ICAR-NBSS&LUP Sujala MWS Publ.440

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

BELUR-2 (4D4A2R2e) MICRO WATERSHED

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

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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.

Citation: Rajendra Hegde, Ramesh Kumar, S.C., K.V. Niranjana, S. Srinivas, M.Lalitha, B.A. Dhanorkar, R.S. Reddy and S.K. Singh (2019). “Land resource inventory and socio-economic status of farm households for watershed planning and development of Belur-2 (4D4A2R2e) Microwatershed, Koppal Taluk and District, Karnataka”, ICAR-NBSS&LUP Sujala MWS Publ.440, ICAR – NBSS & LUP, RC, Bangalore. p.147 & 45.

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PREFACE

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

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

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

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

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

ICAR-NBSS&LUP, Regional Centre, Bangalore has taken up a project sponsored by the Karnataka Watershed Development Project-II, (Sujala-III), Government of Karnataka funded by the World Bank under Component -1 Land Resource Inventry. This study was taken up to demonstrate the utility of such a database in reviewing, monitoring and evaluating all the land based watershed development programs on a scientific footing. To meet the requirements of various land use planners at grassroots level, the present study on "Land Resource Inventory and Socio-Economic Status of Farm Households for Watershed Planning and Development of for Belur-2 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: 22-10-2019

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

The land resource inventory of Belur-2 microwatershed was conducted using village cadastral maps and IRS satellite imagery on 1:7920 scale. The false colour composites of IRS imagery were interpreted for physiography and these physiographic delineations were used as base for mapping soils. The soils were studied in several transects and a soil map was prepared with phases of soil series as mapping units. Random checks were made all over the area outside the transects to confirm and validate the soil map unit boundaries. The soil map shows the geographic distribution and extent, characteristics, classification, behavior and use potentials of the soils in the Microwatershed.

The present study covers an area of 566 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. Entire area is covered by soil and <1 per cent by habitation and water body. The salient findings from the land resource inventory are summarized briefly below

- *The soils belong to 14 soil series and 22 soil phases (management units) and 7 land management units.*
- *The length of crop growing period is <90 days and starts from 2nd week of August to 2nd week of November.*
- *From the master soil map, several interpretative and thematic maps like land capability, soil depth, surface soil texture, soil gravelliness, available water capacity, soil slope and soil erosion were generated.*
- *Soil fertility status maps for macro and micronutrients were generated based on the surface soil samples collected at every 320 m grid interval.*
- *Land suitability for growing 31 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area is suitable for agriculture.*
- *About 16 per cent of the soils are shallow (25-50 cm), 21 per cent of the soils are moderately shallow (50-75 cm), 39 per cent moderately deep (75- 100 cm) and 23 per cent is deep to very deep (100 to >150cm) soils.*
- *About 9 per cent loamy (sandy clay loam) and 91 per cent has clayey (sandy clay and clay) soils at the surface.*
- *About 44 per cent of the area has non-gravelly (<15%) soils, 54 per cent has gravelly soils (15-35 % gravel) and 2 per cent very gravelly (35-60 %) soils.*
- *With respect to available water capacity 2 per cent of the area has very low (<50mm/m), 54 per cent of the area has low (51-100 mm/m), 19 per cent medium (101-150 mm/m) and 24 per cent very high (>200 mm/m) in available water capacity.*

