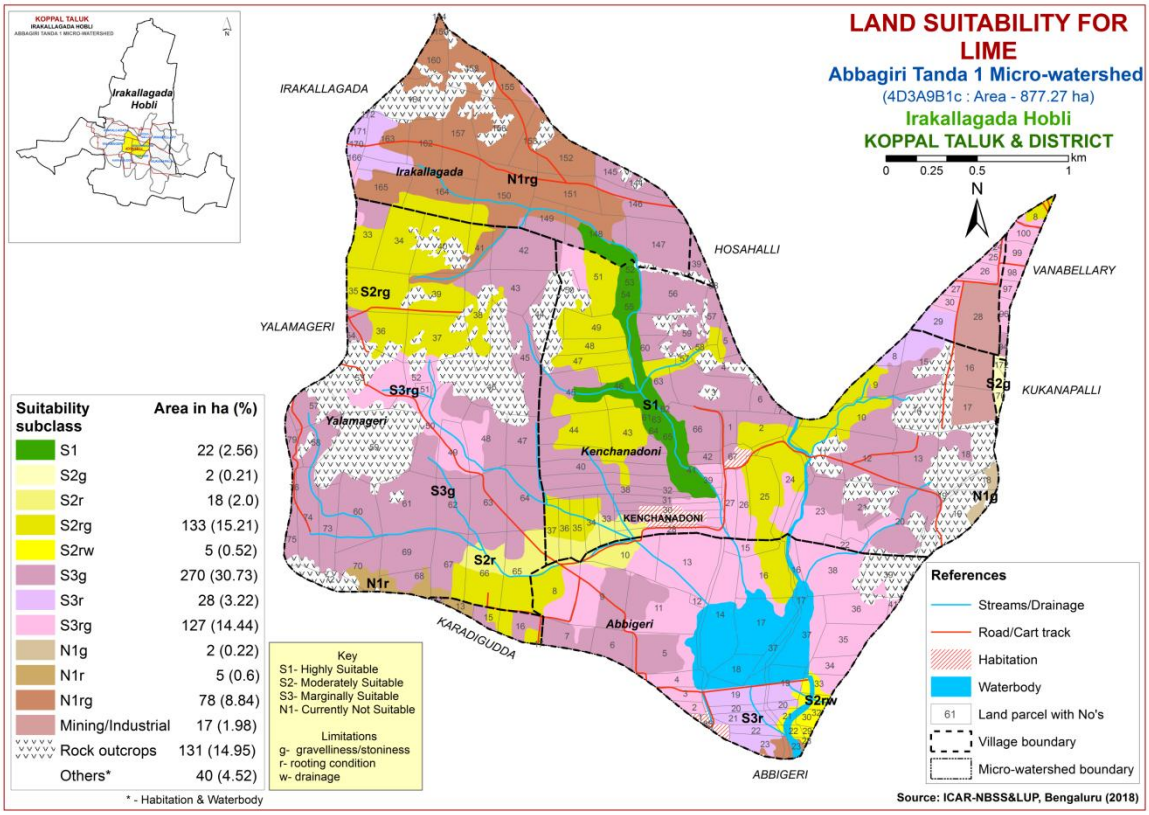


Fig. 7.20 Land Suitability map of Lime

7.21 Land Suitability for Cashew (*Anacardium occidentale)*

Cashew is one of the most important nut crop grown in an area of 7052 ha in almost all the districts of the State. The crop requirements (Table 7.22) for growing cashew were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cashew was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.21.

Highly suitable (Class S1) lands for growing cashew occur in an area of 15 ha (2%) and are distributed in the southwestern part of the microwatershed. An area of 233 ha (27%) is moderately suitable (Class S2) for cashew and are distributed in all parts of the microwatershed except western side. They have minor limitations of rooting depth, gravelliness and texture. About 317 ha (35%) area is marginally suitable (Class S3) for cashew and is distributed in the major part of the microwatershed. They have moderate limitations of texture and gravelliness. An area of 125 ha (14%) is currently not suitable (Class N1) for cashew and is distributed in the eastern, western, northern, southern and central part of the microwatershed with severe limitations of rooting depth, texture, gravelliness and drainage.

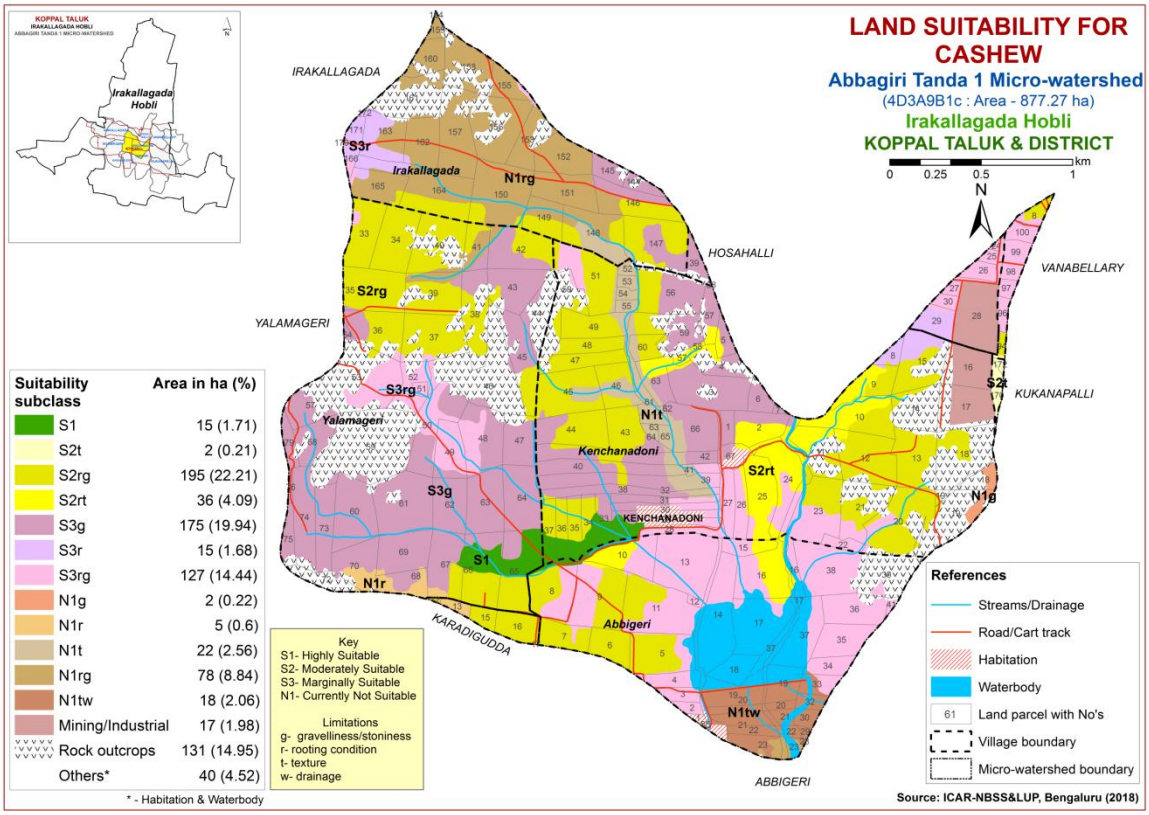


Fig. 7.21 Land Suitability map of Cashew

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

Custard apple is one of the most important fruit crop grown in 1426 ha in almost all the districts of the State. The crop requirements (Table 7.23) for growing custard apple were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing custard apple was generated .The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.22.

About 75 ha (9%) area is highly suitable (Class S1) for growing custard apple and occur in the central, northern, northeastern, eastern and southwestern part of the microwatershed. Maximum area of about 531 ha (60%) is moderately suitable (Class S2) for growing custard apple and are distributed in the major part of the microwatershed. They have minor limitations of rooting depth, drainage and gravelliness. An area of about 9 ha (<1%) is marginally suitable (Class S3) for growing custard apple and is distributed in the eastern, western and southern part of the microwatershed with moderate limitations rooting depth and gravelliness. An area of about 76 ha (9%) is currently not suitable (Class N1) and are distributed in the northern part of the microwatershed with severe limitations of rooting depth and gravelliness.

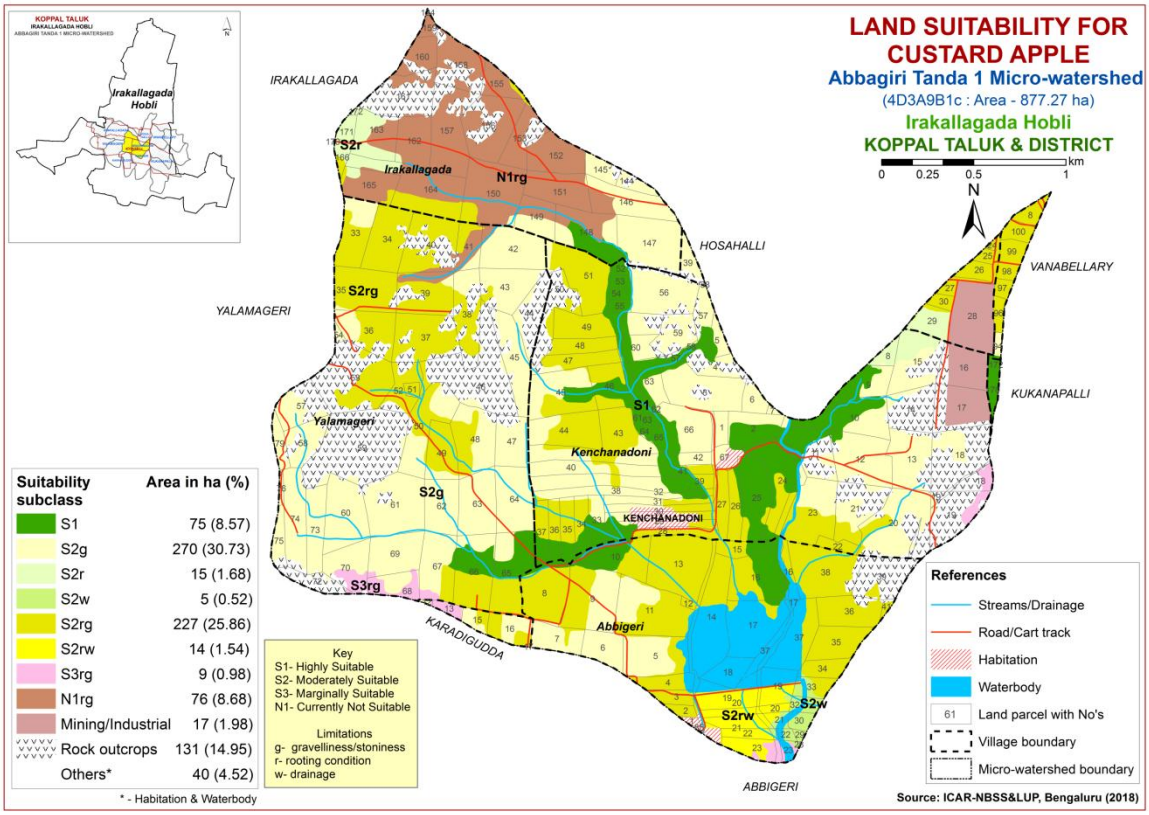


Fig. 7.22 Land Suitability map of Custard Apple

7.23 Land Suitability for Amla (*Phyllanthus emblica*)

Amla is one of the most important fruit and medicinal crop grown in an area of 151 ha and distributed in almost all the districts of the state. The crop requirements for (Table 7.24) growing amla were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing amla was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.23.

Highly (Class S1) suitable lands for growing amla occur in an area of 46 ha (5%) and are distributed in the central, northern, eastern and southwestern part of the microwatershed. Maximum area of about 557 ha (64%) is moderately suitable (Class S2) for amla and is distributed in the major part of the microwatershed. They have minor limitations of texture, gravelliness, drainage and rooting depth. An area of 8 ha (<1%) is marginally suitable (Class S3) and is distributed in the eastern, western and southern part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. An area of about 76 ha (9%) is currently not suitable (Class N1) for growing amla and occur in the northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

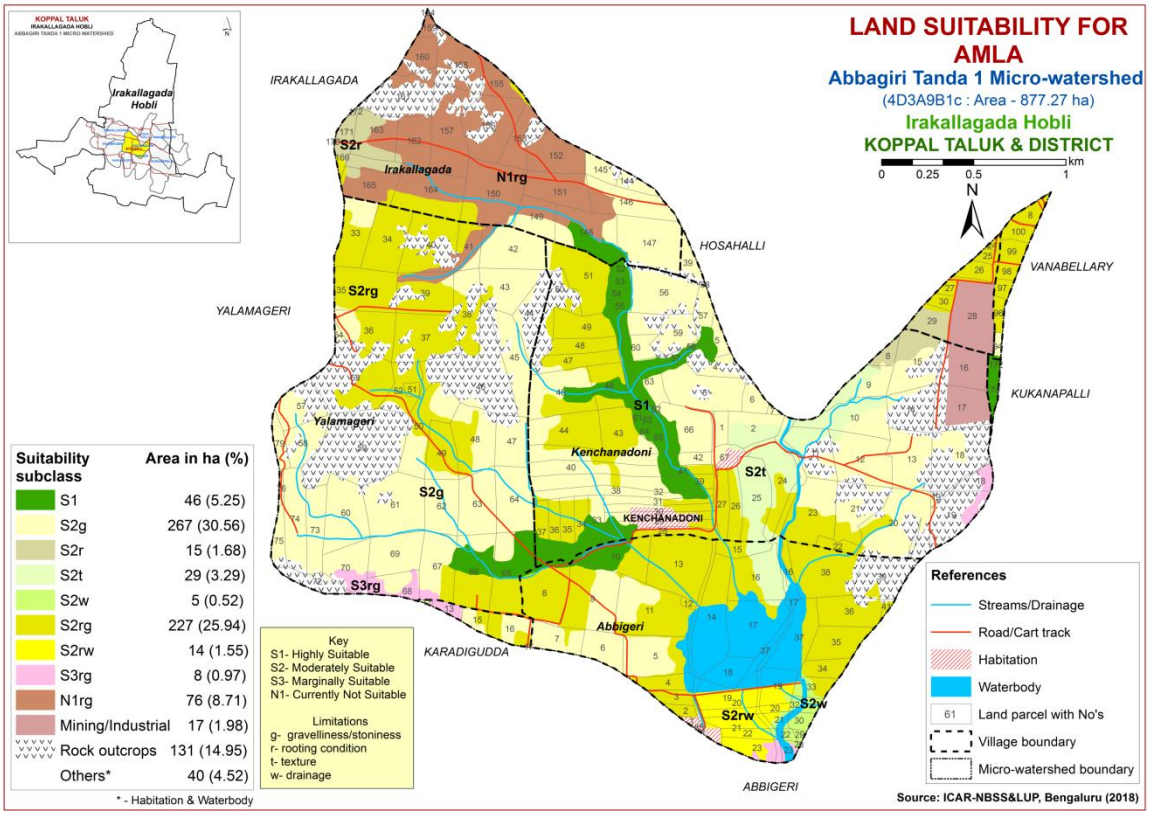


Fig. 7.23 Land Suitability map of Amla

7.24 Land Suitability for Tamarind (*Tamarindus indica*)

Tamarind is one of the most important spice crop grown in 14897 ha in all the districts of the state. The crop requirements (Table 7.25) for growing tamarind were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tamarind was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.24.

No highly suitable (Class S1) lands available for growing tamarind in the microwatershed. An area of about 24 ha (3%) is moderately suitable (Class S2) for growing tamarind and are distributed in the eastern, northern and central part of the microwatershed. They have minor limitations of texture, rooting depth, calcareousness and gravelliness. Marginally suitable (Class S3) lands for growing tamarind occupy a maximum area of about 426 ha (48%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and drainage. An area of about 239 ha (27%) is currently not suitable (Class N1) for growing tamarind and occur in all parts of the microwatershed. They have severe limitations of rooting depth and gravelliness.

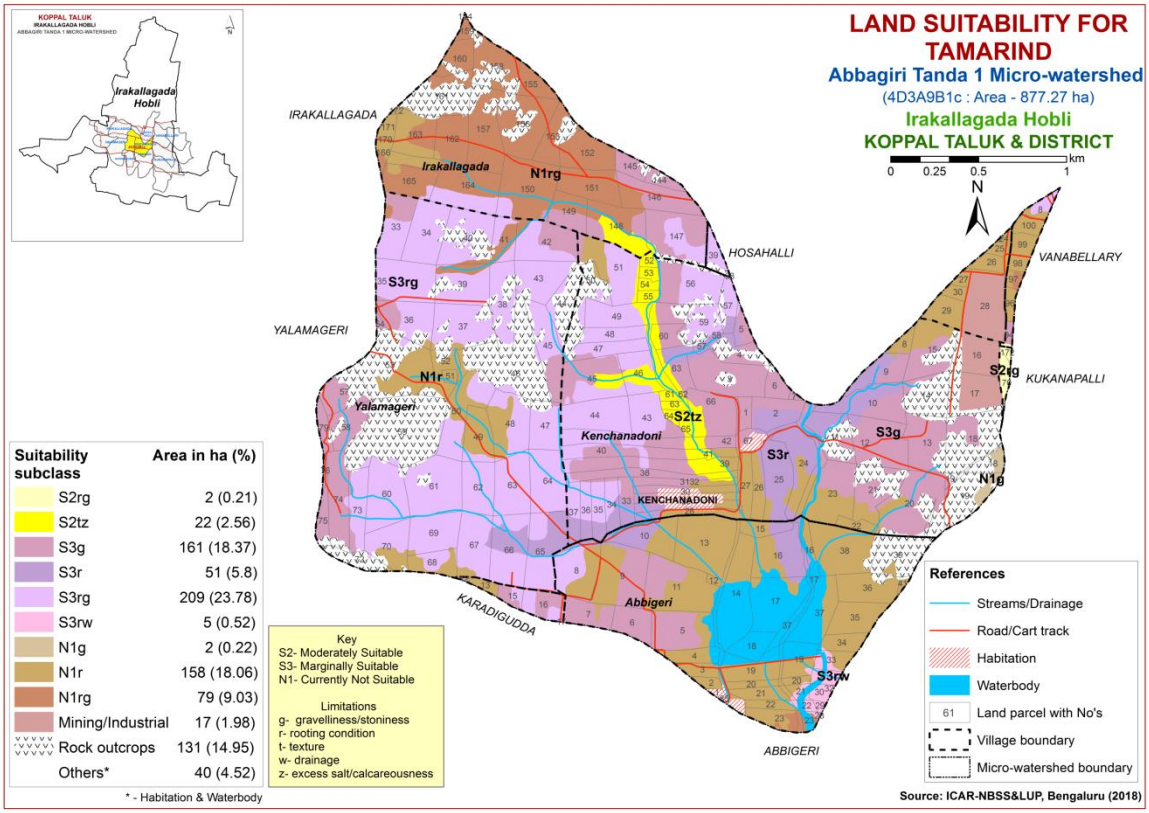


Fig. 7.24 Land Suitability map of Tamarind

7.25 Land Suitability for Marigold (*Tagetes erecta*)

Marigold is one of the most important flower crop grown in an area of 9108 ha in almost all the districts of the state. The crop requirements (Table 7.26) for growing marigold were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing marigold was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.25.

Highly (Class S1) suitable lands for growing marigold occur in an area of 15 ha (2%) and are distributed in the southwestern part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 202 ha (23%) and are distributed in all parts of the microwatershed with minor limitations of calcareousness, drainage, texture, gravelliness and rooting depth. An area of about 396 ha (45%) is marginally suitable (Class S3) for growing marigold and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. Currently not suitable (Class N1) lands for growing marigold occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

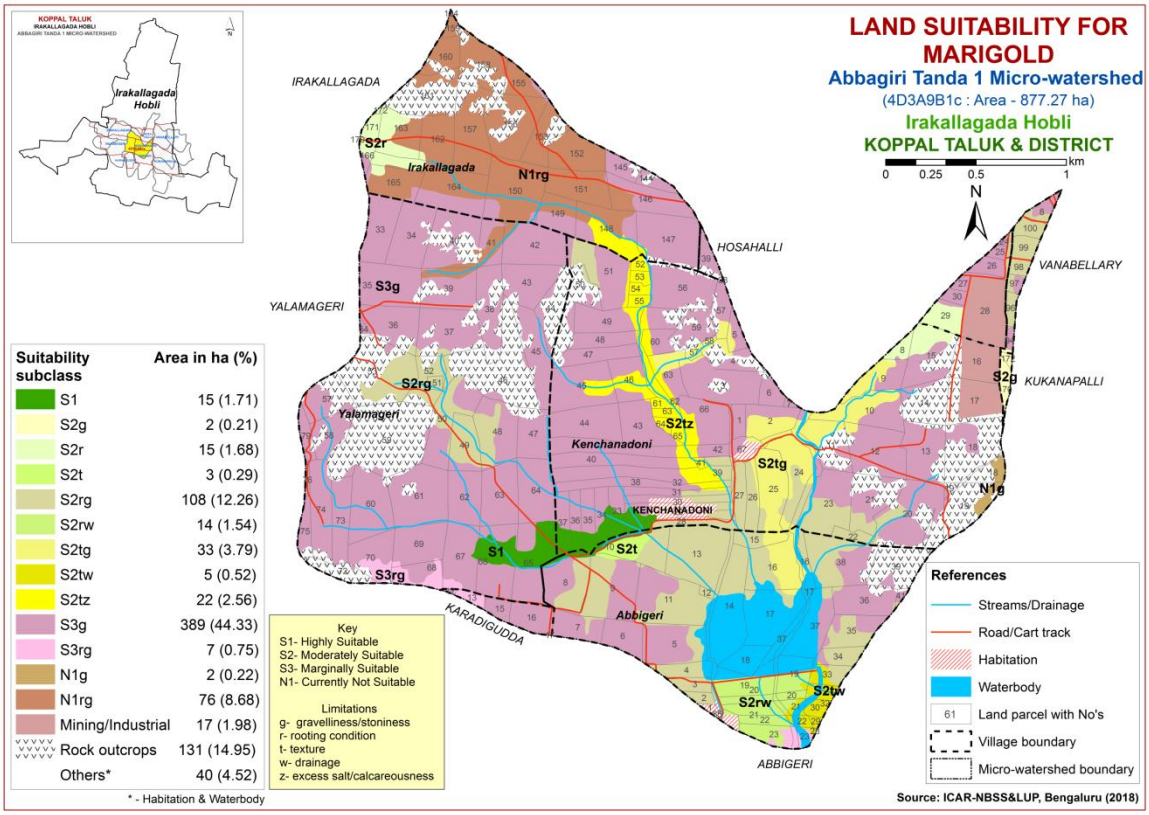


Fig. 7.25 Land Suitability map of Marigold

7.26 Land Suitability for Chrysanthemum (*Chrysanthemum indicum*)

Chrysanthemum is one of the most important flower crop grown in an area of 4978 ha in almost all the districts of the State. The crop requirements (Table 7.27) for growing chrysanthemum were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing chrysanthemum was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed is given in Figure 7.26.