- *About 8 per cent area in the microwatershed is nearly level (0-1%) and 92 per cent very gently sloping (1-3%) lands.*
- *An area of about 28 per cent is slightly eroded (e1) and 72 per cent is moderately eroded (e2) lands.*
- *An area of about 4 per cent is neutral (pH 6.5-7.3), 10 per cent is slightly alkaline (pH 7.3-7.8), 19 per cent is moderately alkaline (pH 7.8-8.4), 38 per cent is strongly alkaline (pH 8.4-9.0) and 29 per cent is very strongly alkaline (pH >9.0) in reaction.*
- *The Electrical Conductivity (EC) of the soils are dominantly <2 dSm^{-1} indicating that the soils are non saline.*
- *Organic carbon is low (<0.5%) in 16 per cent and medium (0.5-0.75%) in 83 per cent area of the soils.*
- *Available phosphorus is low (<23 kg/ha) in 62 per cent and medium (23-57 kg/ha) in 37 per cent area of the microwatershed.*
- *Available potassium is medium (145-337 kg/ha) in 87 per cent and high (>337 kg/ha) in 13 per cent area of the soils.*
- *Available sulphur is low (<10 ppm) in 30 per cent, medium (10-20 ppm) in 66 per cent and high (>20 ppm) in 4 per cent area of the soils.*
- *Available boron is low (<0.5 ppm) in 54 per cent and medium (0.5-1.0) in 46 per cent area of the microwatershed.*
- *Available iron is deficient (<4.5 ppm) in 48 per cent and sufficient (>4.5 ppm) in 52 per cent area of the microwatershed.*
- *Available zinc is deficient (<0.6 ppm) in the entire area of the microwatershed.*
- *Available manganese and copper is sufficient in the entire area of the microwatershed.*
- *The land suitability for 31 major agricultural and horticultural crops grown in the microwatershed was assessed and the areas that are highly suitable (class S1) and moderately suitable (class S2) are given below. It is however to be noted that a given soil may be suitable for various crops but what specific crop to be grown may be decided by the farmer looking to his capacity to invest on various inputs, marketing infrastructure, market price, and finally the demand and supply position.*

Land suitability for various crops in the microwatershed

Crop	Suitability Area in ha (%)		Crop	Suitability Area in ha (%)	
	Highly suitable (S1)	Moderately suitable (S2)		Highly suitable (S1)	Moderately suitable (S2)
Sorghum	*209(37)*	*244(43)*	*Sapota*	-	*114(20)*
Maize	*61(11)*	*393(69)*	*Pomegranate*	-	*356(63)*
Bajra	*126(22)*	*331(59)*	*Musambi*	*90(16)*	*256(45)*
Groundnut	*41(7)*	*82(15)*	*Lime*	*90(16)*	*256(45)*
Sunflower	*90(16)*	*245(43)*	*Amla*	*103(18)*	*370(66)*
Redgram	-	*305(54)*	*Cashew*	*61(11)*	*52(9)*
Bengal gram	*148(26)*	*296(52)*	*Jackfruit*	-	*114(20)*
Cotton	*148(26)*	*306(54)*	*Jamun*	-	*164(29)*
Chilli	*62(11)*	*74(13)*	*Custard apple*	*251(44)*	*222(40)*
Tomato	*62(11)*	*51(9)*	*Tamarind*	-	*135(24)*
Brinjal	*103(18)*	*360(64)*	*Mulberry*	-	*303(54)*
Onion	*41(7)*	*72(13)*	*Marigold*	*61(11)*	*392(69)*
Bhendi	*41(7)*	*422(75)*	*Chrysanthemum*	*61(11)*	*392(69)*
Drumstick	-	*345(61)*	*Jasmine*	*61(11)*	*160(28)*
Mango	-	*22(4)*	*Crossandra*	*61(11)*	*99(17)*
Guava	-	*113(20)*			

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the 7 identified LMUs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and other horticulture crops.*
- *Maintaining soil-health is vital for crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested to these problematic soils like saline/alkali, highly eroded, sandy soils etc.,*
- *Soil and water conservation and drainage line treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. That would help in supplementing the farm income, provide fodder and fuel, and generate lot of biomass which in turn would help in maintaining the ecological balance and contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

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

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

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

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

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

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

The land resource inventory aims to provide site-specific database for Belur-2 microwatershed in Koppal Taluk, Koppal District, Karnataka State for the Karnataka Watershed Development Department. The database was generated by using cadastral map of the village as a base along with high resolution IRS LISS IV and Cartosat-1 merged satellite imagery. Later, an attempt will be made to uplink this LRI data generated at 1:7920 scale under Sujala-III Project to the proposed Landscape Ecological Units (LEUs) map.

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

Chapter 2

GEOGRAPHICAL SETTING

2.1 Location and Extent

The Belur-2 micro-watershed is located in the central part of Karnataka in Koppal taluk and district (Fig 2.1). It lies between $15^0$13' and $15^0$15' North latitudes and $76^0$04' and $76^0$06' East longitudes and covers an area of about 566 ha. It is about 17 km from Koppal town. It comprises and bounded by Bisarahalli and Dombrahalli on the north, Beelura on the east and Gudlanura on the southern side of the microwatershed.

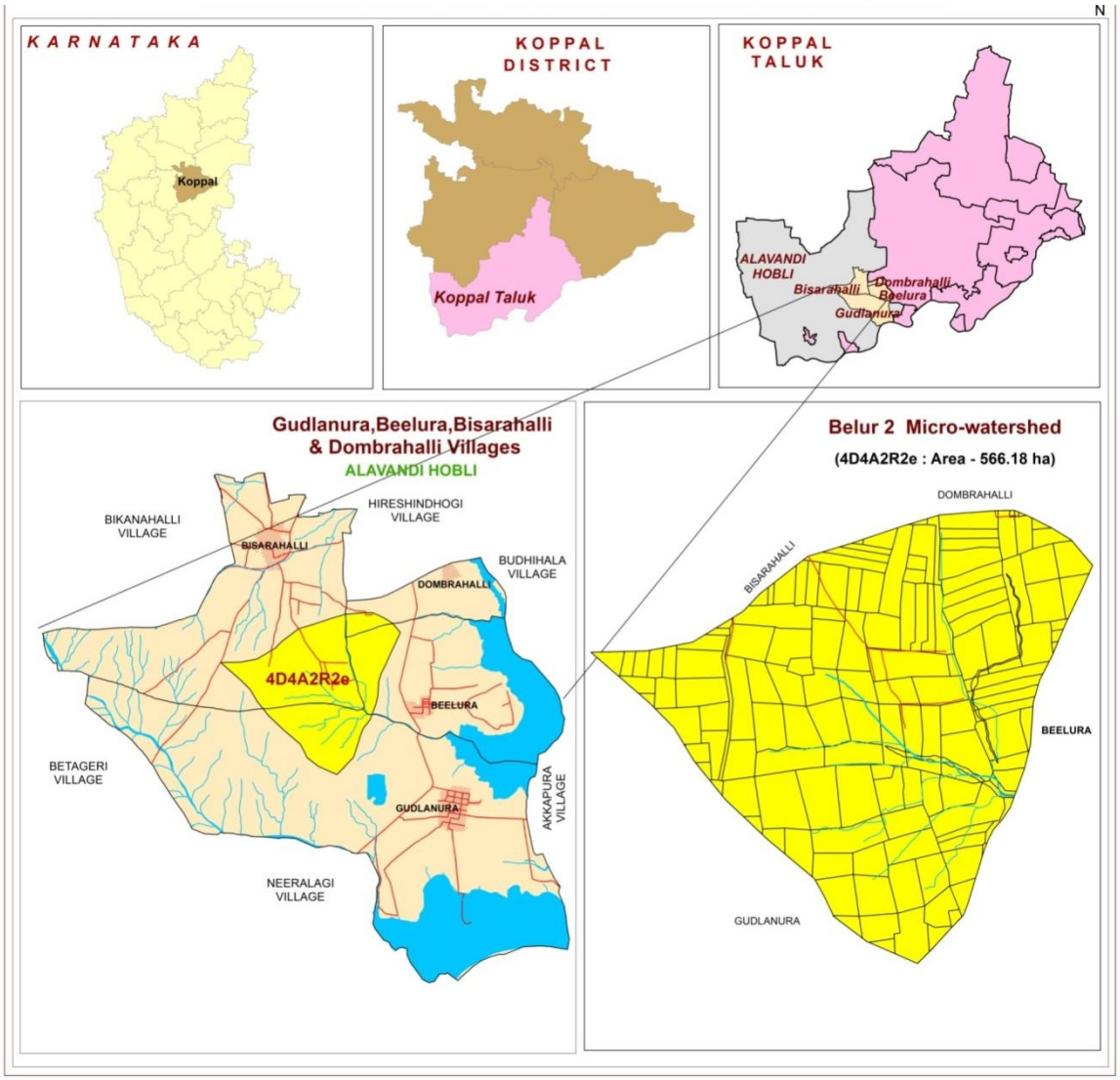


Fig.2.1 Location map of Belur-2 Microwatershed

2.2 Geology

Major rock formations observed in the microwatershed are granite gneiss and alluvium (Fig.2.2 a and b). Granite gneisses are essentially pink to gray and are coarse to medium grained. They consist primarily of quartz, feldspar, biotite and hornblende. The gray granite gneisses are highly weathered, fractured and fissured upto a depth of about 10 m. Dolerite dykes and quartz veins are common with variable width and found to

occur in Bikkanahalli village. The thickness of the alluvium generally is limited to less than a meter, except in river valleys where it is very deep extending to tens of meters. Such soils are transported and represent paleo black soils originally formed at higher elevation, but now occupying river valleys.

Fig.2.2a Granite and granite gneiss rocks

Fig.2.2b Alluvium

2.3 Physiography

Physiographically, the area has been identified as Granite gneiss and Alluvial landscapes based on geology. The microwatershed area has been further divided into mounds/ridges, summits, side slopes and very gently sloping uplands and nearly level plains based on slope and its relief features. The elevation ranges from 510 to 537 m in the gently sloping uplands. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