Highly (Class S1) suitable lands for growing chrysanthemum occur in an area of 15 ha (2%) and are distributed in the southwestern part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 202 ha (23%) and are distributed in all parts of the microwatershed with minor limitations of calcareousness, drainage, texture, gravelliness and rooting depth. An area of about 396 ha (45%) is marginally suitable (Class S3) for growing chrysanthemum and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth and gravelliness. Currently not suitable (Class N1) lands for growing chrysanthemum occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

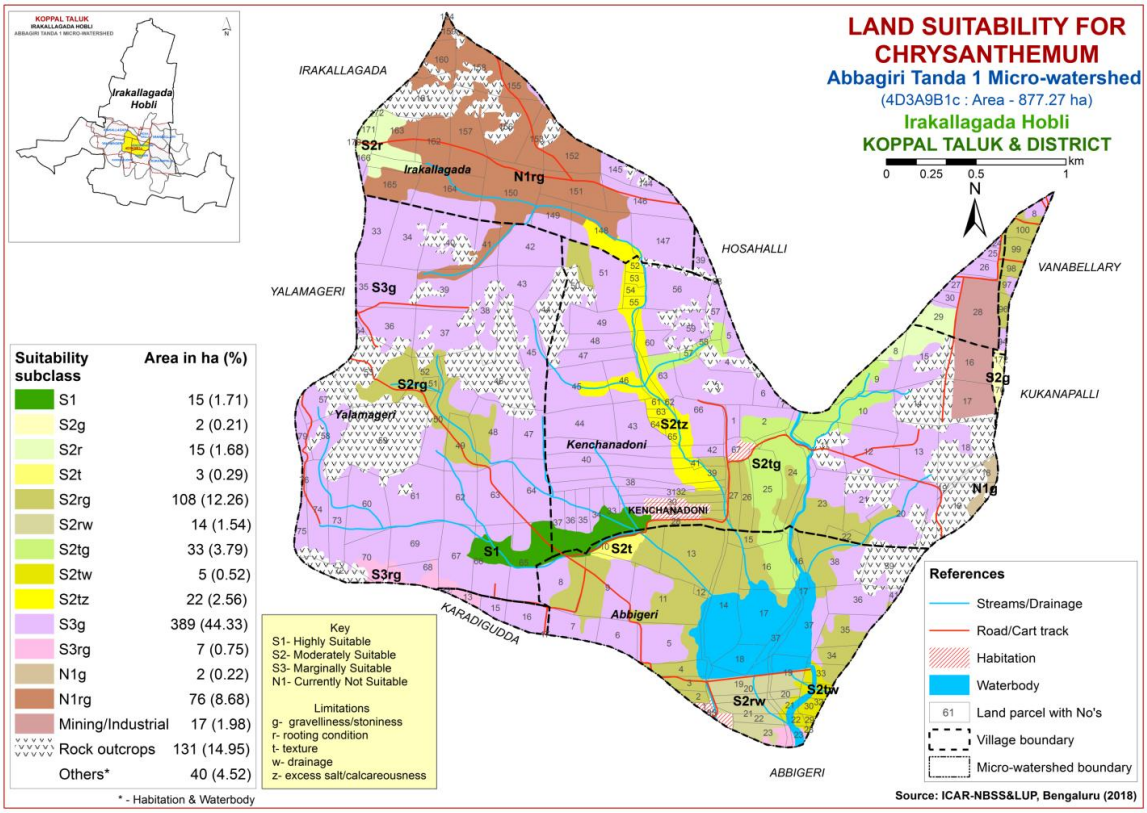


Fig. 7.26 Land Suitability map of Chrysanthemum

7. 27 Land Suitability for Jasmine *(Jasminum sp.)*

Jasmine is one of the most important flower crop grown in an area of 803 ha in almost all the districts of the State. The crop requirements (Table 7.28) for growing jasmine were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jasmine was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.27.

Highly (Class S1) suitable lands for growing jasmine occur in an area of 15 ha (2%) and are distributed in the southwestern part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 180 ha (20%) and are distributed in all parts of the microwatershed with minor limitations of drainage, texture, gravelliness and rooting depth. Maximum area of about 418 ha (48%) is marginally suitable (Class S3) for growing jasmine and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness and gravelliness. Currently not suitable (Class N1) lands for growing jasmine occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

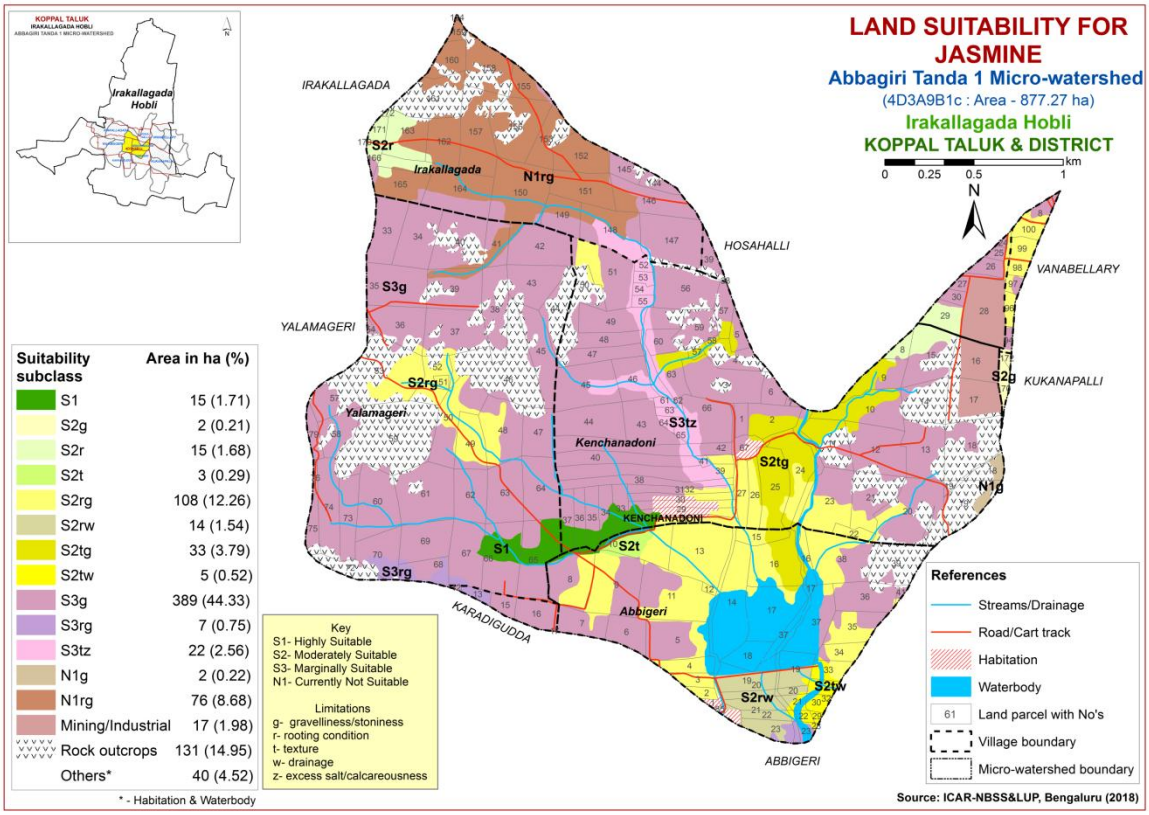


Fig. 7.27 Land Suitability map of Jasmine

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

Crossandra is one of the most important flower crop grown in an all the districts of the state. The crop requirements (Table 7.29) for growing crossandra were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing crossandra was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.27.

Highly (Class S1) suitable lands for growing crossandra occur in an area of 15 ha (2%) and are distributed in the southwestern part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 180 ha (20%) and are distributed in all parts of the microwatershed with minor limitations of drainage, texture, gravelliness and rooting depth. Maximum area of about 418 ha (48%) is marginally suitable (Class S3) for growing crossandra and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness and gravelliness. Currently not suitable (Class N1) lands for growing crossandra occur in an area of 78 ha (9%) and are distributed in the eastern and northern part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

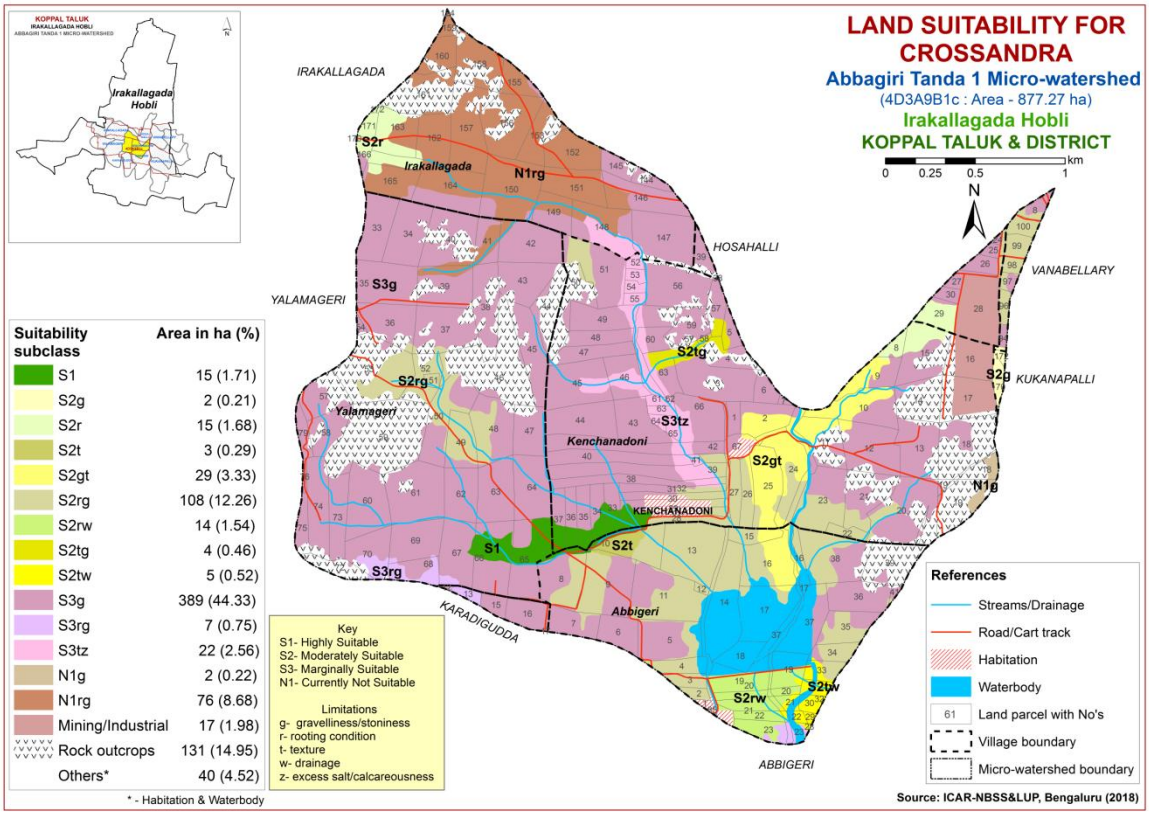


Fig. 7.28 Land Suitability map of Crossandra

Table 7.1 Soil-Site Characteristics of Abbagiri Tanda-1 Microwatershed

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m	Slope (%)	Erosion	pH	EC	ESP	CEC [Cmol (p+)kg-1]	BS (%)
					Surf-ace	Sub-surface	Sur-face	Sub-surface								
BGThB2g1	662	<90	W	<25	scl	G	15-35	>35	50-100	1-3	Moderate	8.4	0.15	1.11	44.84	-
BGTmB2	662	<90	W	<25	c	Gc	-	>35	50-100	1-3	Moderate	8.4	0.15	1.11	44.84	-
HRVcB2g1	662	<90	W	25-50	sl	gscl	15-35	>35	<50	1-3	Moderate	6.05	0.21	0.73	11.24	100
ABRbB2g2	662	<90	W	25-50	ls	gsc	35-60	>35	<50	1-3	Moderate	6.13	0.02	0.36	3.60	58.76
LKRhC2g3	662	<90	W	50-75	scl	gsc	60-80	40-60	50-100	3-5	Severe	8.18	0.30	4.51	12.19	100.00
LKRiB2g1	662	<90	W	50-75	sc	gsc	15-35	40-60	50-100	3-5	Moderate	8.18	0.30	4.51	12.19	100.00
KGHhB1g1	662	<90	W	50-75	scl	gscl	15-35	15-35	100-150	1-3	Slight	7.55	0.17	3.02	13.30	100
KGHiB1g2	662	<90	W	50-75	sc	sgcl	35-60	15-35	100-150	1-3	Slight	7.55	0.17	3.02	13.30	100
KTPcB1g1	662	<90	W	50-75	sl	gsc	15-35	15-35	101-150	1-3	Slight	6.42	0.07	0.05	4.41	100
MKHcB1g1	662	<90	W	50-75	sl	gsc	15-35	15-35	50-100	1-3	Slight	7.38	0.09	1.49	14.84	93
MKHcB2	662	<90	W	50-75	sl	gsc	-	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHcB2g1	662	<90	W	50-75	sl	gsc	15-35	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHcB2g2	662	<90	W	50-75	sl	gsc	35-60	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHhB1g1	662	<90	W	50-75	scl	gsc	15-35	>35	50-100	1-3	Slight	7.38	0.09	1.49	14.84	93
MKHhB2	662	<90	W	50-75	scl	gsc	-	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHhB2g1	662	<90	W	50-75	scl	gsc	15-35	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHiB2	662	<90	W	50-75	sc	gsc	-	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
HDHcA1g1	662	<90	W	75-100	sl	gsc-gc	15-35	>35	50-100	0-1	Slight	6.54	0.07	7.11	5.84	84.07
HDHcB2g1	662	<90	W	75-100	sl	gsc-gc	15-35	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
HDHcB2g2	662	<90	W	75-100	sl	gsc-gc	35-60	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
HDHhB2	662	<90	W	75-100	scl	gsc-gc	-	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
HDHhB2g1	662	<90	W	75-100	scl	gsc-gc	15-35	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
HDHiB1g1	662	<90	W	75-100	sc	gsc-gc	15-35	>35	50-100	1-3	Slight	6.54	0.07	7.11	5.84	84.07
HDHiB2g1	662	<90	W	75-100	sc	gsc-gc	15-35	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	84.07
BSRbB2g1	662	<90	W	75-100	ls	gsc	15-35	15-35	50-100	1-3	Moderate	6.59	0.12	6.00	8.80	77.55

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m	Slope (%)	Erosion	pH	EC	ESP	CEC [Cmol (p+)kg-1]	BS (%)
					Surf-ace	Sub-surface	Sur-face	Sub-surface								
BSRiB1	662	<90	W	75-100	sc	gsc	-	15-35	50-100	1-3	Slight	6.59	0.12	6.00	8.80	77.55
BSRiB2	662	<90	W	75-100	sc	gsc	-	15-35	50-100	1-3	Moderate	6.59	0.12	6.00	8.80	77.55
BSRiB2g1	662	<90	W	75-100	sc	gsc	15-35	15-35	50-100	1-3	Moderate	6.59	0.12	6.00	8.80	77.55
BDGcB1g1	662	<90	W	75-100	sl	gc	15-35	35-60	<50	1-3	Slight	6.24	0.06	0.35	3.76	52.56
BDGcC2g1	662	<90	W	75-100	sl	gc	15-35	35-60	<50	3-5	Severe	6.24	0.06	0.35	3.76	52.56
BDGhB1g1	662	<90	W	75-100	scl	gc	15-35	35-60	<50	1-3	Moderate	6.24	0.06	0.35	3.76	52.56
BDGhB2	662	<90	W	75-100	scl	gc	-	35-60	<50	1-3	Moderate	6.24	0.06	0.35	3.76	52.56
BDGhB2g1	662	<90	W	75-100	scl	gc	15-35	35-60	<50	1-3	Moderate	6.24	0.06	0.35	3.76	52.56
BDGiB1g2	662	<90	W	75-100	sc	gc	35-60	35-60	<50	1-3	Slight	6.24	0.06	0.35	3.76	52.56
BDGiB2g1	662	<90	W	75-100	sc	gc	15-35	35-60	<50	1-3	Moderate	6.24	0.06	0.35	3.76	52.56
BDGcB2	662	<90	W	75-100	sl	gc	-	35-60	<50	1-3	Moderate	6.24	0.06	0.35	3.76	52.56
JDGiB2g1	662	<90	W	100-150	sc	sc-c	-	<15	>200	1-3	Moderate					
BPRcB1g1	662	<90	W	100-150	sl	gsc-gc	15-35	>35	51-100	1-3	Slight	6.64	0.03	0.51	5.45	63.48
BPRcB2	662	<90	W	100-150	sl	gsc-gc	-	>35	51-100	1-3	Moderate	6.64	0.03	0.51	5.45	63.48
BPRcB2g1	662	<90	W	100-150	sl	gsc-gc	15-35	>35	51-100	1-3	Moderate	6.64	0.03	0.51	5.45	63.48
BPRcC2g1	662	<90	W	100-150	sl	gsc-gc	15-35	>35	51-100	3-5	Severe	6.64	0.03	0.51	5.45	63.48
BPRhB2	662	<90	W	100-150	scl	gsc-gc	-	>35	51-100	1-3	Moderate	6.64	0.03	0.51	5.45	63.48
NGPbB1	662	<90	W	100-150	ls	gsc	-	>35	51-100	1-3	Slight	6.77	0.09	0.46	7.10	82.70
NGPcB2g1	662	<90	W	100-150	sl	gsc	15-35	>35	51-100	1-3	Moderate	6.77	0.09	0.46	7.10	82.70
NGPcC2g1	662	<90	W	100-150	sl	gsc	15-35	>35	51-100	3-5	Severe	6.77	0.09	0.46	7.10	82.70
NGPiB2g1	662	<90	W	100-150	sc	gsc	15-35	>35	51-100	1-3	Moderate	6.77	0.09	0.46	7.10	82.70
NGPhC2g1	662	<90	W	100-150	scl	gsc	15-35	>35	51-100	3-5	Severe	6.77	0.09	0.46	7.10	82.70
HNHiB2	662	<90	MW	50-75	sc	sc	-	-	101-150	1-3	Moderate	7.94	0.99	2.13	18.00	99.15
KLRmA1	662	<90	MW	>150	c	sc	-	-	>200	0-1	Slight	7.11	0.33	3.42	19.50	100
HLPhB1	662	<90	W	75-100	scl	scl	-	-	51-100	1-3	Slight					
HLPiB2	662	<90	W	75-100	sc	scl	-	-	51-100	1-3	Moderate					

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

Table 7.2 Land suitability criteria for Sorghum

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

Table 7.3 Land suitability criteria for Maize

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

Table 7.4 Land suitability criteria for Bajra

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

Table 7.5 Land suitability criteria for Groundnut

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

Table 7.6 Land suitability criteria for Sunflower

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

Table 7.7 Land suitability criteria for Cotton

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime	Mean temperature in growing season	°C	22-32	>32	<19	-
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristic					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well to moderately well	Poorly drained/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 7.8 Land suitability criteria for Red gram

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

Table 7.9 Land suitability criteria for Bengal gram

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

Table 7.10 Land suitability criteria for Chilli

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

Table 7.11 Land suitability criteria for Tomato

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

Table 7.12 Land suitability criteria for 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 7.13 Land suitability criteria for Mulberry

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

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

Table 7.14 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 7.15 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 7.16 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 7.17 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 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 7.19 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 7.20 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 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 7.23 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 7.24 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 7.25 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 7.26 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 7.27 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 7.28 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

7.29 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

7.29 Land Management Units (LMUs)

The 52 soil map units identified in Abbagiri Tanda-1 microwatershed have been grouped into 8 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.7.25) 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 three Land Management Units along with brief description of soil and site characteristics are given below.

LMUs	Mapping unit	Soil and site characteristics
1	473.KLRmA1 437.HLPhB1 438.HLPiB2	Moderately deep to very deep, calcareous to non calcareous sandy clay to clay lowland soils with slopes of 0-3%, slight erosion to moderate erosion, non-gravelly (<15%)
2	471.HNHiB2	Moderately shallow, sandy clay lowland soils with slopes of 1-3%, moderate erosion, non-gravelly (<15%)
3	106.HDHcA1g1 111.HDHcB2g1 112.HDHcB2g2 122.HDHhB2 123.HDHhB2g1 126.HDHiB1g1 128.HDHiB2g1 180.BDGcB1g1 182.BDGcC2g1 185.BDGhB1g1 187.BDGhB2 188.BDGhB2g1 193.BDGiB1g2 194.BDGiB2g1 223.BPRcB1g1 224.BPRcB2 225.BPRcB2g1 227.BPRcC2g1 230.BPRhB2 249.NGPbB1 251.NGPcB2g1 253.NGPcC2g1 265.NGPiB2g1	Moderately deep to deep, red gravelly sandy clay to clay soils with slopes of 0-5%, slight erosion to severe erosion, non-gravelly to very gravelly (15-60%)

	455.BDGcB2 460.NGPhC2g1	
4	158.BSRbB2g1 164.BSRiB1 167.BSRiB2 168.BSRiB2g1 213.JDGiB2g1	Moderately deep to deep, red sandy clay to sandy clay loam soils with slopes of 1-3%, slight erosion to moderate erosion, non-gravelly to gravelly (<15-35%)
5	49.LKRhC2g3 54.LKRiB2g1 75.MKHcB1g1 76.MKHcB2 77.MKHcB2g1 78.MKHcB2g2 82.MKHhB1g1 84.MKHhB2 85.MKHhB2g1 89.MKHiB2	Moderately shallow, red gravelly sandy clay to sandy clay loam soils with slopes of 1-5%, slight erosion to severe erosion, non-gravelly to extremely gravelly (<15-80%)
6	67.KGHhB1g1 70.KGHiB1g2 71.KTPcB1g1	Moderately shallow, red loamy soils with slopes of 1-3%, slight erosion, gravelly to very gravelly (15-60%)
7	465.HRVcB2g1 470.ABRbB2g2	Shallow, red gravelly sandy clay to sandy clay loam soils with slopes of 1-3%, moderate erosion, gravelly to very gravelly (15-60%)
8	4.BGThB2g1 9.BGTmB2	Very shallow, gravelly black calcareous gravelly clayey soils with slopes of 1-3%, moderate erosion, non-gravelly to gravelly (<15-35%)

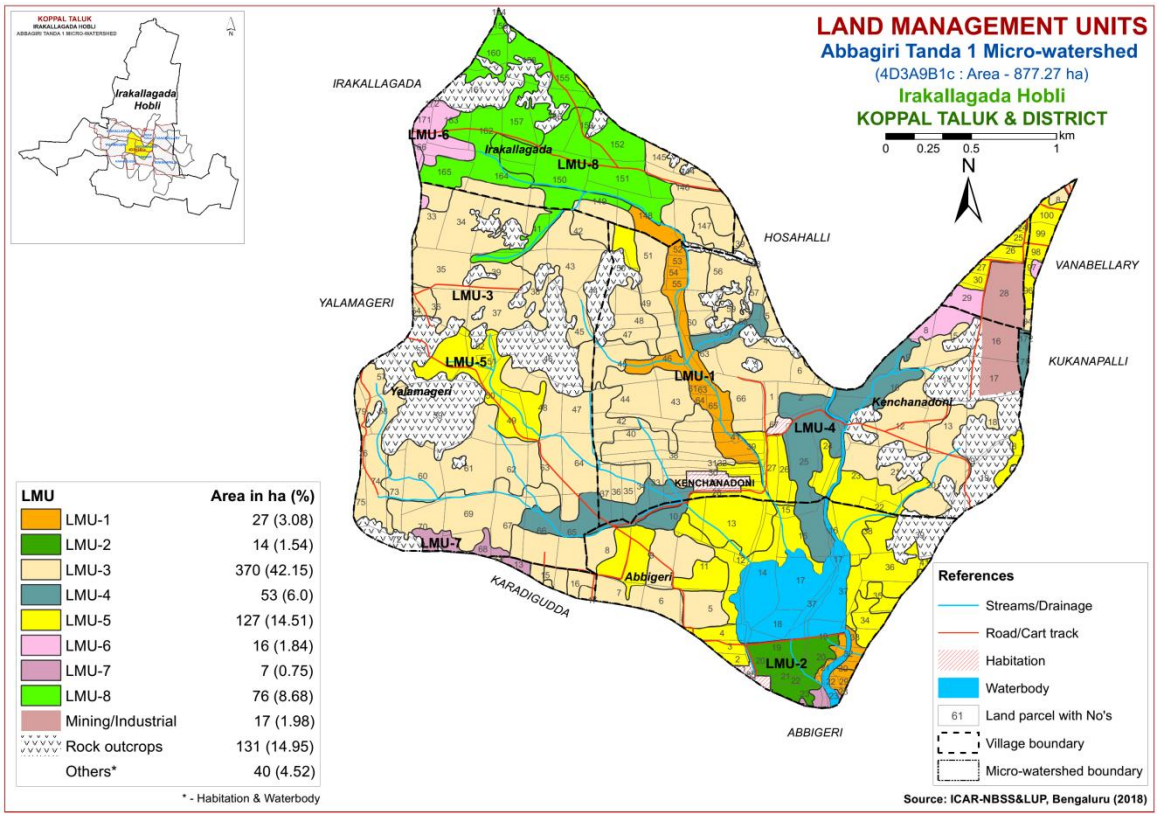


Fig 7.29 Land Management Units map of Abbagiri Tanda-1 microwatershed

7.30 Proposed Crop Plan for Abbagiri Tanda-1 Microwatershed

After assessing the land suitability for the 28 crops, the proposed crop plan has been prepared for the 8 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 28 crops. The resultant proposed crop plan is presented in Table 7.30.

Table 7.30 Proposed Crop Plan for Abbagiri Tanda-1 Microwatershed

LMU	Soil Map Units	Survey Number	Soil Characteristics	Field Crops	Horticulture Crops	Suitable Interventions
1	473.KLRmA1 437.HLPhB1 438.HLPiB2	**Abbigeri:**28,29,30,32 **Irakallagada:** 148 **Kenchanadoni:**41,46,52, 53,54,55,61,62,63,64,65	Moderately deep to very deep, calcareous to non calcareous sandy clay to clay lowland soils with slopes of 0-3%, slight erosion to moderate erosion, non-gravelly (<15%)	Paddy, Maize, Sugarcane, Cotton	**Fruit crops:** Custard Apple, Amla **Vegetable crops:** Brinjal, Tomato, Chillies, Drumstick, Coriander **Flower crops:** Marigold, Chrysanthemum, Jasmine	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practices
2	471.HNHiB2	**Abbigeri:**19,20,21,22,23	Moderately shallow, sandy clay lowland soils with slopes of 1-3%, moderate erosion, non-gravelly (<15%)	Maize, Bajra	**Fruit crops:** Custard Apple, Amla **Vegetable crops:** Brinjal, Tomato, Chillies, Coriander, Cabbage, Onion	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practices
3	106.HDHcA1g1 111.HDHcB2g1 112.HDHcB2g2 122.HDHhB2 123.HDHhB2g1 126.HDHiB1g1 128.HDHiB2g1 180.BDGcB1g1 182.BDGcC2g1 185.BDGhB1g1 187.BDGhB2 188.BDGhB2g1 193.BDGiB1g2	**Abbigeri:** 5,6,7,8,9 **Hosahalli:** 39 **Irakallagada:**144,145,146, 147,149 **Karadigudda:**12,15,16,17 **Kenchanadoni:**1,3,5,6,7, 12,13,15,20,31,32,34,35, 36,37,38,39,40,42,43,44, 45,47,48,49,51,56,57,59, 60,66. **Vanabellary:**8,94 **Yalamageri:**33,34,35,36,	Moderately deep to deep, red gravelly sandy clay to clay soils with slopes of 0-5%, slight erosion to severe erosion, non-gravelly to very gravelly (15-60%)	Sorghum, Groundnut, Redgram, Bajra, Horsegram, Castor	**Fruit crops:** Musambi, Lime, Jamun, Jackfruit Amla, Custard apple **Vegetable crops:** Drumstick, Curry leaves	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)

LMU	Soil Map Units	Survey Number	Soil Characteristics	Field Crops	Horticulture Crops	Suitable Interventions
	194.BDGiB2g1 223.BPRcB1g1 224.BPRcB2 225.BPRcB2g1 227.BPRcC2g1 230.BPRhB2 249.NGPbB1 251.NGPcB2g1 253.NGPcC2g1 265.NGPiB2g1 455.BDGcB2 460.NGPhC2g1	37,38,39,40,42,43,45,47, 48,54,57,58,60,61,62,63, 64,66,67,69,70,73,74,75, 76,79				
4	158.BSRbB2g1 164.BSRiB1 167.BSRiB2 168.BSRiB2g1 213.JDGiB2g1	**Abbigeri:** 10,15,16 **Kenchanadoni:**2,9,10,24 ,25,33,58 **Kukanapalli:**170,172 **Yalamageri:** 65	Moderately deep to deep, red sandy clay to sandy clay loam soils with slopes of 1-3%, slight erosion to moderate erosion, non-gravelly to gravelly (<15-35%)	Maize, Sorghum, Sunflower, Bajra, Finger millet, Groundnut, Redgram, 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 practices (Crescent Bunding with Catch Pit etc)
5	49.LKRhC2g3 54.LKRiB2g1 75.MKHcB1g1 76.MKHcB2 77.MKHcB2g1 78.MKHcB2g2	**Abbigeri:**11,12,13,2,3,33 , 34,35,36,38,4,41 **Hosahalli:**24,25,26,27,30 **Kenchanadoni:**22,23,26, 27,28 **Vanabellary:**96,98,99,10	Moderately shallow, red gravelly sandy clay to sandy clay loam soils with slopes of 1-5%, slight erosion to severe erosion, non-gravelly to	Sorghum, Groundnut, Bajra, Castor	**Fruit crops:** Lime, Musambi, Amla, Cashew, Custard apple,	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent

LMU	Soil Map Units	Survey Number	Soil Characteristics	Field Crops	Horticulture Crops	Suitable Interventions
	82.MKHhB1g1 84.MKHhB2 85.MKHhB2g1 89.MKHiB2	0 **Yalamageri:**49,50,51,52	extremely gravelly (<15-80%)			Bunding with Catch Pit etc)
6	67.KGHhB1g1 70.KGHiB1g2 71.KTPcB1g1	**Hosahalli:** 29 **Irakallagada:**163,166,170,171,172 **Kenchanadoni:** 8 **Vanabellary:** 97	Moderately shallow, red loamy soils with slopes of 1-3%, slight erosion, gravelly to very gravelly (15-60%)	Sorghum, Groundnut, Bajra, Green gram, Black gram, Cowpea, Horse gram, Castor,	**Fruit crops:** Lime, Musambi, Amla, Custard apple, Cashew **Flower crops:** Marigold, Chrysanthemum	Drip irrigation, Mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
7	465.HRVcB2g1 470.ABRbB2g2	**Karadigudda:** 13 **Yalamageri:** 68	Shallow, red gravelly sandy clay to sandy clay loam soils with slopes of 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
8	4.BGThB2g1 9.BGTmB2	**Irakallagada:**124,150,151,152,153,155,156,157,158,159,160,162,164,165 **Yalamageri:** 41	Very shallow, gravelly black calcareous clayey soils with slopes of 1-3%, moderate erosion, non-gravelly to gravelly (<15-35%)	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 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 characterististics 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 Abbagiri Tanda-1 Microwatershed

- The soil phases with sizeable area identified in the microwatershed belonged to the soil of MKH series occupies maximum area of 124 ha (14%) followed by BPR 108 ha (12%), HDH 100 ha (11%), BDG 95 ha (11%), BGT 76 ha (9%), GNP 66 ha (8%), BSR 51 ha (6%), KLR 22 ha (3%), HNH 14 ha (2%), KGH 9 ha (2%), KTP 7 ha (<1%), ABR 5 ha (<1%), HLP 5 ha (<1%), LKR 2 ha (<1%) and JDG 2 ha (<1%).
- As per land capability classification, 689 ha (79%) area in the microwatershed falls under arable land category (Class II, III & IV) with major limitations of soil, drainage and erosion.

- On the basis of soil reaction, about 182 ha (21%) is strongly acid (pH 6.0-6.5), 183 ha (21%) is moderately acid (pH 5.5- 6.0), 114 ha (13%) is slightly acid (pH 6.0-6.5), 84 ha (10%) is neutral (pH 6.5-7.3), 47 ha (5%) is slightly alkaline (pH 7.3-7.8), 61 ha (7%) is moderately alkaline (pH 7.8-8.4) and 17 ha (2%) is strongly alkaline (pH 8.4-9.0).

Soil Health Management

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

Acid soils

Strongly acidic to slightly acidic soils cover about 407 ha area in the microwatershed.

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

Liming materials:

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

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

Alkaline soils

Slightly alkaline to very strongly alkaline soils cover 145 ha area in the microwatershed.

1. Regular addition of organic manure, green manuring, green leaf manuring, crop residue incorporation and mulching needs to be taken up to improve the soil organic matter status.
2. Application of biofertilizers (Azospirullum, Azatobacter, Rhizobium).
3. Application of 25% extra N and P (125 % RDN&P).
4. Application of ZnSO4 – 12.5 kg/ha (once in three years).
5. Application of Boron – 5 kg/ha (once in three years).

Neutral soils

Neutral soils occur in 84 ha area in the microwatershed.

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

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

Soil Degradation

Soil erosion is one of the major factor affecting the soil health in the microwatershed. Out of total 887 ha area in the microwatershed, an area of about 167 ha (19%) is suffering from slight erosion and a maximum area about 522 ha (59%) is suffering from moderate erosion. These areas of moderate erosion need immediate soil and water conservation and other land development and land husbandry practices are required 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-Dry land 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 Abbagiri Tanda-1 Microwatershed.
- **Organic Carbon:** The OC content is medium (0.5-0.75%) in an area of about 151 ha (17%) and high (>0.75%) in a maximum area of 538 (61%). Area under 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 151 ha (17%) area where OC is medium (0.5-0.75%). For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg /ha needs to be applied for all the crops grown in these plots.
- **Available Phosphorus**: Available phosphorus is medium (23-57 kg/ha) in an area of 219 ha (25%) and high (23-57 kg/ha) in a maximum area of 470 ha (54%). In medium area, for all the crops 25% additional P needs to be applied.
- **Available Potassium:** Available potassium is low (<145 kg/ha) in an area of 380 ha (43%), medium (145-337 kg/ha) in an area of 235 ha (27%) and high in an area of about 74 ha (8%) of the microwatershed. All the plots, where available potassium is low and medium, for all the crops, additional 25% potassium may be applied.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops. It is low (<10 ppm) in a maximum area of 554 ha (63%) and medium (10-20 ppm) in an area of 136 ha (15%). Low and medium areas 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.
- **Available Boron:** Maximum area of about 665 ha (76%) is low (<0.5 ppm) in available boron and an area of 24 ha (3%) is medium (05 -1.0 ppm) in available boron content. These areas need to be applied with sodium borate @ 10kg/ha as soil application or 0.2% borax as foliar spray to correct the deficiency.

- **Available Iron:** It is deficient (<4.5 ppm) in 98 ha (11%) area. For deficient areas, iron sulphate @ 25 kg/ha needs to be applied for 2-3 years to correct the deficiency and sufficient (>4.5 ppm) in a maximum area of 591 ha (67%).
- **Available Manganese:** All the soils in the microwatershed are sufficient (>1.0 ppm) in available manganese.
- **Available Copper:** All the soils in the microwatershed are sufficient (>0.2 ppm) in available copper.
- **Available Zinc:** Available zinc is deficient (<0.6 ppm) in an area of 359 ha (41%). For these areas, application of zinc sulphate @ 25kg/ha is to be recommended and sufficient (>0.6 ppm) in an area of 330 ha (38%).
- **Soil Alkalinity:** An area of 145 ha (14%) in the microwatershed has soils that are slightly alkaline to strongly alkaline. These areas need application of gypsum and wherever calcium is in excess, iron pyrites and element sulphur can be recommended. Management practices like treating repeatedly with good quality water to drain out the excess salts and provision of subsurface drainage and growing of salt tolerant crops like Casuarina, Acasia, Neem, Ber etc, are recommended.

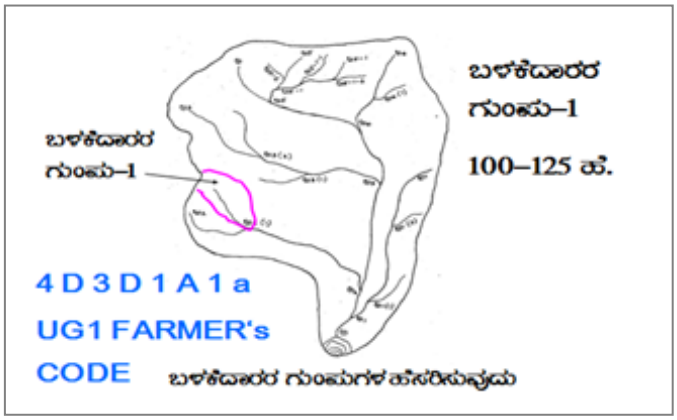
Land Suitability for Various Crops: Areas that are highly, moderately and marginally suitable and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, rooting depth and salinity/alkalinity are the major constraints in various plots. With suitable management interventions, the productivity can be enhanced. In order to increase water holding capacity of light textured soils, growing of green manure crops and application of organic manure is recommended.

Chapter 9

SOIL AND WATER CONSERVATION TREATMENT PLAN

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

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



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

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

Steps for Survey and Preparation of Treatment Plan

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

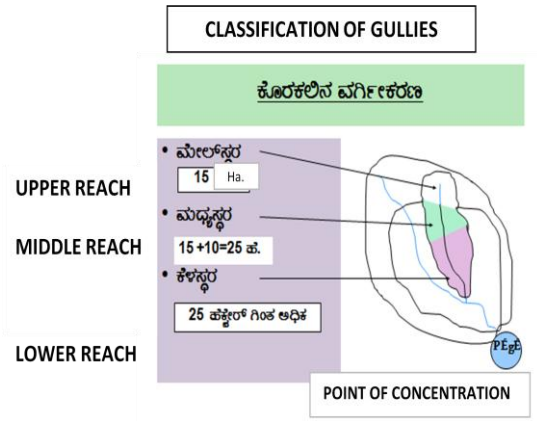
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge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

9.1 Treatment Plan

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

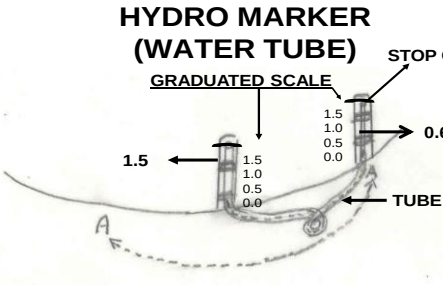
9.1.1 Arable Land Treatment

A. BUNDING

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

Measurement of Land Slope

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



FALL: 1.5 - 0.6 = 0.9 m.

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

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

Note: i) The above intervals are maximum.

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

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

Section of the Bund

Bund section is decided considering the soil texture class and gravelliness class (bg0 .....b= loamy sand, g0 = <15% gravel). The recommended sections for different soils are given below.

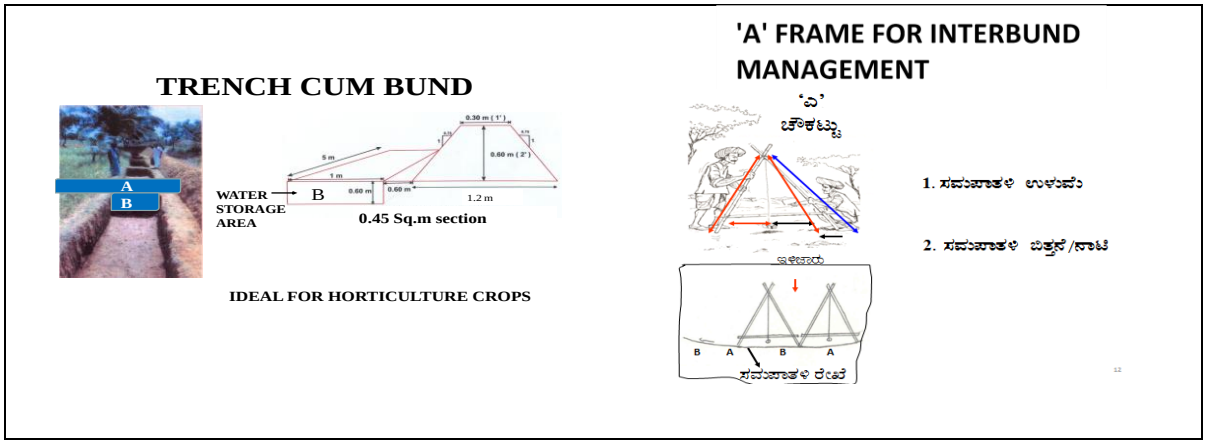
Recommended Bund Section

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

Formation of Trench cum Bund

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

Details of Borrow Pit dimensions are given below



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

Bund section	Bund length	Earth quantity	Pit				Berm (pit to pit)	Soil depth Class
m2	m	m3	L(m)	W(m)	D(m)	Quantity (m3)	m	
0.375	6	2.25	5.85	0.85	0.45	2.24	0.15	Shallow
0.45	6	2.7	5.4	1.2	0.43	2.79	0.6	Shallow
0.45	6	2.7	5	0.85	0.65	2.76	1	Moderately Shallow
0.54	5.6	3.02	5.5	0.85	0.7	3.27	0.1	Moderately shallow
0.54	5.5	2.97	5	1.2	0.5	3	0.5	Shallow
0.72	6.2	4.46	6	1.2	0.7	5.04	0.2	Moderately shallow
0.72	5.2	3.74	5.1	0.85	0.9	3.9	0.1	Moderately deep

B. Waterways

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

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

c) The design details are given in the Manual.

C. Farm Ponds

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

D. Diversion Channel

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

9.1.2 Non-Arable Land Treatment

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

9.1.3 Treatment of Natural Water Course/ Drainage Lines

a) The cadastral map has to be updated as regards the network of drainge lines (gullies/ *nalas/ hallas*) and existing structures are marked to the scale and storage capacity of the existing water bodies are documented.
b) The drainage line will be demarcated into Upper Reach, Middle Reach and Lower Reach.
c) Considering the Catchment, *Nala* bed and bank conditions, suitable structures are decided.
d) Number of storage structures (Check dam/ *Nala* bund/ Percolation tank) will be decided considering the commitments and available runoff in water budgeting and quality of water in the wells and site suitability.
e) Detailed Leveling Survey using Dumpy Level / Total Station has to be carried out to arrive at the site-specific designs as shown in the Manual.
f) The location of ground water recharge structures are decided by examining the lineaments and fracture zones from geological maps.
g) Rainfall intensity data of the nearest Rain Gauge Station is considered for Hydrologic Designs.
h) Silt load to the Storage/Recharge Structures is reduced by providing vegetative, boulder and earthern checks in the natural water course. Location and design details are given in the Manual.

9.2 Recommended Soil and Water Conservation Measures

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

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

A map (Fig. 9.1) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. Maximum area of about 600 ha (68%) needs Trench Cum Bunding, an area of about 55 ha (6%) needs Graded Bunding and an area of 34 ha (4%) needs Strengthening of existing bunds. The conservation plan prepared may be presented to all the stakeholders including farmers and after considering their suggestions, the conservation plan for the microwatershed may be finalised in a participatory approach.

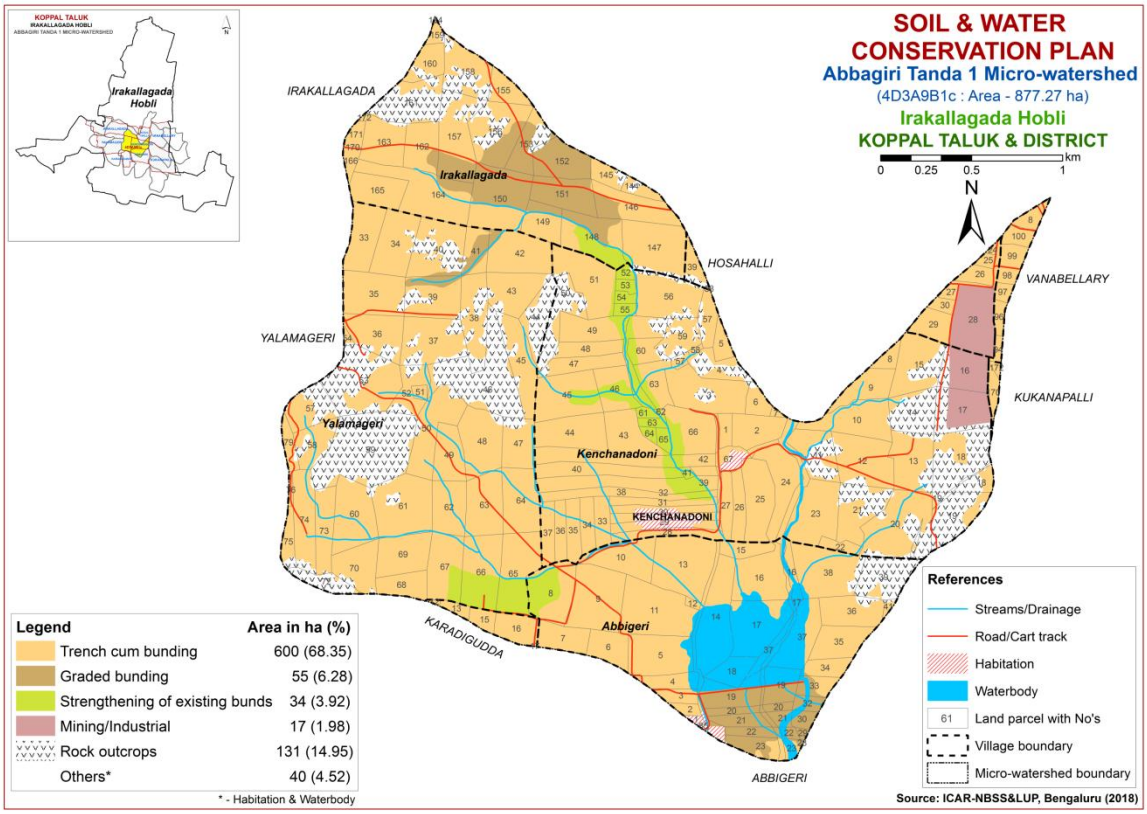


Fig. 9.1 Soil and Water Conservation Plan map of Abbagiri Tanda-1 Microwatershed

9.3 Greening of Microwatershed

As part of the greening programme in the watersheds, it is envisaged to plant a variety of horticultural and other tree plants that are edible, economical and produce lot of biomass which helps to restore the ecological balance in the watersheds. The lands that are suitable for greening programme are non-arable lands (land capability classes V, VI VII and VIII) and also the lands that are not suitable or marginally suitable for growing annual and perennial crops. The method of planting these trees is given below.