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

2.5 Climate

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

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

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

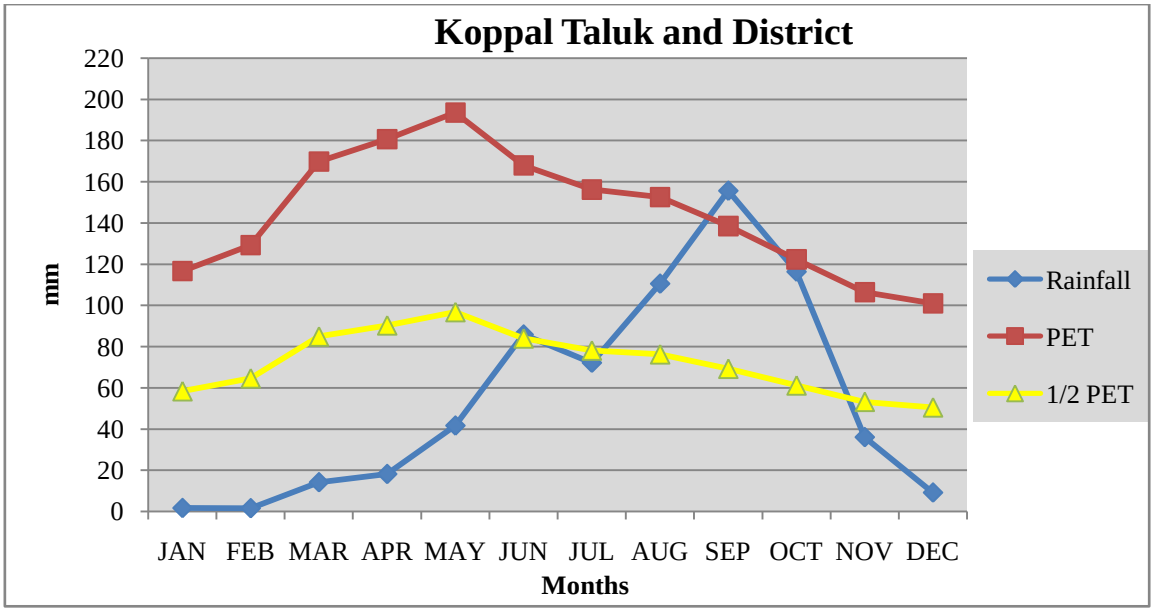


Fig. 2.3 Rainfall distribution in Koppal Taluk and District

2.6 Natural Vegetation

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

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

Fig 2.4 Natural vegetation of Belur-2 microwatershed

2.7 Land Utilization

About 91 per cent area (Table 2.2) in Koppal district is cultivated at present and about 17 per cent of the area is sown more than once. An area of about 3 per cent is currently barren. Forests occupy a small area of about 5 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and boulder areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, bajra, cotton, safflower, sunflower, red gram, horse gram, onion, mulberry, pomegranate, sugarcane, bengalgram and groundnut (Fig 2.5). While carrying out land resource inventory, the land use/land cover particulars are collected from all the survey numbers and a current land use map of the microwatershed is prepared. The current land use map prepared shows the arable and non-arable lands, other land uses and different types of crops grown in the area. The current land use map of Belur-2 microwatershed is presented in Fig.2.6. Simultaneously, enumeration of existing wells (bore wells) and conservation structures is made and their location in different survey numbers is marked on the cadastral map. Map showing the location of wells and conservation structures in Belur-2 microwatershed is given in Fig 2.7.