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

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

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

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Appendix I

Abbagiri Tanda -1 (9B1c) 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
Abbigeri	1	0.37	Habitation	Others	Others	Others	Others	Others	Others	Others	Jowar+Maize (Jw+Mz)	Not Available	Others	Others
Abbigeri	2	0.88	MKHhB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Maize (Jw+Mz)	Not Available	IIIes	TCB
Abbigeri	3	1.67	MKHhB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Maize (Jw+Mz)	Not Available	IIIes	TCB
Abbigeri	4	2.49	MKHhB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Maize (Jw+Mz)	Not Available	IIIes	TCB
Abbigeri	5	7.67	BDGhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Eucalyptus (Eu)	Not Available	IIIes	TCB
Abbigeri	6	3.8	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Jowar+Maize (Jw+Mz)	1 Borewell	IIIs	TCB
Abbigeri	7	3.92	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Jowar+Maize (Jw+Mz)	Not Available	IIIs	TCB
Abbigeri	8	7.45	HDHcA1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	3 Borewell	IIs	Graded bunding
Abbigeri	9	9.61	BDGhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Maize (Jw+Mz)	1 Borewell	IIIes	TCB
Abbigeri	10	6.23	BSRiB2	LMU-4	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	1 Borewell	IIe	TCB
Abbigeri	11	10.5	MKHhB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Abbigeri	12	0.36	MKHiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	TCB
Abbigeri	13	10.11	MKHhB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	2 Borewell	IIIes	TCB
Abbigeri	14	9.5	Waterbody	Others	Others	Others	Others	Others	Others	Others	Maize+Waterbody (Mz+Wb)	Not Available	Others	Others
Abbigeri	15	2.29	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	TCB
Abbigeri	16	8.68	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	TCB
Abbigeri	17	8.52	Waterbody	Others	Others	Others	Others	Others	Others	Others	Waterbody	Not Available	Others	Others
Abbigeri	18	2.92	Waterbody	Others	Others	Others	Others	Others	Others	Others	Waterbody	Not Available	Others	Others
Abbigeri	19	8.3	HNHiB2	LMU-2	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar(Jw)	Not Available	IIew	Graded bunding
Abbigeri	20	1.93	HNHiB2	LMU-2	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	21	3.06	HNHiB2	LMU-2	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	22	2.02	HNHiB2	LMU-2	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	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
Abbigeri	23	3.74	HNHiB2	LMU-2	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	28	0.05	HLPiB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	29	0.32	HLPiB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	30	1.2	HLPiB2	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	32	1.34	HLPhB1	LMU-1	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIew	Graded bunding
Abbigeri	33	2.19	MKHiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Abbigeri	34	2.38	MKHiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Abbigeri	35	4.81	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Abbigeri	36	5.53	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Abbigeri	37	7.37	Waterbody	Others	Others	Others	Others	Others	Others	Others	Current fallow (Cf)	Not Available	Others	Others
Abbigeri	38	9.28	MKHhB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Current fallow (Jw+Cf)	Not Available	IIIes	TCB
Abbigeri	39	6.07	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Current fallow+Rock outcrops (Cf+Rc)	Not Available	Rock outcrops	Rock outcrops
Abbigeri	41	0.41	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Abbigeri	85	0.06	Habitation	Others	Others	Others	Others	Others	Others	Others	Jowar+Maize (Jw+Mz)	Not Available	Others	Others
Hosahalli	24	0.24	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Current fallow (Rg+Cf)	Not Available	IIIes	TCB
Hosahalli	25	0.69	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Maize (Pd+Mz)	Not Available	IIIes	TCB
Hosahalli	26	1.64	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Current fallow+Redgram (Pd+Cf+Rg)	1 Borewell	IIIes	TCB
Hosahalli	27	0.69	MKHcB2g2	LMU-5	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
Hosahalli	28	8.28	Mining/Industrial	Mining_Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Rock outcrops	Not Available	Mining/Industrial	Mining/Industrial
Hosahalli	29	3.2	KTPcB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Mango+Maize (Mn+Mz)	Not Available	IIs	TCB
Hosahalli	30	0.97	MKHcB2g2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Maize (Cf+Mz)	Not Available	IIIes	TCB
Hosahalli	39	2.01	BPRcB1g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIIs	TCB
Irakallagada	124	0.04	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram	Not Available	IVes	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
											(Fl+Rg)			
Irakallagada	144	1.5	NGPhC2g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Fallow land (Fl)	Not Available	IIIes	TCB
Irakallagada	145	2.07	NGPhC2g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Fallow land (Fl)	Not Available	IIIes	TCB
Irakallagada	146	6.59	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Fallow land (Rg+Fl)	2 Borewell	IIIs	TCB
Irakallagada	147	9.29	BDGcB1g1	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 +Groundnut+Maize (Rg+Veg+Gn+Mz)	Not Available	IIIs	TCB
Irakallagada	148	7.9	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram+Fallow land (Rg+Fl)	Not Available	IIw	Graded bunding
Irakallagada	149	4.09	BDGiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bajra+Maize (Rg+Bj+Mz)	Not Available	IIIes	TCB
Irakallagada	150	10.41	BGTmB2	LMU-8	Very shallow (<25 cm)	Clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bajra (Rg+Bj)	Not Available	IVes	Graded bunding
Irakallagada	151	5.87	BGTmB2	LMU-8	Very shallow (<25 cm)	Clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land+Vegetables (Rg+Fl+Veg)	Not Available	IVes	Graded bunding
Irakallagada	152	5.64	BGTmB2	LMU-8	Very shallow (<25 cm)	Clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land+Vegetables (Rg+Fl+Veg)	Not Available	IVes	Graded bunding
Irakallagada	153	4.38	BGTmB2	LMU-8	Very shallow (<25 cm)	Clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram (Fl+Rg)	Not Available	IVes	Graded bunding
Irakallagada	155	2.74	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land+Bajra (Rg+Fl+Bj)	Not Available	IVes	TCB
Irakallagada	156	8.81	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Current fallow (Fl+Cf)	Not Available	IVes	TCB
Irakallagada	157	9.4	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram+Vegetables (Fl+Rg+Veg)	Not Available	IVes	TCB
Irakallagada	158	6.56	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IVes	TCB
Irakallagada	159	0.85	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram+Vegetables (Fl+Rg+Veg)	Not Available	IVes	TCB
Irakallagada	160	3.28	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IVes	TCB
Irakallagada	161	7.58	RO	RO	RO	RO	RO	RO	RO	RO	Fallow land (Fl)	Not Available	RO	RO
Irakallagada	162	4.91	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram (Fl+Rg)	Not Available	IVes	TCB
Irakallagada	163	5.67	KGHhB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Fallow land (Rg+Fl)	Not Available	IIs	TCB
Irakallagada	164	10.71	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bajra+Horsegram+Maize (Rg+Bj+Hg+Mz)	Not Available	IVes	TCB
Irakallagada	165	4.91	BGThB2g1	LMU-8	Very shallow (<25 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IVes	TCB
Irakallagada	166	1.13	KGHhB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Vegetables +Maize (Rg+Veg+Mz)	Not Available	IIs	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
Irakallagada	170	0.13	KGHhB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIs	TCB
Irakallagada	171	1.16	KGHhB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	1 Borewell	IIs	TCB
Irakallagada	172	0.17	KGHhB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Bajra+Maize (Rg+Bj+Mz)	Not Available	IIs	TCB
Karadigudda	12	0.16	BDGhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Karadigudda	13	0.98	ABRbB2g2	LMU-7	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut+Maize (Gn+Mz)	Not Available	IIIes	TCB
Karadigudda	15	1.52	BDGhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram (Mz+Rg)	Not Available	IIIes	TCB
Karadigudda	16	3.63	BDGhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Pearl Millet+Redgram (Pm+Rg)	1 Open well	IIIes	TCB
Karadigudda	17	0.01	HDHhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	TCB
Kenchanadoni	1	1.31	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	2	4.62	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cucumber (Rg+Cu)	Not Available	IIes	TCB
Kenchanadoni	3	8.57	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	4	3.79	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not Available	RO	RO
Kenchanadoni	5	1.63	NGPcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	6	1.86	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Groundnut (Rg+Gn)	Not Available	IIIes	TCB
Kenchanadoni	7	0.26	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	8	1.31	KTPcB1g1	LMU-6	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow+ Sugarcane (Cf+Sc)	Not Available	IIs	TCB
Kenchanadoni	9	4.24	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Current fallow (Mz+Cf)	Not Available	IIes	TCB
Kenchanadoni	10	7.21	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Kenchanadoni	11	5.66	RO	RO	RO	RO	RO	RO	RO	RO	Current fallow+Rock outcrops (Cf+Rc)	1 Borewell	RO	RO
Kenchanadoni	12	8.37	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIIs	TCB
Kenchanadoni	13	7.13	BDGcC2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Gently sloping (3-5%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	14	5.59	RO	RO	RO	RO	RO	RO	RO	RO	Maize+Redgram (Mz+Rg)	Not Available	RO	RO
Kenchanadoni	15	7.54	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Redgram (Mz+Rg)	Not Available	IIIs	TCB
Kenchanadoni	16	5.61	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kenchanadoni	17	6.76	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kenchanadoni	18	10.64	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not	RO	RO

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
												Available		
Kenchanadoni	19	6.51	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not Available	RO	RO
Kenchanadoni	20	11.62	BDGcC2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Gently sloping (3-5%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	21	6.7	RO	RO	RO	RO	RO	RO	RO	RO	Maize (Mz)	Not Available	RO	RO
Kenchanadoni	22	1.32	MKHhB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	23	8.27	MKHhB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Kenchanadoni	24	6.15	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Kenchanadoni	25	6.77	BSRbB2g1	LMU-4	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram (Mz+Rg)	Not Available	IIes	TCB
Kenchanadoni	26	2.69	MKHcB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIIs	TCB
Kenchanadoni	27	2.48	MKHcB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Groundnut+Maize (Gn+Mz)	2 Borewell	IIIs	TCB
Kenchanadoni	28	2.98	MKHhB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIIes	TCB
Kenchanadoni	29	2.85	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Kenchanadoni	30	2.65	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Kenchanadoni	31	2.43	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIIes	TCB
Kenchanadoni	32	2.39	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Groundnut (Bj+Gn)	Not Available	IIIes	TCB
Kenchanadoni	33	2.36	BSRiB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIs	TCB
Kenchanadoni	34	2.4	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	2 Borewell	IIes	TCB
Kenchanadoni	35	2.72	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Paddy (Rg+Pd)	2 Borewell	IIes	TCB
Kenchanadoni	36	2.15	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	1 Borewell	IIes	TCB
Kenchanadoni	37	2.65	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Maize (Pd+Mz)	Not Available	IIes	TCB
Kenchanadoni	38	4.31	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Bajra (Cf+Bj)	Not Available	IIIes	TCB
Kenchanadoni	39	7.41	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+ Groundnut+Paddy (Cf+Gn+Pd)	1 Borewell	IIIes	TCB
Kenchanadoni	40	5.46	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIIes	TCB
Kenchanadoni	41	0.39	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	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
Kenchanadoni	42	6.95	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bajra (Rg+Bj)	Not Available	IIIes	TCB
Kenchanadoni	43	5.51	HDHhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	1 Borewell	IIes	TCB
Kenchanadoni	44	6.78	HDHhB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	3 Borewell	IIes	TCB
Kenchanadoni	45	8.32	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Paddy+Current fallow (Pd+Cf)	1 Borewell	IIIs	TCB
Kenchanadoni	46	4.53	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIw	Graded bunding
Kenchanadoni	47	3.55	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+Groundnut (Rg+Gn)	Not Available	IIes	TCB
Kenchanadoni	48	2.97	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 (Rg)	Not Available	IIes	TCB
Kenchanadoni	49	5.03	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 (Rg)	Not Available	IIes	TCB
Kenchanadoni	50	5.3	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not Available	RO	RO
Kenchanadoni	51	8.4	HDHiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow+ Redgram (Cf+Rg)	3 Borewell	IIs	TCB
Kenchanadoni	52	0.71	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Kenchanadoni	53	0.78	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Kenchanadoni	54	0.74	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Kenchanadoni	55	0.83	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Kenchanadoni	56	8.08	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	57	3.25	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	58	0.24	BSRiB2g1	LMU-4	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Kenchanadoni	59	3.9	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Kenchanadoni	60	2.45	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIIs	TCB
Kenchanadoni	61	0.68	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIw	Graded bunding
Kenchanadoni	62	0.1	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIw	Graded bunding
Kenchanadoni	63	4.59	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIw	Graded bunding
Kenchanadoni	64	0.6	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIw	Graded bunding
Kenchanadoni	65	0.92	KLRmA1	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	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
Kenchanadoni	66	6.45	NGPcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Groundnut (Rg+Gn)	Not Available	IIIes	TCB
Kenchanadoni	67	1.92	Habitation	Others	Others	Others	Others	Others	Others	Others	Redgram (Rg)	Not Available	Others	Others
Kukanapalli	170	1.4	JDGiB2g1	LMU-4	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+ Groundnut+ Vegetables+Redgram (Fl+Gn+Vg+Rg)	Not Available	IIes	TCB
Kukanapalli	172	0.35	JDGiB2g1	LMU-4	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Groundnut +Maize (Rg+Gn+Mz)	Not Available	IIes	TCB
Vanabellary	8	1.61	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+ Redgram+Groundnut (Cf+Rg+Gn)	Not Available	IIes	TCB
Vanabellary	94	0.68	BDGiB1g2	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Mango (Mn)	Not Available	IIIes	TCB
Vanabellary	96	1.08	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Vanabellary	97	0.89	KGHiB1g2	LMU-6	Moderately shallow (50-75 cm)	Sandy clay	Very gravelly (35-60%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Current fallow (Mz+Cf)	Not Available	IIIs	TCB
Vanabellary	98	1	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Vanabellary	99	1.74	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Vanabellary	100	1.6	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Yalamageri	33	5.94	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	TCB
Yalamageri	34	7.05	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Current fallow (Rg+Cf)	Not Available	IIes	TCB
Yalamageri	35	7.75	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Current fallow (Mz+Cf)	Not Available	IIes	TCB
Yalamageri	36	6.43	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Eucalyptus (Eu)	Not Available	IIes	TCB
Yalamageri	37	8.39	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Current fallow (Rg+Mz+Cf)	Not Available	IIes	TCB
Yalamageri	38	6.78	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Rainfall Paddy (RPd)	Not Available	IIes	TCB
Yalamageri	39	7.05	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Yalamageri	40	8.51	HDHhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Current fallow (Mz+Cf)	Not Available	IIes	TCB
Yalamageri	41	3.35	BGTmB2	LMU-8	Very shallow (<25 cm)	Clay	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Horsegram (Rg+Hg)	1 Borewell	IVes	Graded bunding
Yalamageri	42	7.57	PRcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Yalamageri	43	6.13	PRcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	TCB
Yalamageri	44	4.59	RO	RO	RO	RO	RO	RO	RO	RO	Rainfed Paddy (RPd)	Not Available	RO	RO

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
Yalamageri	45	6.5	BPRcB2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIIes	TCB
Yalamageri	46	13.39	RO	RO	RO	RO	RO	RO	RO	RO	Dyke (Dy)	Not Available	RO	RO
Yalamageri	47	4.89	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Maize (Mz)	Not Available	IIIes	TCB
Yalamageri	48	7.75	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB
Yalamageri	49	4.79	MKHcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	TCB
Yalamageri	50	8.03	MKHcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	TCB
Yalamageri	51	0.6	MKHcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIIes	TCB
Yalamageri	52	3.84	MKHcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIIes	TCB
Yalamageri	53	12.03	RO	RO	RO	RO	RO	RO	RO	RO	Dyke+Eucalyptus (Dy+Eu)	Not Available	RO	RO
Yalamageri	54	0.37	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Horsegram (Mz+Hg)	Not Available	IIIs	TCB
Yalamageri	57	5.05	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Eucalyptus (Eu)	Not Available	IIIs	TCB
Yalamageri	58	4.27	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Eucalyptus (Eu)	Not Available	IIIs	TCB
Yalamageri	59	17.72	RO	RO	RO	RO	RO	RO	RO	RO	Current fallow (Cf)	Not Available	RO	RO
Yalamageri	60	8.04	BPRcB2	LMU-3	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Rainfall Paddy (RPd)	1 Borewell	IIIes	TCB
Yalamageri	61	9.91	BPRcB2	LMU-3	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Rainfall Paddy (Mz+RPd)	2 Borewell	IIIes	TCB
Yalamageri	62	5.4	BPRcB2	LMU-3	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Eucalyptus (Eu)	1 Borewell	IIIes	TCB
Yalamageri	63	6.8	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Redgram+Maize (Rg+Mz)	3 Borewell	IIIes	TCB
Yalamageri	64	7.05	BPRcC2g1	LMU-3	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Gently sloping (3-5%)	Moderate	Groundnut (Gn)	Not Available	IIIes	TCB
Yalamageri	65	8.54	BSRiB1	LMU-4	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Bengalgram (Rg+Bg)	Not Available	IIs	TCB
Yalamageri	66	8.31	HDHcA1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	1 Borewell	IIs	Graded bunding
Yalamageri	67	6.87	BPRhB2	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Pearl Millet (CFL+Pm)	Not Available	IIIes	TCB
Yalamageri	68	3.48	ABRbB2g2	LMU-7	Shallow (25-50 cm)	Loamy sand	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Crossandra (Crd)	Not Available	IIIes	TCB
Yalamageri	69	6.07	BPRhB2	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Chilli (Ch)	Not Available	IIIes	TCB
Yalamageri	70	5.38	BPRhB2	LMU-3	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	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
Yalamageri	72	2.64	RO	RO	RO	RO	RO	RO	RO	RO	Dyke (Dy)	Not Available	RO	RO
Yalamageri	73	4.65	BPRcB2	LMU-3	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Pearl Millet (Rg+Pm)	Not Available	IIIes	TCB
Yalamageri	74	6.39	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Fallow land+Mesta+ Maize+Redgram (Fl+Mst+Mz+Rg)	Not Available	IIIs	TCB
Yalamageri	75	2	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Horsegram (Hg)	Not Available	IIIs	TCB
Yalamageri	76	0.46	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIIs	TCB
Yalamageri	79	1.71	NGPbB1	LMU-3	Deep (100-150 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Eucalyptus+Pearl Millet (Eu+Pm)	Not Available	IIIs	TCB

RO-Rock outcrops, MI- Mining/ industrial

Appendix II

Abbagiri Tanda -1 (9B1c) Microwatershed

Soil Fertility Information

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Abbigeri	1	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Abbigeri	2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	3	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	4	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	5	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	6	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	7	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	8	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	9	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	10	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	11	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	12	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	13	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	14	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Abbigeri	15	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	16	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	17	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Abbigeri	18	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Abbigeri	19	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	20	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	21	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	22	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	23	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	28	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	29	Moderately alkaline	Non saline	High (> 0.75	High (> 57	Medium (145 –	Low (<10	Low (< 0.5	Deficient (<	Sufficient (>	Sufficient (>	Sufficient (>

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		(pH 7.8 – 8.4)	(<2 dsm)	%)	kg/ha)	337 kg/ha)	ppm)	ppm)	4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Abbigeri	30	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	32	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	33	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	34	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	35	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	36	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	37	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Abbigeri	38	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	39	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Abbigeri	41	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Abbigeri	85	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Hosahalli	24	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hosahalli	25	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hosahalli	26	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hosahalli	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)	Sufficient (> 0.6 ppm)
Hosahalli	28	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial
Hosahalli	29	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Hosahalli	30	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)
Hosahalli	39	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	124	Moderately acid (pH 5.5 – 6.0)	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)
Irakallagada	144	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	145	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	146	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	147	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	148	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Irakallagada	149	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	150	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	151	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	152	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	153	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	155	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	156	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	157	Strongly acid (pH 5.0 – 5.5)	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)	Deficient (< 0.6 ppm)
Irakallagada	158	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Rock outcrops	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Irakallagada	159	Moderately acid (pH 5.5 – 6.0)	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)
Irakallagada	160	Moderately acid (pH 5.5 – 6.0)	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)
Irakallagada	161	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Irakallagada	162	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	163	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	164	Strongly acid (pH 5.0 – 5.5)	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)	Deficient (< 0.6 ppm)
Irakallagada	165	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	166	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	170	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	171	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Irakallagada	172	Slightly acid (pH 6.0 – 6.5)	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)	Deficient (< 0.6 ppm)
Karadigudda	12	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Karadigudda	13	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Karadigudda	15	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Karadigudda	16	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Karadigud	17	Slightly alkaline (pH	Non saline	High (> 0.75	High (> 57	High (> 337	Low (<10	Low (< 0.5	Deficient (<	Sufficient (>	Sufficient (>	Sufficient (>

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
da		7.3 – 7.8)	(<2 dsm)	%)	kg/ha)	kg/ha)	ppm)	ppm)	4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Kenchanadoni	1	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	2	Moderately acid (pH 5.5 – 6.0)	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)	Sufficient (> 0.6 ppm)
Kenchanadoni	3	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	4	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	5	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	6	Moderately acid (pH 5.5 – 6.0)	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)	Sufficient (> 0.6 ppm)
Kenchanadoni	7	Moderately acid (pH 5.5 – 6.0)	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)	Sufficient (> 0.6 ppm)
Kenchanadoni	8	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	9	Moderately acid (pH 5.5 – 6.0)	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)	Sufficient (> 0.6 ppm)
Kenchanadoni	10	Moderately acid (pH 5.5 – 6.0)	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)	Sufficient (> 0.6 ppm)
Kenchanadoni	11	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	12	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	13	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	14	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	15	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	16	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial
Kenchanadoni	17	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial	Mining/Industrial
Kenchanadoni	18	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	19	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	20	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	21	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	22	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	23	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	24	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Kenchanadoni	25	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	26	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	27	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	28	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	29	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Kenchanadoni	30	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Kenchanadoni	31	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	32	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	33	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	34	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	35	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	36	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	37	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	38	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	39	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	40	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	41	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	42	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	43	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	44	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	45	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	46	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	47	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	48	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanad	49	Slightly acid (pH 6.0	Non saline	High (> 0.75	High (> 57	Low (<145	Low (<10	Low (< 0.5	Sufficient	Sufficient (>	Sufficient (>	Deficient (<

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
oni		– 6.5)	(<2 dsm)	%)	kg/ha)	kg/ha)	ppm)	ppm)	(>4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Kenchanadoni	50	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Kenchanadoni	51	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	52	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	53	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	54	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	55	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	56	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	57	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	58	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	59	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kenchanadoni	60	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	61	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	62	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	63	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	64	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	65	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	66	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kenchanadoni	67	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Kukanapalli	170	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Kukanapalli	172	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Vanabellary	8	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Vanabellary	94	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Vanabellary	96	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Vanabellary	97	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Vanabellary	98	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Vanabellary	99	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Vanabellary	100	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Yalamageri	33	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	34	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	35	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	36	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	37	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	38	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	39	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	40	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	41	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	42	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	43	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	44	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Yalamageri	45	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	46	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Yalamageri	47	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	48	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	49	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	50	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	51	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	52	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	53	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Yalamageri	54	Strongly acid (pH	Non saline	High (> 0.75	Medium (23 –	Low (<145	Low (<10	Low (< 0.5	Sufficient	Sufficient (>	Sufficient (>	Deficient (<

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		5.0 – 5.5)	(<2 dsm)	%)	57 kg/ha)	kg/ha)	ppm)	ppm)	(>4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Yalamageri	57	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	58	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	59	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Yalamageri	60	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	61	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	62	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	63	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	64	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	65	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	66	Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	67	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	68	Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	69	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	70	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	72	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops	Rock outcrops
Yalamageri	73	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	74	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	75	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	76	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Yalamageri	79	Strongly acid (pH 5.0 – 5.5)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Appendix III

Abbagiri Tanda -1 (9B1c) 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	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Abbigeri	1	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Abbigeri	2	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	3	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	4	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	5	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Abbigeri	6	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Abbigeri	7	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Abbigeri	8	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Abbigeri	9	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Abbigeri	10	S3r	S2t	S2r	S1	S2rt	S2r	S3r	S2r	S2t	S2r	S2r	S1	S2rg	S1	S2rt	S2r	S2r	S2t	S2t	S1	S1	S2t	S2t	S2r	S1	S1	S2t	S2t	S2t	S2r	S2r
Abbigeri	11	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	12	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	13	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	14	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Abbigeri	15	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Abbigeri	16	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Abbigeri	17	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Abbigeri	18	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Abbigeri	19	N1r	S2rw	S3r	S2rw	S3r	S2rw	N1r	S3r	S2rw	S3r	S3rw	S2rw	S3r	S2rw	N1tw	S3r	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S2rw	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S3rw	S3rw
Abbigeri	20	N1r	S2rw	S3r	S2rw	S3r	S2rw	N1r	S3r	S2rw	S3r	S3rw	S2rw	S3r	S2rw	N1tw	S3r	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S2rw	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S3rw	S3rw
Abbigeri	21	N1r	S2rw	S3r	S2rw	S3r	S2rw	N1r	S3r	S2rw	S3r	S3rw	S2rw	S3r	S2rw	N1tw	S3r	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S2rw	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S3rw	S3rw
Abbigeri	22	N1r	S2rw	S3r	S2rw	S3r	S2rw	N1r	S3r	S2rw	S3r	S3rw	S2rw	S3r	S2rw	N1tw	S3r	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S2rw	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S3rw	S3rw
Abbigeri	23	N1r	S2rw	S3r	S2rw	S3r	S2rw	N1r	S3r	S2rw	S3r	S3rw	S2rw	S3r	S2rw	N1tw	S3r	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S2rw	S3r	S2rw	S2rw	S2rw	S2rw	S2rw	S3rw	S3rw
Abbigeri	28	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2w	S2tw	S2w	S2tw	S2rw	S2rw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Abbigeri	29	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2w	S2tw	S2w	S2tw	S2rw	S2rw
Abbigeri	30	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2w	S2tw	S2w	S2tw	S2rw	S2rw
Abbigeri	32	S3rw	S2w	S2rw	S2w	S2rw	S2w	S3rw	S2rw	S2w	S2rw	S2rw	S2w	S2rw	S2w	N1tw	S3rw	S2rw	S2tw	S2w	S2w	S2w	S2tw	S2tw	S2rw	S2w	S2w	S2tw	S2w	S2tw	S2rw	S2rw
Abbigeri	33	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	34	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	35	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Abbigeri	36	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Abbigeri	37	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Abbigeri	38	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Abbigeri	39	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
Abbigeri	41	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Abbigeri	85	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Hosahalli	24	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Hosahalli	25	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Hosahalli	26	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Hosahalli	27	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Hosahalli	28	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Hosahalli	29	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Hosahalli	30	N1r	S3rg	S3rg	S3rg	S3rg	S3g	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg
Hosahalli	39	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Irakallagada	124	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	144	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Irakallagada	145	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Irakallagada	146	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Irakallagada	147	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Irakallagada	148	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Irakallagada	149	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S3g	S2g
Irakallagada	150	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1r
Irakallagada	151	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1r
Irakallagada	152	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1r
Irakallagada	153	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1r
Irakallagada	155	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	156	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	157	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	158	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	159	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	160	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	161	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
Irakallagada	162	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	163	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Irakallagada	164	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	165	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1rg
Irakallagada	166	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Irakallagada	170	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Irakallagada	171	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Irakallagada	172	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2rt	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Karadigudda	12	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S3g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Karadigudda	13	N1r	S3rg	N1r	S3rg	N1r	S3rt	N1r	N1r	S3rt	N1r	N1r	S3rg	N1r	S3rg	N1r	N1r	N1r	S3rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1r	S3rg	S3rg	S3rg	S3rg	S3rg	N1r	N1r
Karadigudda	15	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Karadigudda	16	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Karadigudda	17	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	1	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	2	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Kenchanadoni	3	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	4	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
Kenchanadoni	5	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	6	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	7	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	8	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r
Kenchanadoni	9	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Kenchanadoni	10	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Kenchanadoni	11	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
Kenchanadoni	12	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Kenchanadoni	13	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Kenchanadoni	14	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
Kenchanadoni	15	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Kenchanadoni	16	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kenchanadoni	17	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI	MI
Kenchanadoni	18	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

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Kenchanadoni	19	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
Kenchanadoni	20	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Kenchanadoni	21	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
Kenchanadoni	22	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Kenchanadoni	23	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Kenchanadoni	24	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Kenchanadoni	25	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S1	S2tg	S2t	S2gt	S2r	S2r
Kenchanadoni	26	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Kenchanadoni	27	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Kenchanadoni	28	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Kenchanadoni	29	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Kenchanadoni	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
Kenchanadoni	31	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	32	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	33	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S2t	S1	S1	S1	S1	S2r	S1	S1	S1	S2t	S1	S2r	S2r
Kenchanadoni	34	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	35	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	36	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	37	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	38	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	39	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	40	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Kenchanadoni	41	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	42	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	43	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	44	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	45	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Kenchanadoni	46	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	47	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	48	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	49	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	50	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
Kenchanadoni	51	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Kenchanadoni	52	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	53	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	54	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	55	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	56	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	57	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	58	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2tg	S2rg	S2r	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2g	S2g	S2tg	S2tg	S2rg	S2g	S1	S2tg	S2t	S2tg	S2rg	S2r
Kenchanadoni	59	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	60	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Kenchanadoni	61	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	62	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Kenchanadoni	63	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	64	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	65	S3tz	S2tz	S3tz	S1	S3tz	S1	S2tz	S1	S1	S1	S2tz	S1	S3tz	S1	N1t	S2tz	S1	S3t	S3tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S3tz	S2tz	S3tz
Kenchanadoni	66	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Kenchanadoni	67	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Kukanapalli	170	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2tg	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2t	S2g	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S2g	S1	S1
Kukanapalli	172	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2tg	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2t	S2g	S2g	S2g	S2g	S2g	S1	S1	S2g	S2t	S2g	S1	S1
Vanabellary	8	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Vanabellary	94	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S2tg	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S3g	S2tg	S3g	S3g	S2g
Vanabellary	96	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Vanabellary	97	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S3g	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2r	S3g	S3g	S3g	S3g	S3rg	S2rg	S2r	S3g	S2r	S3g	S3rg	S3rg
Vanabellary	98	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Vanabellary	99	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Vanabellary	100	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Yalamageri	33	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	34	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	35	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	36	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	37	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	38	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	39	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	40	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	41	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1rg	N1rg	N1rg	N1rg	N1rg	N1r	N1rg	N1r	N1rg	N1rg	N1r
Yalamageri	42	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Yalamageri	43	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	44	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
Yalamageri	45	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	46	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
Yalamageri	47	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	48	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	49	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Yalamageri	50	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Yalamageri	51	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Yalamageri	52	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S3g	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg
Yalamageri	53	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
Yalamageri	54	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	57	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	58	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	59	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
Yalamageri	60	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	61	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	62	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	63	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	64	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	65	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S2t	S1	S1	S1	S1	S2r	S1	S1	S1	S2t	S1	S2r	S2r
Yalamageri	66	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g
Yalamageri	67	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	68	N1r	S3rg	N1r	S3rg	N1r	S3rt	N1r	N1r	S3rt	N1r	N1r	S3rg	N1r	S3rg	N1r	N1r	N1r	S3rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1r	S3rg	S3rg	S3rg	S3rg	S3rg	N1r	N1r
Yalamageri	69	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	70	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	72	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

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Jasmine	Bhendi	Crossandra	Drumstick	Mulberry
Yalamageri	73	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	74	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	75	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	76	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g
Yalamageri	79	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S2g	S2g

RO- Rock outcrops, MI- Mining /industry

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

CONTENTS

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Chapter 1

SALIENT FINDINGS OF THE SURVEY

- *The data indicated that there were 124 (53.45%) men and 108 (46.55%) were women among the sampled households. The average family size of land less farmers was 4, marginal farmers were 4, small farmer was 5, semi medium farmer was 5 and medium farmers were 3.*
- *There were 55 (23.71%) people were in 0-15 years of age, 101 (43.53%) were in 16-35 years of age, 57 (24.57 %) were in 36-60 years of age and 19 (8.19%) were above 61 years of age.*
- *The micro watershed had 34.48 per cent illiterates, 0.43 per cent functional literates, 34.48 per cent of them had primary school education, 2.59 per cent of them had middle school education, 13.36 per cent of them had high school education, 7.33 per cent of them had PUC education, 1.66 per cent of them diploma, 0.86 per cent of them had ITI, 3.45 per cent of them had degree education and 1.29 per cent of them had other education.*
- *The results indicate that, 81.63 per cent of households practicing agriculture and 4.08 per cent of the household heads were agricultural laborers.*
- *The results indicate that agriculture was the major occupation for 53.88 per cent of the household members, 7.33 per cent were agricultural laborers, 4.31 per cent were general labours, 0.43 percent were in government service, 0.86 per cent of them were in private sector, 0.43 per cent of them were in trade and business, 21.98 per cent of them were students and 1.72 per cent were housewives.*
- *The results shows that 1.72 per cent of them participated in self help groups, 0.86 per cent of them participated in gram panchayat, 0.43 per cent of them participated in Raitha Sangha and 96.98 per cent of them have not participated in any local institutions. Landless and medium farmers were found to have no participation in any local institutions. Semi medium farmers were found to participate in one or the other local institutions.*
- *The results indicate that 87.76 per cent of the households possess Katcha house and 10.20 per cent of them possess Pucca house and 2.04 per cent them possess semi Pucca house. 100 percent of the landless, marginal and small farmers possess Katcha house.*
- *The results shows that 57.14 per cent of the households possess TV, 34.69 per cent of the households possess Mixer grinder, 28.57 per cent of the households possess bicycle, 42.86 per cent of the households possess motor cycle, and 83.67 per cent of the households possess mobile phones. The average value of television was Rs.3178, mixer grinder was Rs.1876, DVD player was Rs.2000, motor cycle was Rs.33857, bicycle was Rs.1250, Auto Rs.200000 and mobile phone was Rs.1736.*
- *About 34.69 per cent of the households possess plough, 30.61 per cent of them possess bullock cart and 26.53 per cent of the households possess sprayer, 12.24*

per cent of them possess chaff cutter and 46.94 per cent of the households possess weeder. The average value of plough was Rs.748, the average value of bullock cart was Rs. 18750 and the average value of sprayer was Rs.2117.

- *The results indicate that, 36.73 per cent of the households possess bullocks, 18.37 per cent of the households possess local cow, 6.12 per cent of the households possess buffalo and 2.04 per cent of the households possess equally for sheep and goat respectively.*
- *Average own labour men available in the micro watershed was 1.91, average own labour (women) available was 1.45, average hired labour (men) available was 11.36 and average hired labour (women) available was 11.41.*
- *The results indicate that, 89.80 per cent of the household opined that hired labour was adequate. The results indicate that, 1 person was migrated from micro watershed that belonged to semi medium farmer category. People have migrated on an average of 450 Kms and average duration was 10 months. Job/work was important reason for migration for all the migrants.*
- *Households of the Abbagiri Tanda-1 micro watershed possess 40.54 ha (68.45%) of dry land and 18.69 ha (31.55%) of irrigated land. The average value of dry land was Rs.260116.79 and average value of irrigated was Rs.316639.24. There were 14 functioning and 7 defunct bore wells in the micro watershed. Bore well was the major irrigation source for 28.57 per cent of the farmers. There were 10.76 ha of irrigated area in total in the micro watershed.*
- *The results indicate that, farmers have grown Maize (29.38 ha), Navane (0.81 ha), Bajra (7.32 ha), Paddy (1.22 ha), Sorghum (3.04 ha), and Red gram (2.49ha) in kharif season and Bengal gram (4.08 ha), groundnut (1.21 ha), Red gram (1.21 ha) and sorghum (0.81 ha) in Rabi season.*
- *Marginal farmers have grown Maize, Bajra, sorghum, Ground nut, Bengal gram and Redgram. Small farmers have grown Maize, Bajra, sorghum, Bengal gram and paddy. Semi medium farmers have grown Maize, bajra, Bengal gram and Paddy. Medium farmers have grown Maize and Bengal gram. Medium farmers have grown Maize and Bengal gram.*
- *The cropping intensity in Abbagiri Tanda-1 micro watershed was found to be 90.91 per cent. In case of Marginal farmers it was 96.40 per cent, for small farmers it was 87.36 per cent, in case of semi medium farmers it was 89.84 per cent and medium farmers had cropping intensity of 100 per cent.*
- *The results indicate that, 55.10 per cent and 53.06 per cent of the households have both bank account and savings respectively. Among marginal farmers 63.64 percent of them possess both bank account and savings. 65 per cent of small farmers possess bank account and 60 per cent of savings. Semi medium farmers possess 54.55 per cent of both bank account and savings and medium category of farmers possess 50 per cent of bank account and also savings.*

- *The results indicate that, 65.22 per cent have availed loan in Grameena bank, 43.48 per cent have availed loan in money lender and 4.35 per cent have availed loan from cooperative bank. Marginal, small, semi medium and medium have availed Rs.16142.86, Rs. 114444.44, Rs.50000, and Rs. 250000 respectively. Overall average credit amount availed by households in the micro watershed is 73608.70.*
- *The results indicate that, 18.75 per cent of the households have repaid their institutional credit partially which includes 22.22 per cent of small farmers, 33.33 per cent of semi medium farmers.*
- *The data also showed that 56.25 per cent of households have unpaid their loans and only 25 per cent of households have fully repaid their loans. The results also indicated that 20 per cent of the households have repaid their private credit partially and 80 percent of the households have unpaid their loan.*
- *The results indicated that, the total cost of cultivation for bajra was Rs. 23153.0. The gross income realized by the farmers was Rs. 22838.19. The net income from bajra cultivation was Rs. -314.89, thus the benefit cost ratio was found to be 1:0.99.*
- *The results indicate that, the total cost of cultivation for maize was Rs. 20389.96. The gross income realized by the farmers was Rs. 47012.31. The net income from maize cultivation was Rs. 26622.35, and the income generated from red gram was Rs. 10618.55, thus the benefit cost ratio was found to be 1:2.31.*
- *Total cost of cultivation for navane was Rs. 12067.31. The gross income realized by the farmers was Rs. 25935. The net income from navane cultivation was Rs. 13867.69. Thus the benefit cost ratio was found to be 1:2.15.*
- *Total cost of cultivation for paddy was Rs. 35259.34. The gross income realized by the farmers was Rs. 41003.63. The net income from paddy cultivation was Rs. 5744.09. Thus the benefit cost ratio was found to be 1:1.16.*
- *The total cost of cultivation for sorghum was Rs. 14260.22. The gross income realized by the farmers was Rs. 27694.88. The net income from sorghum cultivation was Rs. 13715.62. Thus the benefit cost ratio was found to be 1:1.96.*
- *The total cost of cultivation for bengalgram was Rs. 41141.81. The gross income realized by the farmers was Rs. 80509.57. The net income from bengalgram cultivation was Rs. 39367.76. Thus the benefit cost ratio was found to be 1:1.96.*
- *Total cost of cultivation for groundnut was Rs. 48921.12. The gross income realized by the farmers was Rs. 80878.78. The net income from groundnut cultivation was Rs. 31957.66. Thus the benefit cost ratio was found to be 1:1.65.*
- *The total cost of cultivation for redgram was Rs. 13963.32. The gross income realized by the farmers was Rs. 25468.44. The net income from redgram cultivation was Rs. 11505.12. Thus the benefit cost ratio was found to be 1:1.82.*

- *The results indicate that, 59.18 per cent of the households opined that dry fodder was adequate, 4.08 per cent of the households opined that dry fodder was inadequate also the data revealed that 24.49 per cent of the farmers opined that green fodder is adequate.*
- *The table indicated that the average income from service/salary was Rs. 3571.43, business Rs.3632.65, wage Rs.27367.35, agriculture Rs. 52992.86, farm income Rs.1632.65, Non farm income Rs.3061.22, dairy farm Rs.2215.31 and goat farming was Rs.3061.22.*
- *The results indicated that, 44.90 per cent of the households are interested in growing horticultural crops which include 45.45 per cent marginal farmers, 55 per cent small farmers, 45.45 per cent semi medium farmers and 50 per cent medium farmers.*
- *The results indicated that for 12 per cent of the households were dependent on government subsidy for land development. Similarly for the dependency was for irrigation facility 48 percent and only 2 percent for improved crop production. The results indicated that, only Navane was sold to the extent of 100 per cent.*
- *The data regarding marketing channels used for sale of agricultural produce was showing that 57.14 percent of the households have sold their produce to local/village merchants, 42.86 percent of the households sold their produce in regulated markets and only 4.08 per cent of the households sold their produce to agents/traders.*
- *The data about mode of transport of agricultural produce indicated that 75.51 per cent of the households have used cart as a mode of transport and 28.57 per cent have used tractor. The results indicated that, 57.14 per cent of the households have shown interest in soil testing i.e. 63.64 per cent of marginal farmers, 70 per cent of small farmers, 54.55 per cent of semi medium and 50 per cent of medium farmers have shown interest in soil testing.*
- *The data pertaining to soil and water conservation practices and structures adopted in micro watershed was indicating that, 10.20 per cent of the households have adopted field bunding which includes 18.18 per cent of marginal, 10 per cent of small farmers, and 50 per cent of medium farmers. Summer ploughing was adopted by 57.14 per cent of the households i.e.63.64 per cent of the marginal farmers, 70 per cent of the small farmers, 54.55 per cent of semi medium and 50 per cent medium farmers.*
- *Form pond was adopted by the farmers was 2.04 per cent. The data regarding agencies involved in soil conservation structures in was showing that 2.04 per cent of soil conservation structure is constructed by farmers on their own, 8.16 per cent of the soil conservation structures are constructed by the government and another 2.04 per cent is constructed by farmer's organization.*

- *The results indicated that, 83.67 percent used fire wood as a source of fuel, and 14.29 percent of the households used LPG. Also results indicated that, piped supply was the major source for drinking water for 53.06 per cent which includes 100 per cent of landless, 45.45 per cent of marginal, 40 per cent of small farmers, 63.64 per cent of semi medium and 50 per cent of medium farmers and 10.20 per cent of the households were using bore well as a source of drinking water.*
- *The results indicated that, electricity was the major source of light which was found to be 93.88 per cent. The results indicated that, 34.69 per cent of the households possess sanitary toilet i.e. 60 per cent of landless, 45.45 per cent of marginal, 3 per cent of small, 9.09 per cent of semi medium and 50 per cent of medium had sanitary toilet facility.*
- *The results indicated that, 91.84 per cent of the sampled households possessed BPL card and 2.04 per cent of the sampled households have not possessed BPL card.*
- *The results indicated that, 36.73 per cent of the households participated in NREGA programme which included 60 per cent of the landless, 45.45 percent of the marginal, 4 per cent of the small, 36.36 per cent of the semi medium and 100 percent of the medium farmers.*
- *The result of data regarding adequacy of food items was showing that that, 97.97 per cent of cereals, 79.59 per cent of pulses, 63.27 per cent of oilseeds and 67.35 percent of both milk and egg were adequate for the households. Vegetables and fruits were adequate only for 10.20 per cent and meat was 4.08 per cent for the households respectively.*
- *Also, the results indicated that, both vegetables and fruits were inadequate for 85.71 per cent of the households. Milk and egg were inadequate for 30.61 per cent respectively; meat was inadequate for 89.90 per cent. Cereals, pulses and oilseeds were inadequate for 2.04 per cent, 18.37 per cent and 8.16 per cent respectively.*
- *The results of the farming constraints experienced by households in studied micro watershed was indicating that Lower fertility status of the soil was the constraint experienced by 32.65 per cent of the households, wild animal menace on farm field (59.18%), frequent incidence of pest and diseases (55.10%), inadequacy of irrigation water (55.10%), high cost of Fertilizers and plant protection chemicals (65.31%), high rate of interest on credit (63.27%), low price for the agricultural commodities (65.31%), lack of marketing facilities in the area (67.35%), inadequate extension services (63.27%), lack of transport for safe transport of the agricultural produce to the market (79.59%), less rainfall (30.61%) and Source of Agri-technology information(Newspaper/TV/Mobile) (12.24).*

Chapter 2

INTRODUCTION

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

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

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

Scope and importance of survey

Survey helps in identification of different socio-economic and resource use-patterns of farmers at the Micro watershed. Household survey provides demographic features, labour force, and levels of education; land ownership and asset position (including livestock and other household assets) of surveyed households; and cropping patterns, input intensities, and average crop yields from farmers' fields. It also discusses crop utilization and the degree of commercialization of production in the areas; farmers' access to and utilization of credit from formal and informal sources; and the level of adoption and use of soil, water,and pest management technologies.

Chapter 3

METHODOLOGY

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

Description of the study area

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

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

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

Description of the micro watershed

Abbagiri Tanda-1 micro-watershed (Tavaregere sub-watershed, Koppal Taluk and District) is located at North latitude 15^0 26' 39.138" and 15^0 28' 23.630" and East longitude 76^0 14' 11.805" and 76^0 16' 43.423" covering an area of 877.55 ha and spread across Kechanadoni, Irakalaguda, Abbageri, Yalamageri and Hosahalli 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 49 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 Abbagiri Tanda-1 micro watershed is presented in Table 1 and it indicated that 35 farmers were sampled in Abbagiri Tanda-1 micro watershed among them 11 (22.45%) were marginal farmers, 20 (40.82 %) were small farmers, 11 (22.45 %) were semi medium farmers and 2 (4.08 %) was medium farmer. Apart from these 5 landless farmers were also interviewed for the survey.

Table 1: Households sampled for socio economic survey in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	5	10.20	11	22.45	20	40.82	11	22.45	2	4.08	49	100.00

Population characteristics: The population characteristics of households sampled for socio-economic survey in Abbagiri Tanda-1 micro watershed is presented in Table 2. The data indicated that there were 124 (53.45%) men and 108 (46.55%) were women among the sampled households. The average family size of marginal farmers was 4, small farmer was 5, semi medium farmer was 5, medium farmers were 3 and for landless farmers it was 4.

Table 2: Population characteristics of Abbagiri Tanda-1 micro-watershed

S.N.	Particulars	LL (20)		MF (46)		SF (101)		SMF (59)		MDF (6)		All (232)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Male	8	40	25	54.35	54	53.47	35	59.32	2	33.33	124	53.45
2	Female	12	60	21	45.65	47	46.53	24	40.68	4	66.67	108	46.55
3	Death	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total		20	100	46	100	101	100	59	100	6	100	100	232
Average family size		4		4		5		5		3		5	

Age wise classification of population: The age wise classification of household members in Abbagiri Tanda-1 micro watershed is presented in Table 3. The data indicated that 55 (23.71%) people were in 0-15 years of age, 101 (43.55%) were in 16-35 years of age, 57 (24.57 %) were in 36-60 years of age and 19 (8.19%) were above 61 years of age.