Table 2.2 Land Utilization in Koppal District

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

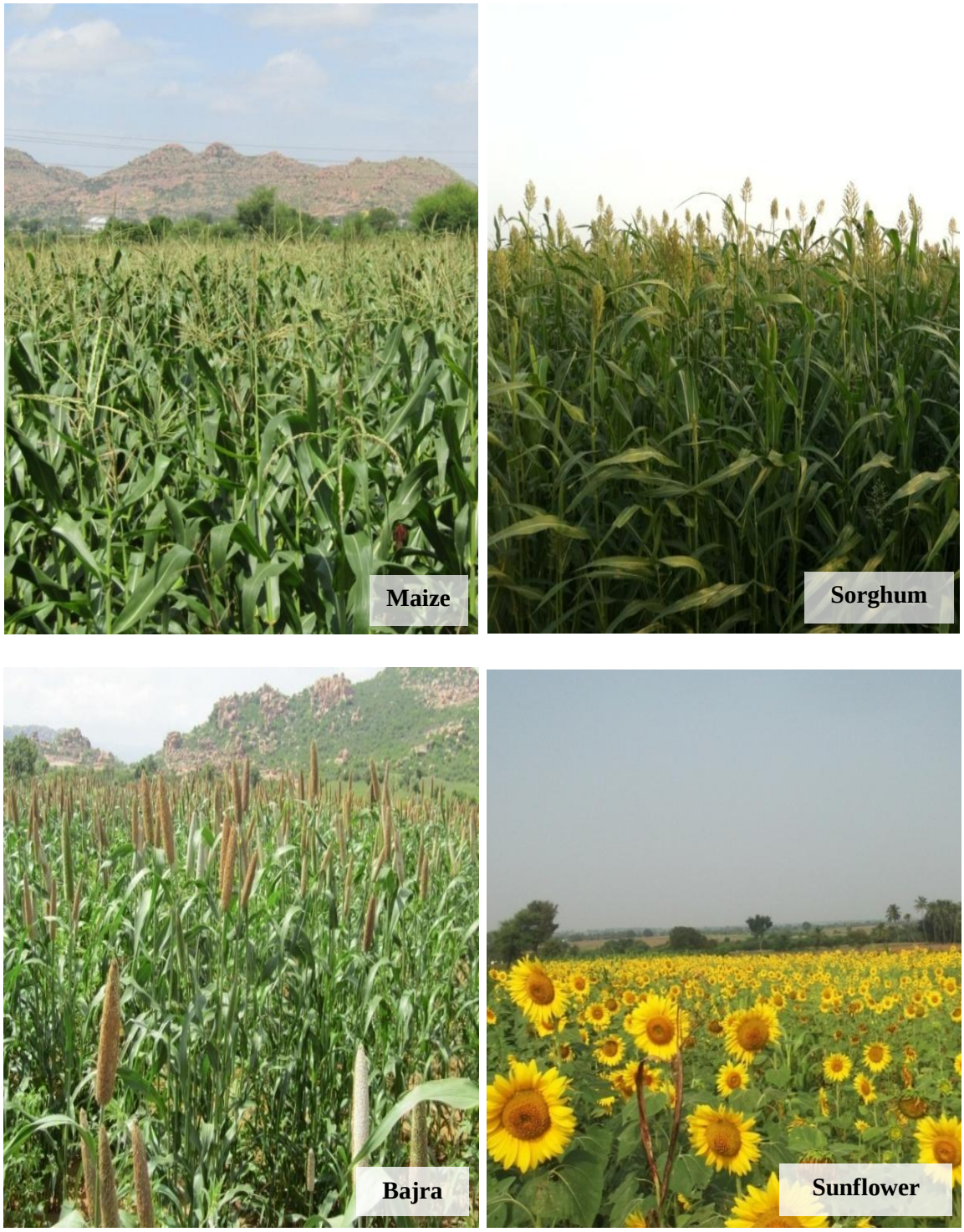


Fig.2.5 (a) Different crops and cropping