Table 3: Age wise classification of household members in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (20)		MF (46)		SF (101)		SMF (59)		MDF (6)		All (232)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years	1	5.00	12	26.09	27	26.73	14	23.73	1	16.67	55	23.71
2	16-35 years	12	60.00	20	43.48	40	39.60	26	44.07	3	50.00	101	43.53
3	36-60 years	6	30.00	12	26.09	26	25.74	12	20.34	1	16.67	57	24.57
4	> 61 years	1	5.00	2	4.35	8	7.92	7	11.86	1	16.67	19	8.19
Total		20	100	46	100	101	100	59	100	6	100	232	100

Education level of household members: Education level of household members in Abbagiri Tanda-1 micro watershed is presented in Table 4. The results indicated that the Abbagiri Tanda-1 had 34.48 per cent illiterates, 0.43 per cent functional literates, 34.48 per cent of them had primary school education, 2.59 per cent of them had middle school education, 13.36 per cent of them had high school education, 7.33 per cent of them had PUC education, 0.86 per cent of them had ITI, 1.72 per cent them had Diploma education, 3.45 per cent of them had degree education and 1.29 per cent of them had other education.

Table 4: Education level of household members in Abbagiri Tanda-1 micro watershed

S. N.	Particulars	LL (20)		MF (46)		SF (101)		SMF (59)		MDF (6)		All (232)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	5	25.00	13	28.26	36	35.64	23	38.98	3	50.00	80	34.48
2	Functional Literate	0	0.00	0	0.00	0	0.00	1	1.69	0	0.00	1	0.43
3	Primary School	9	45.00	18	39.13	28	27.72	22	37.29	3	50.00	80	34.48
4	Middle School	0	0.00	6	13.04	0	0.00	0	0.00	0	0.00	6	2.59
5	High School	1	5.00	4	8.70	22	21.78	4	6.78	0	0.00	31	13.36
6	PUC	2	10.00	3	6.52	7	6.93	5	8.47	0	0.00	17	7.33
7	Diploma	0	0.00	0	0.00	4	3.96	0	0.00	0	0.00	4	1.72
8	ITI	0	0.00	1	2.17	1	0.99	0	0.00	0	0.00	2	0.86
9	Degree	3	15.00	0	0.00	2	1.98	3	5.08	0	0.00	8	3.45
10	Others	0	0.00	1	2.17	1	0.99	1	1.69	0	0.00	3	1.29
Total		20	100	46	100	101	100	59	100	6	100	232	100

Occupation of household heads: The data regarding the occupation of the household heads in Abbagiri Tanda-1 micro watershed is presented in Table 5. The results indicate that, 81.63 per cent of households practicing agriculture and 4.08 per cent of the household heads were agricultural labourers.

Table 5: Occupation of household heads in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF(2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	10	90.91	18	90	11	100	1	50	40	81.63
2	Agricultural Labour	1	20	1	9.09	0	0	0	0	0	0	2	4.08
3	General Labour	3	60	0	0.00	0	0	0	0	0	0	3	6.12
4	Student	0	0	0	0.00	0	0	1	9.09	0	0	1	2.04
5	Others	1	20	0	0.00	2	10	0	0	1	50	4	8.16
Total		5	100	11	100	20	100	12	100	2	100	50	100

Occupation of the household members: The data regarding the occupation of the household members in Abbagiri Tanda-1 micro watershed is presented in Table 6. The results indicate that agriculture was the major occupation for 53.88 per cent of the household members, 7.33 per cent were agricultural labourers, 4.31 per cent were general labours, 0.43 percent were in government service, 0.86 per cent of them were in private sector, 0.43 per cent of them were trade and business, 21.98 per cent of them were students and 1.72 per cent were housewives. In case of landless households 30 per cent

were agricultural labourers, 3 per cent were general labour, 10 per cent were in private service and 5 per cent were students. In case of marginal farmers 63.04 per cent were agriculturist, 10.87 percent were agricultural labour, 2.17 per cent were General labour, 10.87 per cent were students and 13.04 per cent of them were children. In case of small farmers, 52.48 per cent of the household members were practicing agriculture and 31.68 per cent of them were students. In case of semi medium farmers 64.41 per cent of the household members were practicing agriculture and 22.03 per cent of them were students. In case of medium farmers, 83.33 per cent of the household members were performing agriculture.

Table 6: Occupation of family members in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (20)		MF (46)		SF (101)		SMF (59)		MDF (6)		All (232)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	29	63.04	53	52.48	38	64.41	5	83.33	125	53.88
2	Agricultural Labour	6	30	5	10.87	4	3.96	2	3.39	0	0	17	7.33
3	General Labour	7	3	1	2.17	2	1.98	0	0.00	0	0	10	4.31
4	Government Service	0	0	0	0.00	0	0.00	1	1.69	0	0	1	0.43
5	Private Service	2	10	0	0.00	0	0.00	0	0.00	0	0	2	0.86
6	Trade & Business	0	0	0	0.00	1	0.99	0	0.00	0	0	1	0.43
7	Student	1	5	5	10.87	32	31.68	13	22.03	0	0	51	21.98
8	Others	2	10	0	0.00	2	1.98	0	0.00	1	16.67	5	2.16
9	Housewife	1	5	0	0.00	1	0.99	2	3.39	0	0.00	4	1.72
10	Children	1	5	6	13.04	6	5.94	3	5.08	0	0.00	16	6.90
Total		20	100	46	100	101	100	59	100	6	100	232	100

Institutional participation of the household members: The data regarding the institutional participation of the household members in Abbagiri Tanda-1 micro watershed is presented in Table 7. The results showed that 1.72 per cent of them participated in self help groups, 0.86 per cent of them participated in gram panchayat, 0.43 percent of them participated in Raitha Sangha and 96.98 per cent of them have not participated in any local institutions. Landless, marginal and medium farmers were found to have no participation in any local institutions. Small farmers and semi medium farmers were found to participate in one or the other local institutions.

Table 7: Institutional Participation of household members in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	LL (20)		MF (46)		SF (101)		SMF (59)		MDF (6)		All (232)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Gram Panchayat	0	0	0	0	1	0.99	1	1.69	0	0	2	0.86
2	Self Help Group	0	0	0	0	4	3.96	0	0.00	0	0	4	1.72
3	Raitha Sangha	0	0	0	0	1	0.99	0	0.00	0	0	1	0.43
4	No Participation	20	100	46	100	95	94.06	58	98.31	6	100	225	96.98
Total		20	100	46	100	101	100	59	100	6	100	232	100

Type of house owned: The data regarding the type of house owned by the households in Abbagiri Tanda-1 micro watershed is presented in Table 8. The results indicate that 87.76

per cent of the households possess Katcha house, 10.20 per cent of them possess Pucca house and 2.04 per cent of them possess Semi Pacca house. 100 percent of the landless and medium farmers possess Katcha house.

Table 8: Type of house owned by households in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Katcha	5	100	9	81.82	18	90	8	72.73	3	100	43	87.76
2	Pucca/RCC	0	0	1	9.09	2	10	2	18.18	0	0	5	10.20
3	Semi Pacca	0	0	1	9.09	0	0	0	0	0	0	1	2.04
Total		5	100	11	100	20	100	10	100	3	100	49	100

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Abbagiri Tanda-1 micro watershed is presented in Table 9. The results shows that 57.14 per cent of the households possess TV, 34.69 per cent of the households possess Mixer grinder, 28.57 per cent of the households possess bicycle, 42.86 per cent of the households possess motor cycle, 83.67 per cent of the households possess mobile phones and 4.08 per cent of the households possess Computer/laptop.

Table 9: Durable Assets owned by households in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	0	0	6	54.55	13	65	8	72.73	1	50	28	57.14
2	DVD/VCD Player	0	0	0	0.00	1	5	0	0.00	0	0	1	2.04
3	Mixer/Grinder	0	0	3	27.27	7	35	6	54.55	1	50	17	34.69
4	Refrigerator	0	0	0	0.00	1	5	0	0.00	0	0	1	2.04
5	Bicycle	0	0	0	0.00	11	55	3	27.27	0	0	14	28.57
6	Motor Cycle	0	0	2	18.18	10	50	9	81.82	0	0	21	42.86
7	Auto	0	0	0	0.00	0	0	1	9.09	0	0	1	2.04
8	Mobile Phone	2	40	9	81.82	18	90	10	90.91	2	100	41	83.67
9	Computer/Laptop	0	0	2	18.18	0	0	0	0	0	0	2	4.08
10	Blank	3	60	0	0.00	1	5	0	0	0	0	4	8.16

Table 10: Average value of durable assets owned by households in Abbagiri Tanda-1 micro watershed

Average Value (Rs.)

S.N.	Particulars	LL (5)	MF (11)	SF (20)	SMF (11)	MDF (2)	All (49)
1	Television	0	3500	2846	3625	2000	3178
2	DVD/VCD Player	0	0	2000	0	0	2000
3	Mixer/Grinder	0	1333	2671	1200	2000	1876
4	Refrigerator	0	0	13000	0	0	13000
5	Bicycle	0	0	1136	1666	0	1250
6	Motor Cycle	0	40000	33500	32888	0	33857
7	Auto	0	0	0	200000	0	200000
8	Mobile Phone	1150	1142	2218	1422	2000	1736
9	Computer/Laptop	0	2000	0	0	0	2000

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Abbagiri Tanda-1 micro watershed is presented in Table 10.

The results shows that the average value of television was Rs.3178, mixer grinder was Rs.1876, DVD player was Rs.2000, refrigerator Rs.13000, bicycle Rs.1250, motor cycle was Rs.33857, Auto Rs.200000, Computer/ Laptop Rs. 2000 and mobile phone was Rs.1736.

Farm Implements owned: The data regarding the farm implements owned by the households in Abbagiri Tanda-1 micro watershed is presented in Table 11. About 30.61 per cent of the households possess plough, 34.69 per cent of them possess bullock cart, 26.53 per cent of the households possess sprayer, 12.24 per cent of them possess chaff cutter, 6.12 per cent of them were possess harvester and 46.94 per cent of the households possess weeder.

Table 11: Farm Implements owned by households in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	0	0	2	18.18	11	55	2	18.18	0	0	15	30.61
2	Plough	0	0	2	18.18	12	60	3	27.27	0	0	17	34.69
3	Seed/Fertilizer Drill	0	0	0	0	0	0	1	9.09	0	0	1	2.04
4	Tractor	0	0	0	0	1	5	1	9.09	0	0	2	4.08
5	Sprayer	0	0	2	18.18	7	35	4	36.36	0	0	13	26.53
6	Sprinkler	0	0	0	0	1	5	0	0	0	0	1	2.04
7	Weeder	0	0	4	36.36	10	50	7	63.64	2	100	23	46.94
8	Harvester	0	0	0	0	2	10	1	9.09	0	0	3	6.12
9	Chaff Cutter	0	0	1	9.09	4	20	1	9.09	0	0	6	12.24
10	JCB/Hitachi	0	0	0	0	1	5	0	0	0	0	1	2.04
11	Blank	5	100	4	36.36	6	30	2	18.18	0	0	17	34.69
12	Earth remover/Duster	0	0	0	0	1	5	1	9.09	0	0	2	4.08

Table 12: Average value of farm implements owned by households in Abbagiri Tanda-1 micro watershed (Avg value in Rs)

S.N	Particulars	LL (5)	MF (11)	SF (20)	SMF(11)	MDF(2)	All (49)
1	Bullock Cart	0	13333	20000	20000	0	18750
2	Plough	0	1000	756	600	0	748
3	Seed/Fertilizer Drill	0	0	0	1000	0	1000
4	Tractor	0	0	200000	300000	0	250000
5	Sprayer	0	1666	2250	2166	0	2117
6	Sprinkler	0	0	2500	0	0	2500
7	Weeder	0	28	25	36	33	29
8	Harvester	0	0	62500	45000	0	56666
9	Chaff Cutter	0	3000	3000	3000	0	3000
10	JCB/Hitachi	0	0	25000	0	0	25000
11	Earth remover/Duster	0	0	48000	35000	0	41500

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Abbagiri Tanda-1 micro watershed is presented in Table 12. The results showed that the average value of plough was Rs.748, the average

value of bullock cart was Rs. 18750, the average value of seed/Fertilizer drill Rs. 1000, the average value of tractor was Rs. 250000, the average value of sprinkler was Rs.2500, the average value of weeder was Rs. 29, the average value of harvester was Rs.56666, the average value of chaff cutter was Rs.3000, the average value of JCB/Hitachi was Rs.25000 and the average value of sprayer was Rs.2117.

Livestock possession by the households: The data regarding the Livestock possession by the households in Abbagiri Tanda-1 micro watershed is presented in Table 13. The results indicate that, 36.73 per cent of the households possess bullocks, 18.37 per cent of the households possess local cow, 6.12 per cent of the households possess buffalo, 2.04 per cent of the households possess sheep and 2.04 per cent of the households possess goat.

In case of marginal farmers, 36.36 per cent of the households possess bullock, 9.09 per cent of the households possess local cow, buffalo and sheep respectively. In case of small farmers, 45 per cent of households possess bullock, 30 per cent possess local cow and 5 per cent of them possess both buffalo and goat. In case of semi medium farmers, 45.45 per cent of the households possess bullock, 9.09 per cent possess both local cow and buffalo and 50 per cent of the medium farmers possess local cow.

Table 13: Livestock possession by households in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF(11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock	0	0	4	36.36	9	45	5	45.45	0	0	18	36.73
2	Local cow	0	0	1	9.09	6	30	1	9.09	1	50	9	18.37
3	Buffalo	0	0	1	9.09	1	5	1	9.09	0	0	3	6.12
4	Sheep	0	0	1	9.09	0	0	0	0.00	0	0	1	2.04
5	Goat	0	0	0	0.00	1	5	0	0.00	0	0	1	2.04
6	blank	4	80	1	9.09	5	25	5	45.45	0	0	15	30.61

Average Labour availability: The data regarding the average labour availability in Abbagiri Tanda-1 micro watershed is presented in Table 14. The results indicate that, average own labour men available in the micro watershed was 1.91, average own labour (women) available was 1.45, average hired labour (men) available was 11.36 and average hired labour (women) available was 11.41.

Table 14: Average Labour availability in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)	SF (20)	SMF (11)	MDF (2)	All (49)
		N	N	N	N	N
1	Own labour Male	1.73	1.85	2.18	2.00	1.91
2	Own Labour Female	1.55	1.35	1.55	1.50	1.45
3	Hired labour Male	7.18	11.40	13.00	25.00	11.36
4	Hired labour Female	8.55	9.90	14.09	27.50	11.41

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Abbagiri Tanda-1 micro watershed is presented in Table 15. The results indicate that, 89.80 per cent of the household opined that hired labour was adequate About 100 per cent

of the marginal farmers, small farmers, semi medium farmers and medium farmers have opined that the hired labour was adequate respectively.

Table 15: Adequacy of Hired Labour in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate	11	100	20	100	11	100	2	100	44	89.80
2	Inadequate	0	0	0	0	0	0	0	0	0	0

Migration among the households: The data regarding the migration among the households in Abbagiri Tanda-1 micro watershed is presented in Table 16. The results indicate that, 1 person was migrated from micro watershed that belonged to semi medium farmer category. Total migration in the micro watershed was only 0.43 per cent.

Table 16: Migration among the households in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (20)		MF (46)		SF (101)		SMF(59)		MDF (6)		All (232)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Migration	0	0.00	0	0.00	0	0.00	1	1.69	0	0.00	1	0.43

Average distance and duration of migration: The data regarding the average distance and duration of migration in Abbagiri Tanda-1 micro watershed is presented in Table 17. The results indicate that, people have migrated on an average of 450 Kms and average duration was 10 months. Semi medium farmers have migrated 450 kms and on an average for 10 months.

Table 17: Average distance and duration of migration in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	SMF(1)	All (1)
		N	N
1	Avg. Distance (kms)	450.00	450.00
2	Avg. Duration (months)	10.00	10.00

Purpose of migration: The data regarding the average distance and duration of migration in Abbagiri Tanda-1 micro watershed is presented in Table 18. The results indicate that, job/work was the only reason for migration for all the migrants.

Table 18: Purpose of migration by household members in Abbagiri Tanda-1 micro watershed

S.N	Particulars	SMF(1)		All (1)	
		N	%	N	%
1	Job/wage/work	1	100	1	100
Total		1	100	1	100

Distribution of land (ha): The data regarding the distribution of land (ha) in Abbagiri Tanda-1 micro watershed is presented in Table 19. The results indicate that, households of the Abbagiri Tanda-1 micro watershed possess 40.54 ha (68.45%) of dry land and 18.69 ha (31.55%) of irrigated land. Marginal farmers possess 8.13 ha (100 %) of dry land. Small farmers possess 23.06 ha (87.18%) of dry land and 3.39 ha (12.82 %) of

irrigated land. Semi medium farmers possess 9.35 ha (48.85%) of dry land and 9.79 ha (51.15 %) of irrigated land. Medium farmers possess 5.50 ha (100%) of irrigated land.

Table 19: Distribution of land (Ha) in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	8.13	100	23.06	87.18	9.35	48.85	0	0	40.54	68.45
2	Irrigated	0	0	3.39	12.82	9.79	51.15	5.50	100	18.69	31.55
Total		8.13	100	26.46	100	19.15	100	5.50	100	59.23	100

Average land value (Rs. /ha): The data regarding the average land value (Rs./ha) in Abbagiri Tanda-1 micro watershed is presented in Table 20. The results indicate that, the average value of dry land was Rs. 260116.79 and average value of irrigated was Rs. 316639.24. In case of marginal famers, the average land value was Rs. 405926.29 for dry land. In case of small famers, the average land value was Rs. 242709.25 for dry land Rs. 448019.09 for irrigated land. In case of semi medium famers, the average land value was Rs. 176352.23 for dry land and Rs. 306198.35 for irrigated land. In case of medium famers, the average land value was Rs. 254264.70 for irrigated land.

Table 20: Average land value (Rs. /ha) in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	MF (11)	SF (20)	SMF (11)	MDF (2)	All (49)
		N	N	N	N	N
1	Dry	405926.29	242709.25	176352.23	0	260116.79
2	Irrigated	0	448019.09	306198.35	254264.70	316639.24

Status of bore wells: The data regarding the status of bore wells in Abbagiri Tanda-1 micro watershed is presented in Table 21. The results indicate that, there were 14 functioning and 7 defunctioning bore wells in the micro watershed.

Table 21: Status of bore wells in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)	SF (20)	SMF (11)	MDF (2)	All (49)
		N	N	N	N	N
1	De-functioning	0	2	3	2	7
2	Functioning	0	5	6	3	14

Source of irrigation: The data regarding the source of irrigation in Abbagiri Tanda-1 micro watershed is presented in Table 22. The results indicate that, bore well was the major irrigation source for 28.57 per cent of the farmers.

Table 22: Source of irrigation in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%
1	Bore Well	5	25.00	6	54.55	3	100.00	14	28.57

Irrigated Area (ha): The data regarding the irrigated area (ha) in Abbagiri Tanda-1 micro watershed is presented in Table 23. The results indicate that, in case of small farmers there were 3.39 ha of irrigated land, semi medium farmers were having 5.63 ha of irrigated land and medium farmers were having 1.74 ha of irrigated land.

Table 23: Irrigated Area (ha) in Abbagiri Tanda-1 micro watershed

S.N	Particulars	SF (20)	SMF (11)	MDF (2)	All (49)
		Area (ha)	Area (ha)	Area (ha)	Area (ha)
1	Kharif	2.58	5.63	1.74	9.95
2	Rabi	0.81	0.00	0.00	0.81
Total		3.39	5.63	1.74	10.76

Cropping pattern: The data regarding the cropping pattern in Abbagiri Tanda-1 micro watershed is presented in Table 24. The results indicate that, farmers have grown Maize (29.38 ha), Navane (0.81 ha), Bajra (7.32 ha), Paddy (1.22 ha), Sorghum (3.04 ha), and Red gram (2.49ha) in kharif season and Bengal gram (4.08 ha), groundnut (1.21 ha), Red gram (1.21 ha) and sorghum (0.81 ha) in Rabi season. Marginal farmers have grown Maize, Bajra, Sorghum, ground nut, Bengal gram and Redgram. Small farmers have grown Maize, Bajra, sorghum, Bengal gram and paddy. Semi medium farmers have grown Maize, bajra, Bengal gram and Paddy. Medium farmers have grown Maize and Bengal gram.

Table 24: Cropping pattern in Abbagiri Tanda-1 micro watershed Area (ha)

S.N	Particulars	MF (11)	SF(20)	SMF(11)	MDF(2)	All (49)
1	Kharif - Bajra	3.16	2.13	2.02	0.00	7.32
2	Kharif - Maize	2.48	14.17	8.97	3.77	29.38
3	Kharif - Navane (Fox Millet)	0.81	0.00	0.00	0.00	0.81
4	Kharif - Paddy	0.00	0.00	1.22	0.00	1.22
5	Kharif - Red gram (togari)	0.87	1.62	0.00	0.00	2.49
6	Kharif - Sorghum	0.00	1.42	1.62	0.00	3.04
7	Rabi - Bengal gram	0.00	0.81	1.24	2.02	4.08
8	Rabi - Ground nut	0.00	1.21	0.00	0.00	1.21
9	Rabi - Red gram (togari)	0.00	1.21	0.00	0.00	1.21
10	Rabi - Sorghum	0.81	0.00	0.00	0.00	0.81
Total		8.13	22.58	15.08	5.79	51.57

Cropping intensity: The data regarding the cropping intensity in Abbagiri Tanda-1 micro watershed is presented in Table 25. The results indicate that, the cropping intensity in Abbagiri Tanda-1 micro watershed was found to be 90.91 per cent. In case of Marginal farmers it was 96.40 per cent, for small farmers it was 87.76 per cent, in case of semi medium farmers it was 89.84 per cent, and medium farmers had cropping intensity of 100 per cent.

Table 25: Cropping intensity (%) in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)	SF (20)	SMF (11)	MDF (2)	All (49)
1	Cropping Intensity	96.40	87.76	89.84	100.00	90.91

Possession of Bank account: The data regarding the possession of Bank account and savings in Abbagiri Tanda-1 micro watershed is presented in Table 26. The results indicate that, 55.10 per cent of the households have bank account and 53.06 per cent of savings. Among marginal farmers 63.64 percent of them possess both bank account and

savings. 65 per cent of small farmers possess bank account and 60 per cent of savings. Semi medium farmers possess 54.55 per cent of both bank account and savings and medium category of farmers possess 50 per cent of bank account and also savings.

Table 26: Possession of Bank account and savings in Abbagiri Tanda-1 micro watershed

		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
S.N	**Particulars**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	Account	7	63.64	13	65.00	6	54.55	1	50.00	27	55.10
2	Savings	7	63.64	12	60.00	6	54.55	1	50.00	26	53.06

Borrowing status: The data regarding the possession of borrowing status in Abbagiri Tanda-1 micro watershed is presented in Table 27. The results indicate that, 63.64 per cent of marginal, 45 per cent of small, 54.55 per cent semi medium and 50 per cent of medium farmers have borrowed credit from different sources.

Table 27: Borrowing status in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	Credit Availed	7	63.64	9	45.00	6	54.55	1	50.00	23	46.94

Source of credit: The data regarding the source of credit availed by households in Abbagiri Tanda-1 micro watershed is presented in Table 28. The results indicate that, 65.22 per cent have availed loan in Grameena bank, 43.48 per cent have availed loan from money lender and 4.35 per cent have availed loan from Cooperative bank.

Table 28: Source of credit availed by households in Abbagiri Tanda-1 micro watershed

S. N	Particulars	MF (7)		SF (9)		SMF (6)		MDF (1)		All (23)	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	Cooperative Bank	1	14.29	0	0.00	0	0.00	0	0.00	1	4.35
2	Grameena Bank	2	28.57	9	100.00	3	50.00	1	100.00	15	65.22
3	Money Lender	4	57.14	5	55.56	1	16.67	0	0.00	10	43.48

Average credit amount: The data regarding the average credit amount availed by households in Abbagiri Tanda-1 micro watershed is presented in Table 29. The results indicate that,, marginal, small, semi medium and medium have availed Rs.16142.86, Rs. 114,444.44, Rs.50,000 and Rs. 250000 respectively. Overall average credit amount availed by households in the micro watershed is 73608.70.

Table 29: Average Credit amount availed by households in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (7)	SF (9)	SMF (6)	MDF (1)	All (23)
		N	**N**	**N**	**N**	**N**
1	Average Credit	16,142.86	114,444.44	50,000.00	250,000.00	73,608.70

Purpose of credit borrowed (institutional Source): The data regarding the purpose of credit borrowed from institutional sources by households in Abbagiri Tanda-1 micro

watershed is presented in Table 30. The results indicate that, 100 per cent of the households have borrowed loan for agriculture production.

Table 30: Purpose of credit borrowed (institutional Source) by households in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (3)		SF (9)		SMF (3)		MDF (1)		All (16)	
		N	%	N	%	N	%	N	%	N	%
1	Agriculture production	3	100	9	100	3	100	1	100	16	100

Purpose of credit borrowed (Private Credit): The data regarding the purpose of credit borrowed from private sources by households in Abbagiri Tanda-1 micro watershed is presented in Table 31. The results indicate that, agriculture production and other reasons were the main purpose for which marginal, small farmers and semi medium farmers borrowed loan. About 70 percent of loan was taken for agriculture production and 30 per cent of the farmers taken loan for other purpose.

Table 31: Purpose of credit borrowed (Private Credit) by households in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	MF (4)		SF (5)		SMF (1)		All (10)	
		N	%	N	%	N	%	N	%
1	Agriculture production	3	75	3	60	1	100	7	70
2	Other	1	25	2	40	0	0	3	30

Repayment status of households (Institutional): The data regarding the repayment status of credit borrowed from institutional sources by households in Abbagiri Tanda-1 micro watershed is presented in Table 32. Results indicated that 18.75 per cent of the households have repaid their Institutional credit partially and 56.25 percent of the households have unpaid their loan and 25 per cent of the households have fully paid their loan.

Table 32: Repayment status of households (Institutional) **in Abbagiri Tanda-1 micro watershed**

S.N	Particulars	SF (9)		SMF (3)		MDF (1)		All (16)	
		N	%	N	%	N	%	N	%
1	Partially paid	2	22.22	1	33.33	0	0.00	3	18.75
2	Un paid	6	66.67	2	66.67	1	100.00	9	56.25
3	Fully paid	1	11.11	0	0.00	0	0.00	4	25.00

Repayment status of households (Private): Results (Table 33) indicated that 20 per cent of the households have repaid their private credit partially and 80 percent of the households have unpaid their loan.

Table 33: Repayment status of households (Private) in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (4)		SF (5)		SMF (1)		All (10)	
		N	%	N	%	N	%	N	%
1	Partially paid	1	25	1	20	0	0	2	20
2	Un paid	3	75	4	80	1	100	8	80

Cost of Cultivation of Bajra : The data regarding the cost of cultivation of groundnut in Abbagiri Tanda-1 micro watershed is presented in Table 34. The results indicate that, the total cost of cultivation for bajra was Rs. 23153.0. The gross income realized by the farmers was Rs. 22838.19. The net income from bajra cultivation was Rs. -314.89, thus the benefit cost ratio was found to be 1:0.99.

Table 34: Cost of Cultivation of Bajra in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	18.27	2958.49	12.78
2	Bullock		Pairs/day	1.08	543.48	2.35
3	Tractor		Hours	0.99	635.14	2.74
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	9.68	1176.90	5.08
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	2.41	2409.01	10.40
8	Fertilizer + micronutrients		Quintal	5.53	5069.59	21.90
9	Pesticides (PPC)		Kgs/liters	2.82	2738.35	11.83
11	Depreciation charges			0.00	260.17	1.12
12	Land revenue and Taxes			0.00	5.88	0.03
II	**Cost B1**					
13	Interest on working capital				1367.26	5.91
14	**Cost B1 = (Cost A1 + sum of 15 and 16)**				17164.28	74.13
III	**Cost B2**					
15	Rental Value of Land				273.81	1.18
16	**Cost B2 = (Cost B1 + Rental value)**				17438.09	75.32
IV	**Cost C1**					
17	Family Human Labour			18.69	3610.16	15.59
18	**Cost C1 = (Cost B2 + Family Labour)**				21048.25	90.91
V	**Cost C2**					
19	Risk Premium				0.00	0.00
20	**Cost C2 = (Cost C1 + Risk Premium)**				21048.25	90.91
VI	**Cost C3**					
21	Managerial Cost				2104.83	9.09
22	**Cost C3 = (Cost C2 + Managerial Cost)**				23153.08	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		15.35	22799.36	
		b) Main Crop Sales Price (Rs.)			1485.71	
	By Product	e) Main Product (q)		0.68	38.83	
		f) Main Crop Sales Price (Rs.)			57.14	
b.	Gross Income (Rs.)				22838.19	
c.	Net Income (Rs.)				-314.89	
d.	Cost per Quintal (Rs./q.)				1508.76	
e.	Benefit Cost Ratio (BC Ratio)				1:0.99	

Cost of Cultivation of Maize: The data regarding the cost of cultivation of maize in Abbagiri Tanda-1 micro watershed is presented in Table 35. The results indicate that, the total cost of cultivation for maize was Rs. 20389.96. The gross income realized by the farmers was Rs. 47012.31. The net income from maize cultivation was Rs. 26622.35, and the income generated from red gram was Rs. 10618.55, thus the benefit cost ratio was found to be 1:2.31.

Table 35. Cost of Cultivation of Maize in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	15.79	2551.51	12.51
2	Bullock		Pairs/day	0.10	54.04	0.27
3	Tractor		Hours	2.23	1649.81	8.09
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	18.02	2429.80	11.92
6	Seed Inter Crop		Kgs.	2.90	275.64	1.35
7	FYM		Quintal	0.00	0.00	0.00
8	Fertilizer + micronutrients		Quintal	7.42	5762.35	28.26
9	Pesticides (PPC)		Kgs / ltrs	0.86	741.00	3.63
10	Depreciation charges			0.00	1625.81	7.97
11	Land revenue and Taxes			0.00	8.23	0.04
II	**Cost B1**					
12	Interest on working capital				1105.06	5.42
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				16203.25	79.47
III	**Cost B2**					
14	Rental Value of Land				283.33	1.39
15	**Cost B2 = (Cost B1 + Rental value)**				16486.59	80.86
IV	**Cost C1**					
16	Family Human Labour			9.78	2049.74	10.05
17	**Cost C1 = (Cost B2 + Family Labour)**				18536.33	90.91
V	**Cost C2**					
18	**Cost C2 = (Cost C1 + Risk Premium)**				18536.33	90.91
VI	**Cost C3**					
19	Managerial Cost				1853.63	9.09
20	**Cost C3 = (Cost C2 + Managerial Cost)**				20389.96	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		21.18	34764.01	
		b) Main Crop Sales Price (Rs.)			1641.67	
		c) Intercrop (q)		2.36	10618.55	
		d) Intercrop Sales Price (Rs.)			4500.00	
	By Product	e) Main Product (q)		8.20	1613.22	
		f) Main Crop Sales Price (Rs.)			196.67	
		g) Intercrop (q)		0.47	16.53	
		h) Intercrop Sales Price (Rs.)			35.00	
b.	Gross Income (Rs.)				47012.31	
c.	Net Income (Rs.)				26622.35	
d.	Cost per Quintal (Rs./q.)				866.34	
e.	Benefit Cost Ratio (BC Ratio)				1:2.31	

Cost of Cultivation of Navane: The data regarding the cost of cultivation of navane in Abbagiri Tanda-1 micro watershed is presented in Table 36. The results indicate that, the total cost of cultivation for navane was Rs. 12067.31. The gross income realized by the farmers was Rs. 25935. The net income from navane cultivation was Rs. 13867.69. Thus the benefit cost ratio was found to be 1:2.15.

Table 36: Cost of Cultivation of Navane in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	17.29	2778.75	23.03
2	Bullock		Pairs/day	1.24	617.50	5.12
3	Tractor		Hours	0.00	0.00	0.00
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	7.41	815.10	6.75
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	0.00	0.00	0.00
8	Fertilizer + micronutrients		Quintal	4.94	4137.25	34.28
9	Land revenue and Taxes			0.00	8.23	0.07
II	**Cost B1**					
10	Interest on working capital				594.28	4.92
11	**Cost B1 = (Cost A1 + sum of 15 and 16)**				8951.12	74.18
III	**Cost B2**					
12	Rental Value of Land				166.67	1.38
13	**Cost B2 = (Cost B1 + Rental value)**				9117.78	75.56
IV	**Cost C1**					
14	Family Human Labour			9.88	1852.50	15.35
15	**Cost C1 = (Cost B2 + Family Labour)**				10970.28	90.91
V	**Cost C2**					
16	**Cost C2 = (Cost C1 + Risk Premium)**				10970.28	90.91
VI	**Cost C3**					
17	Managerial Cost				1097.03	9.09
18	**Cost C3 = (Cost C2 + Managerial Cost)**				12067.31	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.82	25935.00	
		b) Main Crop Sales Price (Rs.)			1750.00	
b.	Gross Income (Rs.)				25935.00	
c.	Net Income (Rs.)				13867.69	
d.	Cost per Quintal (Rs./q.)				814.26	
e.	Benefit Cost Ratio (BC Ratio)				1:2.15	

Cost of cultivation of Paddy: The data regarding the cost of cultivation of paddy in Abbagiri Tanda-1 micro watershed is presented in Table 37. The results indicate that, the total cost of cultivation for paddy was Rs. 35259.34. The gross income realized by the farmers was Rs. 41003.63. The net income from paddy cultivation was Rs. 5744.09. Thus the benefit cost ratio was found to be 1:1.16.

Table 37: Cost of Cultivation of Paddy in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	15.49	3016.17	8.55
2	Bullock		Pairs/day	0.82	407.59	1.16
3	Tractor		Hours	3.26	2445.54	6.94
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	97.82	11738.61	33.29
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	0.00	0.00	0.00
8	Fertilizer + micronutrients		Quintal	7.34	6032.34	17.11
9	Pesticides (PPC)		Kgs/liters	0.82	1222.77	3.47
10	Irrigation		Number	0.82	0.00	0.00
11	Depreciation charges			0.00	409.22	1.16
12	Land revenue and Taxes			0.00	8.23	0.02
II	**Cost B1**					
13	Interest on working capital				2279.25	6.46
14	**Cost B1 = (Cost A1 + sum of 15 and 16)**				27559.74	78.16
III	**Cost B2**					
15	Rental Value of Land				500.00	1.42
16	**Cost B2 = (Cost B1 + Rental value)**				28059.74	79.58
IV	**Cost C1**					
17	Family Human Labour			17.12	3994.39	11.33
18	**Cost C1 = (Cost B2 + Family Labour)**				32054.13	90.91
V	**Cost C2**					
19	Risk Premium				0.00	0.00
20	**Cost C2 = (Cost C1 + Risk Premium)**				32054.13	90.91
VI	**Cost C3**					
21	Managerial Cost				3205.41	9.09
22	**Cost C3 = (Cost C2 + Managerial Cost)**				35259.54	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		30.98	40269.97	
		b) Main Crop Sales Price (Rs.)			1300.00	
	By Product	e) Main Product (q)		8.15	733.66	
		f) Main Crop Sales Price (Rs.)			90.00	
b.	Gross Income (Rs.)				41003.63	
c.	Net Income (Rs.)				5744.09	
d.	Cost per Quintal (Rs./q.)				1138.25	
e.	Benefit Cost Ratio (BC Ratio)				1:1.16	

Cost of cultivation of Sorghum: The data regarding the cost of cultivation of sorghum in Abbagiri Tanda-1 micro watershed is presented in Table 38. The results indicate that, the total cost of cultivation for sorghum was Rs. 14260.22. The gross income realized by the farmers was Rs. 27694.88. The net income from sorghum cultivation was Rs. 13715.62. Thus the benefit cost ratio was found to be 1:1.96.

Table 38: Cost of Cultivation of Sorghum in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	12.66	1945.13	13.64
2	Bullock		Pairs/day	0.93	478.56	3.36
3	Tractor		Hours	0.00	0.00	0.00
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	8.34	91.70	0.64
8	Fertilizer + micronutrients		Quintal	7.41	6020.63	42.22
9	Depreciation charges			0.00	471.15	3.30
10	Land revenue and Taxes			0.00	8.23	0.06
II	**Cost B1**					
11	Interest on working capital				733.48	5.14
12	**Cost B1 = (Cost A1 + sum of 15 and 16)**				9748.88	68.36
III	**Cost B2**					
13	Rental Value of Land				158.33	1.11
14	**Cost B2 = (Cost B1 + Rental value)**				9907.21	69.47
IV	**Cost C1**					
15	Family Human Labour			16.98	3056.63	21.43
16	**Cost C1 = (Cost B2 + Family Labour)**				12963.83	90.91
V	**Cost C2**					
17	Risk Premium				0.00	0.00
18	**Cost C2 = (Cost C1 + Risk Premium)**				12963.83	90.91
VI	**Cost C3**					
19	Managerial Cost				1296.38	9.09
20	**Cost C3 = (Cost C2 + Managerial Cost)**				14260.22	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		12.04	27694.88	
		b) Main Crop Sales Price (Rs.)			2300.00	
	By Product	e) Main Product (q)		4.32	280.96	
		f) Main Crop Sales Price (Rs.)			65.00	
b.	Gross Income (Rs.)				27975.84	
c.	Net Income (Rs.)				13715.62	
d.	Cost per Quintal (Rs./q.)				1184.28	
e.	Benefit Cost Ratio (BC Ratio)				1:1.96	

Cost of cultivation of Bengalgram: The data regarding the cost of cultivation of bengalgram in Abbagiri Tanda-1 micro watershed is presented in Table 39. The results indicate that, the total cost of cultivation for bengalgram was Rs. 41141.81. The gross income realized by the farmers was Rs. 80509.57. The net income from bengalgram cultivation was Rs. 39367.76. Thus the benefit cost ratio was found to be 1:1.96.

Table 39: Cost of Cultivation of Bengalgram in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	21.26	3464.77	8.42
3	Tractor		Hours	2.04	1529.67	3.72
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	118.44	14940.28	36.31
8	Fertilizer + micronutrients		Quintal	7.19	5636.76	13.70
9	Pesticides (PPC)		Kgs /liters	1.92	3405.25	8.28
10	Depreciation charges			0.00	3068.70	7.46
11	Land revenue and Taxes			0.00	5.49	0.01
II	**Cost B1**					
12	Interest on working capital				2877.88	7.00
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				34928.80	84.90
III	**Cost B2**					
14	Rental Value of Land				500.00	1.22
15	**Cost B2 = (Cost B1 + Rental value)**				35428.80	86.11
IV	**Cost C1**					
16	Family Human Labour			9.80	1972.85	4.80
17	**Cost C1 = (Cost B2 + Family Labour)**				37401.65	90.91
V	**Cost C2**					
18	**Cost C2 = (Cost C1 + Risk Premium)**				37401.65	90.91
VI	**Cost C3**					
19	Managerial Cost				3740.16	9.09
20	**Cost C3 = (Cost C2 + Managerial Cost)**				41141.81	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		20.97	80033.68	
		b) Main Crop Sales Price (Rs.)			3816.67	
	By Product	e) Main Product (q)		6.80	475.90	
		f) Main Crop Sales Price (Rs.)			70.00	
b.	Gross Income (Rs.)				80509.57	
c.	Net Income (Rs.)				39367.76	
d.	Cost per Quintal (Rs./q.)				1961.98	
e.	Benefit Cost Ratio (BC Ratio)				1:1.96	

Cost of cultivation of Groundnut: The data regarding the cost of cultivation of groundnut in Abbagiri Tanda-1 micro watershed is presented in Table 40. The results indicate that, the total cost of cultivation for groundnut was Rs. 48921.12. The gross income realized by the farmers was Rs. 80878.78. The net income from groundnut cultivation was Rs. 31957.66. Thus the benefit cost ratio was found to be 1:1.65.

Table 40: Cost of Cultivation of Groundnut in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	26.35	3667.95	7.50
2	Bullock		Pairs/day	0.82	411.67	0.84
3	Tractor		Hours	4.94	2964.00	6.06
4	Machinery		Hours	1.65	1646.67	3.37
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	123.50	8233.33	16.83
7	FYM		Quintal	4.12	4116.67	8.41
8	Fertilizer + micronutrients		Quintal	10.70	10003.50	20.45
9	Pesticides (PPC)		Kgs /liters	3.71	3828.50	7.83
10	Depreciation charges			0.00	382.05	0.78
11	Land revenue and Taxes			0.00	4.12	0.01
II	**Cost B1**					
12	Interest on working capital				3141.84	6.42
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				38400.29	78.49
III	**Cost B2**					
14	Rental Value of Land				800.00	1.64
15	**Cost B2 = (Cost B1 + Rental value)**				39200.29	80.13
IV	**Cost C1**					
16	Family Human Labour			33.35	5273.45	10.78
17	**Cost C1 = (Cost B2 + Family Labour)**				44473.74	90.91
V	**Cost C2**					
18	Risk Premium				0.00	0.00
19	**Cost C2 = (Cost C1 + Risk Premium)**				44473.74	90.91
VI	**Cost C3**					
20	Managerial Cost				4447.37	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				48921.12	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		25.52	80823.89	
		b) Main Crop Sales Price (Rs.)			3166.67	
	By Product	e) Main Product (q)		0.82	54.89	
		f) Main Crop Sales Price (Rs.)			66.67	
b.	Gross Income (Rs.)				80878.78	
c.	Net Income (Rs.)				31957.66	
d.	Cost per Quintal (Rs./q.)				1916.72	
e.	Benefit Cost Ratio (BC Ratio)				1:1.65	

Cost of cultivation of Redgram: The data regarding the cost of cultivation of redgram in Abbagiri Tanda-1 micro watershed is presented in Table 41. The results indicate that, the total cost of cultivation for redgram was Rs. 13963.32. The gross income realized by the farmers was Rs. 25468.44. The net income from redgram cultivation was Rs. 11505.12. Thus the benefit cost ratio was found to be 1:1.82.

Table 41: Cost of Cultivation of Redgram in Abbagiri Tanda-1 micro watershed

S.N	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	8.50	1368.39	9.80
2	Bullock		Pairs/day	0.66	342.42	2.45
3	Tractor		Hours	0.82	617.50	4.42
4	Machinery		Hours	0.00	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	6.36	763.59	5.47
8	Fertilizer + micronutrients		Quintal	6.85	5500.06	39.39
9	Depreciation charges			0.00	355.16	2.54
10	Land revenue and Taxes			0.00	8.23	0.06
II	**Cost B1**					
11	Interest on working capital				751.64	5.38
12	**Cost B1 = (Cost A1 + sum of 15 and 16)**				9707.00	69.52
III	**Cost B2**					
13	Rental Value of Land				161.11	1.15
14	**Cost B2 = (Cost B1 + Rental value)**				9868.11	70.67
IV	**Cost C1**					
15	Family Human Labour			15.46	2825.82	20.24
16	**Cost C1 = (Cost B2 + Family Labour)**				12693.93	90.91
V	**Cost C2**					
17	**Cost C2 = (Cost C1 + Risk Premium)**				12693.93	90.91
VI	**Cost C3**					
18	Managerial Cost				1269.39	9.09
19	**Cost C3 = (Cost C2 + Managerial Cost)**				13963.32	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		5.92	25468.44	
		b) Main Crop Sales Price (Rs.)			4300.00	
b.	Gross Income (Rs.)				25468.44	
c.	Net Income (Rs.)				11505.12	
d.	Cost per Quintal (Rs./q.)				2357.52	
e.	Benefit Cost Ratio (BC Ratio)				1:1.82	

Adequacy of fodder: The data regarding the adequacy of fodder in Abbagiri Tanda-1 micro watershed is presented in Table 42. The results indicate that, 59.18 per cent of the households opined that dry fodder was adequate, 4.08 per cent of the households opined that dry fodder was inadequate also the data revealed that 24.49 per cent of the farmers opined that green fodder is adequate.

Table 42: Adequacy of fodder in Abbagiri Tanda-1 micro watershed

S. N	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	6	54.55	14	70.00	7	63.64	2	100.00	29	59.18
2	Inadequate-Dry Fodder	1	9.09	1	5.00	0	0.00	0	0.00	2	4.08
3	Adequate-Green Fodder	4	36.36	5	25.00	2	18.18	1	50.00	12	24.49

Average Annual gross income of households: The results of the overall average annual gross income of the household in Abbagiri tanda-1 is presented in table 43. The table indicated that the average income from service/salary was Rs. 3571.43, business Rs.3632.65, wage Rs.27367.35, agriculture Rs. 52992.86, farm income Rs.1632.65, Non farm income Rs.3061.22, dairy farm Rs.2215.31 and goat farming was Rs.3061.22.

Table 43: Average Annual gross income of households in Abbagiri Tanda-1 micro watershed (Rupees)

S.N.	Particulars	LL(5)	MF (11)	SF (20)	SMF(11)	MDF(2)	All (49)
1	Service/salary	0	0	8750	0.00	0	3571.43
2	Business	0	7090.91	5000	0.00	0	3632.65
3	Wage	29600	19090.91	33150	29090.91	0	27367.35
4	Agriculture	0	45036.36	59062.50	58181.82	140000	52992.86
5	Farm income	0	0	0	7272.73	0	1632.65
6	Non Farm income	30000	0	0	0.00	0	3061.22
7	Dairy Farm	0	1795.45	2121	3398.18	4,500	2215.31
8	Goat Farming	0	13636.36	0.00	0.00	0	3061.22
Income(Rs.)		59600	86650	108083.50	97943.64	144500	97534.69

Interest towards cultivation of horticulture crops: The data regarding horticulture species grown in Abbagiri Tanda-1 micro watershed is presented in Table 44. The results indicate that, 44.90 per cent of the households are interested in growing horticultural crops which include 45.45 per cent marginal farmers, 55 per cent small farmers, 45.45 per cent semi medium farmers and 50 per cent medium farmers.

Table 44: Interest towards cultivation of horticulture crops in Abbagiri Tanda-1 micro watershed

S. N.	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Interested towards cultivation of horticulture crops	5	45.45	11	55.00	5	45.45	1	50.00	22	44.90

Source of funds for additional investment: The data regarding source of funds for additional investment in Abbagiri Tanda-1 micro watershed is presented in Table 45. The

results indicated that for 12 per cent of the households were dependent on government subsidy for land development. Similarly for the dependency was for irrigation facility 48 percent and only 2 percent for improved crop production.

Table 45: Source of funds for additional investment capacity in Abbagiri Tanda-1 micro watershed

S.N	Item	Land development		Irrigation facility		Improved crop production	
		N	%	N	%	N	%
1	Government subsidy	6	12.0	24	48.0	1	2.0

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Abbagiri Tanda-1 micro watershed is presented in Table 46. The results indicated that, only Navane was sold to the extent of 100 per cent.

Table 46: Marketing of the agricultural produce in Abbagiri Tanda-1 micro watershed

S.N	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Bajra	102.0	3.0	99.0	97.06	1487.5
2	Bengal Gram (Kadale)	81.0	6.0	75.0	92.59	3816.67
3	Ground Nut	37.0	4.0	33.0	89.19	3166.67
4	Maize	39.0	1.0	38.0	97.43	1410.34
5	Navane	12.0	0.0	12.0	100.0	1750.0
6	Paddy	38.0	6.0	32.0	84.21	1300.0
7	Red Gram	20.0	1.0	19.0	95.0	4300.0
8	Sorghum	51.0	2.0	49.0	96.08	2366.67

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Abbagiri Tanda-1 micro watershed is presented in Table 47. The results indicated that, 57.14 percent of the households have sold their produce to local/village merchants, 42.86 percent of the households sold their produce in regulated markets and only 4.08 per cent of the households sold their produce to agents/traders.

Table 47: Marketing Channels used for sale of agricultural produce in Abbagiri Tanda-1 micro watershed

S. N	Particulars	MF (11)		SF (20)		SMF(11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Agent/Traders	1	9.09	1	5	0	0.00	0	0.00	2	4.08
2	Local/village Merchant	5	45.45	15	75	7	63.64	1	50	28	57.14
3	Regulated Market	5	45.45	9	45	5	45.45	2	100	21	42.86

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Abbagiri Tanda-1 micro watershed is presented in Table 48. The results indicated that 75.51 per cent of the households have used cart as a mode of transport and 28.57 per cent have used tractor.

Table 48: Mode of transport of agricultural produce in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Cart	11	100.00	20	100.00	5	45.45	1	50.00	37	75.51
2	Tractor	0	0.00	5	25.00	7	63.64	2	100.00	14	28.57

Interest towards soil testing: The data regarding interest shown towards soil testing in Abbagiri Tanda-1 micro watershed is presented in Table 49. The results indicated that, 57.14 per cent of the households have shown interest in soil testing i.e. 63.64 per cent of marginal farmers, 70 per cent of small farmers, 54.55 per cent of semi medium and 50 per cent of medium farmers have shown interest in soil testing.

Table 49: Interest shown towards soil testing in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	7	63.64	14	70.00	6	54.55	1	50.00	28	57.14

Soil and water conservation practices and structures adopted: The data regarding soil and water conservation practices and structures adopted in Abbagiri Tanda-1 micro watershed is presented in Table 50. The results indicated that, 10.20 per cent of the households have adopted field bunding which includes 18.18 per cent of marginal, 10 per cent of small farmers and 50 per cent of medium farmers. Summer ploughing was adopted by 57.14 per cent of the households i.e.63.64 per cent of the marginal farmers, 70 per cent of the small farmers, 54.55 per cent of semi medium and 50 per cent medium farmers. Form pond was adopted by the farmers was 2.04 per cent.

Table 50: Soil and water conservation practices and structures adopted in Abbagiri Tanda-1 micro watershed

Sl. No.	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Field Bunding	2	18.18	2	10.00	0	0.00	1	50.00	5	10.20
2	Farm Pond	0	0.00	0	0.00	1	9.09	0	0.00	1	2.04
3	Summer Ploughing	7	63.64	14	70.00	6	54.55	1	50.00	28	57.14

Table 51: Agencies involved in soil conservation structures in Abbagiri Tanda-1 micro watershed

S.N.	Particulars	MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Own	0	0.00	1	5.00	0	0.00	0	0.00	1	2.04
2	Govt.	1	9.09	1	5.00	1	9.09	1	50.00	4	8.16
3	Farmer organization	0	0.00	0	0.00	1	9.09	0	0.00	1	2.04

Agencies involved in soil conservation structures: The data regarding agencies involved in soil conservation structures in Abbagiri Tanda-1 micro watershed is presented in Table 51. The results indicated that 2.04 per cent of soil conservation structure is

constructed by farmers on their own, 8.16 per cent of the soil conservation structures are constructed by the government and another 2.04 per cent is constructed by farmer's organization.

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Abbagiri Tanda-1 micro watershed is presented in Table 52. The results indicated that, 83.67 percent used fire wood as a source of fuel, and 14.29 percent of the households used LPG.

Table 52: Usage pattern of fuel for domestic use in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	4	80.00	10	90.91	17	85.00	8	72.73	2	100.00	41	83.67
2	LPG	1	20.00	1	9.09	3	15.00	2	18.18	0	0.00	7	14.29

Source of drinking water: The data regarding source of drinking water in Abbagiri Tanda-1 micro watershed is presented in Table 53. The results indicated that, piped supply was the major source for drinking water for 53.06 per cent which includes 100 per cent of landless, 45.45 per cent of marginal, 40 per cent of small farmers, 63.64 per cent of semi medium and 50 per cent of medium farmers and 10.20 per cent of the households were using bore well as a source of drinking water.

Table 53: Source of drinking water in Abbagiri Tanda-1 micro watershed

S. N	Particulars	LL (5)		MF (11)		SF (20)		SMF(11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	5	100.00	5	45.45	8	40.00	7	63.64	1	50.00	26	53.06
2	Bore Well	0	0.00	2	18.18	1	5.00	2	18.18	0	0.00	5	10.20

Source of light: The data regarding source of light in Abbagiri Tanda-1 micro watershed is presented in Table 54. The results indicated that, electricity was the major source of light which was found to be 93.88 per cent.

Table 54: Source of light in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF(11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Electricity	5	100	11	100	19	95	9	81.82	2	100	46	93.88

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facilit**y** in Abbagiri Tanda-1 micro watershed is presented in Table 55. The results indicated that, 34.69 per cent of the households possess sanitary toilet i.e. 60 per cent of landless, 45.45 per cent of marginal, 3 per cent of small, 9.09 per cent of semi medium and 50 per cent of medium had sanitary toilet facility.

Table 55: Existence of Sanitary toilet facility in Abbagiri Tanda-1 micro watershed

S. N.	Particulars	LL (5)		MF (11)		SF (20)		SMF(11)		MDF(2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	3	60	5	45.45	7	3	1	9.09	1	50	17	34.69

Possession of PDS card: The data regarding possession of PDS card in Abbagiri Tanda-1 micro watershed is presented in Table 56. The results indicated that, 91.84 per cent of the sampled households possessed BPL card and 2.04 per cent of the sampled households have not possessed BPL card.

Table 56: Possession of PDS card in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	BPL	5	100	11	100	18	90	9	81.82	2	100	45	91.84
2	Not Possessed	0	0.00	0	0.00	1	5	0	0.00	0	0.00	1	2.04

Participation in NREGA programme: The data regarding participation in NREGA programme in Abbagiri Tanda-1 micro watershed is presented in Table 57. The results indicated that, 36.73 per cent of the households participated in NREGA programme which included 60 per cent of the landless, 45.45 percent of the marginal, 4 per cent of the small, 36.36 per cent of the semi medium and 100 percent of the medium farmers.

Table 57: Participation in NREGA programme in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF(11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	3	60	5	45.45	4	2	4	36.36	2	100	18	36.73

Adequacy of food items: The data regarding adequacy of food items in Abbagiri Tanda-1 micro watershed is presented in Table 58. The results indicated that, 97.97 per cent of cereals, 79.59 per cent of pulses, 63.27 per cent of oilseeds and 67.35 percent of both milk and egg were adequate for the households. Vegetables and fruits were adequate only for 10.20 per cent and meat was 4.08 per cent for the households respectively.

Table 58: Adequacy of food items in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF(2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	5	100	11	100.00	20	100	10	90.91	2	100	48	97.96
2	Pulses	5	100	10	90.91	15	75	8	72.73	1	50	39	79.59
3	Oilseed	4	80	6	54.55	14	70	6	54.55	1	50	31	63.27
4	Vegetables	0	0	1	9.09	3	15	1	9.09	0	0	5	10.20
5	Fruits	0	0	1	9.09	4	20	0	0.00	0	0	5	10.20
6	Milk	5	100	7	63.64	14	70	6	54.55	1	50	33	67.35
7	Egg	5	100	7	63.64	14	70	6	54.55	1	50	33	67.35
8	Meat	0	0.00	0	0.00	1	5.00	0	0.00	1	50	2	4.08

Response on Inadequacy of food items: The data regarding inadequacy of food items in Abbagiri Tanda-1 micro watershed is presented in Table 59. The results indicated that, both vegetables and fruits were inadequate for 85.71 per cent of the households. Milk and egg were inadequate for 30.61 per cent respectively; meat was inadequate for 89.90 per cent. Cereals, pulses and oilseeds were inadequate for 2.04 per cent, 18.37 per cent and 8.16 per cent respectively.

Table 59: Response on Inadequacy of food items in Abbagiri Tanda-1 micro watershed

S.N	Particulars	LL (5)		MF (11)		SF (20)		SMF (11)		MDF (2)		All (49)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	0	0	1	9.09	0	0	0	0.00	0	0	1	2.04
2	Pulses	0	0	1	9.09	5	25	2	18.18	1	50	9	18.37
3	Oilseed	1	20	0	0.00	1	5	2	18.18	0	0	4	8.16
4	Vegetables	5	100	9	81.82	17	85	9	81.82	2	100	42	85.71
5	Fruits	5	100	10	90.91	16	80	9	81.82	2	100	42	85.71
6	Milk	0	0	4	36.36	6	30	4	36.36	1	50	15	30.61
7	Egg	0	0	4	36.36	6	30	4	36.36	1	50	15	30.61
8	Meat	5	100	11	100.00	18	90	9	81.82	1	50	44	89.80

Farming constraints: The data regarding farming constraints experienced by households in Abbagiri Tanda-1 micro watershed is presented in Table 60. The results indicated that, Lower fertility status of the soil was the constraint experienced by 32.65 per cent of the households, wild animal menace on farm field (59.18%), frequent incidence of pest and diseases (55.10%), inadequacy of irrigation water (55.10%), high cost of Fertilizers and plant protection chemicals (65.31%), high rate of interest on credit (63.27%), low price for the agricultural commodities (65.31%), lack of marketing facilities in the area (67.35%), inadequate extension services (63.27%), lack of transport for safe transport of the agricultural produce to the market (79.59%), less rainfall (30.61%) and Source of Agri-technology information(Newspaper/TV/Mobile) (12.24).

Table 60: Farming constraints Experienced in Abbagiri Tanda-1 micro watershed

S.N	Particulars	MF (11)		SF (20)		SMF (11)		MDF(2)		All (49)	
		N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	4	36.36	7	35	5	45.45	0	0	16	32.65
2	Wild animal menace on farm field	7	63.64	13	65	7	63.64	2	100	29	59.18
3	Frequent incidence of pest and diseases	7	63.64	14	70	5	45.45	1	50	27	55.10
4	Inadequacy of irrigation water	7	63.64	14	70	5	45.45	1	50	27	55.10
5	High cost of Fertilizers and plant protection chemicals	7	63.64	15	75	8	72.73	2	100	32	65.31
6	High rate of interest on credit	8	72.73	15	75	6	54.55	2	100	31	63.27
7	Low price for the agricultural commodities	9	81.82	16	80	6	54.55	1	50	32	65.31
8	Lack of marketing facilities in the area	8	72.73	15	75	8	72.73	2	100	33	67.35
9	Inadequate extension services	9	81.82	15	75	6	54.55	1	50	31	63.27
10	Lack of transport for safe transport of the Agril produce to the market.	9	81.82	19	95	9	81.82	2	100	39	79.59
11	Less rainfall	4	36.36	7	35	3	27.27	1	50	15	30.61
12	Source of Agri-technology information(Newspaper/TV/Mobile)	1	9.09	4	20	1	9.09	0	0	6	12.24

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

The data indicated that there were 124 (53.45%) men and 108 (46.55%) were women among the sampled households. The average family size of land less farmers was 4, marginal farmers were 4, small farmer was 5, semi medium farmer was 5 and medium farmers were 3. There were 55 (23.71%) people were in 0-15 years of age, 101 (43.53%) were in 16-35 years of age, 57 (24.57 %) were in 36-60 years of age and 19 (8.19%) were above 61 years of age. The micro watershed had 34.48 per cent illiterates, 0.43 per cent functional literates, 34.48 per cent of them had primary school education, 2.59 per cent of them had middle school education, 13.36 per cent of them had high school education, 7.33 per cent of them had PUC education, 1.66 per cent of them diploma, 0.86 per cent of them had ITI, 3.45 per cent of them had degree education and 1.29 per cent of them had other education.

The results indicate that, 81.63 per cent of households practicing agriculture and 4.08 per cent of the household heads were agricultural labourers. The results indicate that agriculture was the major occupation for 53.88 per cent of the household members, 7.33 per cent were agricultural labourers, 4.31 per cent were general labours,0.43 percent were in government service, 0.86 per cent of them were in private sector, 0.43 per cent of them were in trade and business, 21.98 per cent of them were students and 1.72 per cent were housewives. The results shows that 1.72 per cent of them participated in self help groups, 0.86 per cent of them participated in gram panchayat, 0.43 per cent of them participated in Raitha Sangha and 96.98 per cent of them have not participated in any local institutions. Landless and medium farmers were found to have no participation in any local institutions. Semi medium farmers were found to participate in one or the other local institutions.

The results indicate that 87.76 per cent of the households possess Katcha house and 10.20 per cent of them possess Pucca house and 2.04 per cent them possess semi Pucca house. 100 percent of the landless, marginal and small farmers possess Katcha house. The results shows that 57.14 per cent of the households possess TV, 34.69 per cent of the households possess Mixer grinder, 28.57 per cent of the households possess bicycle, 42.86 per cent of the households possess motor cycle, and 83.67 per cent of the households possess mobile phones. The average value of television was Rs.3178, mixer

grinder was Rs.1876, DVD player was Rs.2000, motor cycle was Rs.33857, bicycle was Rs.1250, auto Rs.200000 and mobile phone was Rs.1736. About 34.69 per cent of the households possess plough, 30.61 per cent of them possess bullock cart and 26.53 per cent of the households possess sprayer, 12.24 per cent of them possess chaff cutter and 46.94 per cent of the households possess weeder. The average value of plough was Rs.748, the average value of bullock cart was Rs. 18750 and the average value of sprayer was Rs.2117.

The results indicate that, 36.73 per cent of the households possess bullocks, 18.37 per cent of the households possess local cow, 6.12 per cent of the households possess buffalo and 2.04 per cent of the households possess equally for sheep and goat respectively. Average own labour men available in the micro watershed was 1.91, average own labour (women) available was 1.45, average hired labour (men) available was 11.36 and average hired labour (women) available was 11.41.

The results indicate that, 89.80 per cent of the household opined that hired labour was adequate. The results indicate that, 1 person was migrated from micro watershed that belonged to small medium farmer category. People have migrated on an average of 450 Kms and average duration was 10 months. Job/work was important reason for migration for all the migrants.

Households of the Abbagiri Tanda-1 micro watershed possess 40.54 ha (68.45%) of dry land and 18.69 ha (31.55%) of irrigated land. The average value of dry land was Rs.260116.79 and average value of irrigated was Rs.316639.24. There were 14 functioning and 7 defunct bore wells in the micro watershed. Bore well was the major irrigation source for 28.57 per cent of the farmers. There were 10.76 ha of irrigated area in total in the micro watershed.

The results indicate that, farmers have grown Maize (29.38 ha), Navane (0.81 ha), Bajra (7.32 ha), Paddy (1.22 ha), Sorghum (3.04 ha), and Red gram (2.49ha) in kharif season and Bengal gram (4.08 ha), groundnut (1.21 ha), Red gram (1.21 ha) and sorghum (0.81 ha) in Rabi season. Marginal farmers have grown Maize, Bajra, sorghum, Ground nut, Bengal gram and Redgram. Small farmers have grown Maize, Bajra, sorghum, Bengal gram and paddy. Semi medium farmers have grown Maize, bajra, Bengal gram and Paddy. Medium farmers have grown Maize and Bengal gram. Medium farmers have grown Maize and Bengal gram. The cropping intensity in Abbagiri Tanda-1 micro watershed was found to be 90.91 per cent. In case of Marginal farmers it was 96.40 per cent, for small farmers it was 87.36 per cent, in case of semi medium farmers it was 89.84 per cent, and medium farmers had cropping intensity of 100 per cent.

The results indicate that, 55.10 per cent and 53.06 per cent of the households have both bank account and savings respectively. Among marginal farmers 63.64 percent of them possess both bank account and savings. 65 per cent of small farmers possess bank

account and 60 per cent of savings. Semi medium farmers possess 54.55 per cent of both bank account and savings and medium category of farmers possess 50 per cent of bank account and also savings. The results indicate that, 65.22 per cent have availed loan in Grameena bank, 43.48 per cent have availed loan in money lender and 4.35 per cent have availed loan from cooperative bank. Marginal, small, semi medium and medium have availed Rs.16142.86, Rs. 114444.44, Rs.50000, and Rs. 250000 respectively. Overall average credit amount availed by households in the micro watershed is 73608.70.

The results indicate that, 18.75 per cent of the households have repaid their institutional credit partially which includes 22.22 per cent of small farmers, 33.33 per cent of semi medium farmers. The data also showed that 56.25 per cent of households have unpaid their loans and only 25 per cent of households have fully repaid their loans. The results also indicated that 20 per cent of the households have repaid their private credit partially and 80 percent of the households have unpaid their loan.

The results indicated that, the total cost of cultivation for bajra was Rs. 23153.0. The gross income realized by the farmers was Rs. 22838.19. The net income from bajra cultivation was Rs. -314.89, thus the benefit cost ratio was found to be 1:0.99, the total cost of cultivation for maize was Rs. 20389.96. The gross income realized by the farmers was Rs. 47012.31. The net income from maize cultivation was Rs. 26622.35, and the income generated from red gram was Rs. 10618.55, thus the benefit cost ratio was found to be 1:2.31. Total cost of cultivation for navane was Rs. 12067.31. The gross income realized by the farmers was Rs. 25935. The net income from navane cultivation was Rs. 13867.69. Thus the benefit cost ratio was found to be 1:2.15. Total cost of cultivation for paddy was Rs. 35259.34. The gross income realized by the farmers was Rs. 41003.63. The net income from paddy cultivation was Rs. 5744.09. Thus the benefit cost ratio was found to be 1:1.16; total cost of cultivation for sorghum was Rs. 14260.22. The gross income realized by the farmers was Rs. 27694.88. The net income from sorghum cultivation was Rs. 13715.62. Thus the benefit cost ratio was found to be 1:1.96, the total cost of cultivation for bengalgram was Rs. 41141.81. The gross income realized by the farmers was Rs. 80509.57. The net income from bengalgram cultivation was Rs. 39367.76. Thus the benefit cost ratio was found to be 1:1.96. Total cost of cultivation for groundnut was Rs. 48921.12. The gross income realized by the farmers was Rs. 80878.78. The net income from groundnut cultivation was Rs. 31957.66. Thus the benefit cost ratio was found to be 1:1.65; total cost of cultivation for redgram was Rs. 13963.32. The gross income realized by the farmers was Rs. 25468.44. The net income from redgram cultivation was Rs. 11505.12. Thus the benefit cost ratio was found to be 1:1.82.

The results indicate that, 59.18 per cent of the households opined that dry fodder was adequate, 4.08 per cent of the households opined that dry fodder was inadequate also the data revealed that 24.49 per cent of the farmers opined that green fodder is adequate. The table indicated that the average income from service/salary was Rs. 3571.43,

business Rs.3632.65, wage Rs.27367.35, agriculture Rs. 52992.86, farm income Rs.1632.65, Non farm income Rs.3061.22, dairy farm Rs.2215.31 and goat farming was Rs.3061.22.

The results indicated that, 44.90 per cent of the households are interested in growing horticultural crops which include 45.45 per cent marginal farmers, 55 per cent small farmers, 45.45 per cent semi medium farmers and 50 per cent medium farmers. The results indicated that for 12 per cent of the households were dependent on government subsidy for land development. Similarly for the dependency was for irrigation facility 48 percent and only 2 percent for improved crop production. The results indicated that, only Navane was sold to the extent of 100 per cent.

The data regarding marketing channels used for sale of agricultural produce was showing that 57.14 percent of the households have sold their produce to local/village merchants, 42.86 percent of the households sold their produce in regulated markets and only 4.08 per cent of the households sold their produce to agents/traders. The data about mode of transport of agricultural produce indicated that 75.51 per cent of the households have used cart as a mode of transport and 28.57 per cent have used tractor. The results indicated that, 57.14 per cent of the households have shown interest in soil testing i.e. 63.64 per cent of marginal farmers, 70 per cent of small farmers, 54.55 per cent of semi medium and 50 per cent of medium farmers have shown interest in soil testing.

The data pertaining to soil and water conservation practices and structures adopted in micro watershed was indicating that, 10.20 per cent of the households have adopted field bunding which includes 18.18 per cent of marginal, 10 per cent of small farmers, and 50 per cent of medium farmers. Summer ploughing was adopted by 57.14 per cent of the households i.e.63.64 per cent of the marginal farmers, 70 per cent of the small farmers, 54.55 per cent of semi medium and 50 per cent medium farmers. Form pond was adopted by the farmers was 2.04 per cent. The data regarding agencies involved in soil conservation structures in was showing that 2.04 per cent of soil conservation structure is constructed by farmers on their own, 8.16 per cent of the soil conservation structures are constructed by the government and another 2.04 per cent is constructed by farmer's organization.

The results indicated that, 83.67 percent used fire wood as a source of fuel, and 14.29 percent of the households used LPG. Also results indicated that, piped supply was the major source for drinking water for 53.06 per cent which includes 100 per cent of landless, 45.45 per cent of marginal, 40 per cent of small farmers, 63.64 per cent of semi medium and 50 per cent of medium farmers and 10.20 per cent of the households were using bore well as a source of drinking water. The results indicated that, electricity was the major source of light which was found to be 93.88 per cent. The results indicated that, 34.69 per cent of the households possess sanitary toilet i.e. 60 per cent of landless, 45.45 per cent of marginal, 3 per cent of small, 9.09 per cent of semi medium and 50 per cent

of medium had sanitary toilet facility. The results indicated that, 91.84 per cent of the sampled households possessed BPL card and 2.04 per cent of the sampled households have not possessed BPL card. The results indicated that, 36.73 per cent of the households participated in NREGA programme which included 60 per cent of the landless, 45.45 percent of the marginal, 4 per cent of the small, 36.36 per cent of the semi medium and 100 percent of the medium farmers.

The result of data regarding adequacy of food items was showing that that, 97.97 per cent of cereals, 79.59 per cent of pulses, 63.27 per cent of oilseeds and 67.35 percent of both milk and egg were adequate for the households. Vegetables and fruits were adequate only for 10.20 per cent and meat was 4.08 per cent for the households respectively. Also, the results indicated that, both vegetables and fruits were inadequate for 85.71 per cent of the households. Milk and egg were inadequate for 30.61 per cent respectively; meat was inadequate for 89.90 per cent. Cereals, pulses and oilseeds were inadequate for 2.04 per cent, 18.37 per cent and 8.16 per cent respectively.

The results of the farming constraints experienced by households in studied micro watershed was indicating that Lower fertility status of the soil was the constraint experienced by 32.65 per cent of the households, wild animal menace on farm field (59.18%), frequent incidence of pest and diseases (55.10%), inadequacy of irrigation water (55.10%), high cost of Fertilizers and plant protection chemicals (65.31%), high rate of interest on credit (63.27%), low price for the agricultural commodities (65.31%), lack of marketing facilities in the area (67.35%), inadequate extension services (63.27%), lack of transport for safe transport of the agricultural produce to the market (79.59%), less rainfall (30.61%) and Source of Agri-technology information(Newspaper/TV/Mobile) (12.24).