systems in Belur-2 Microwatershed

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

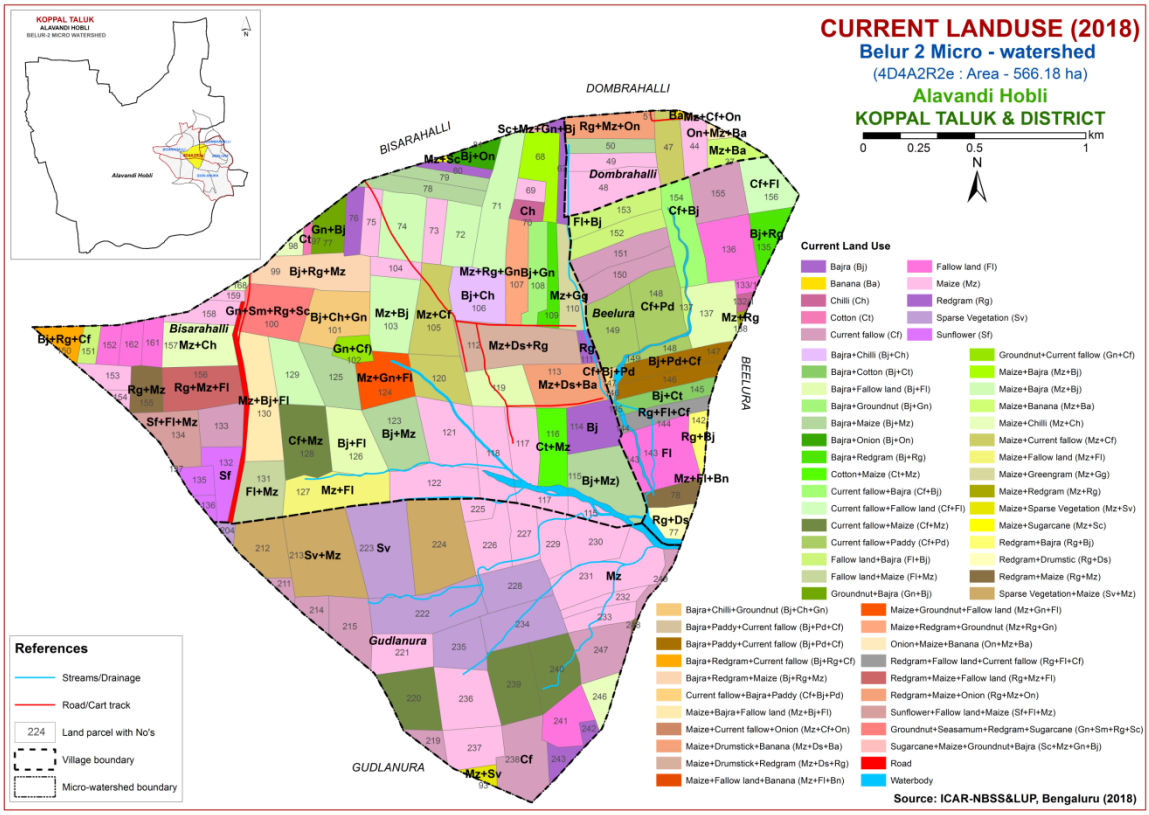


Fig.2.6 Current Land Use map of Belur-2 Microwatershed

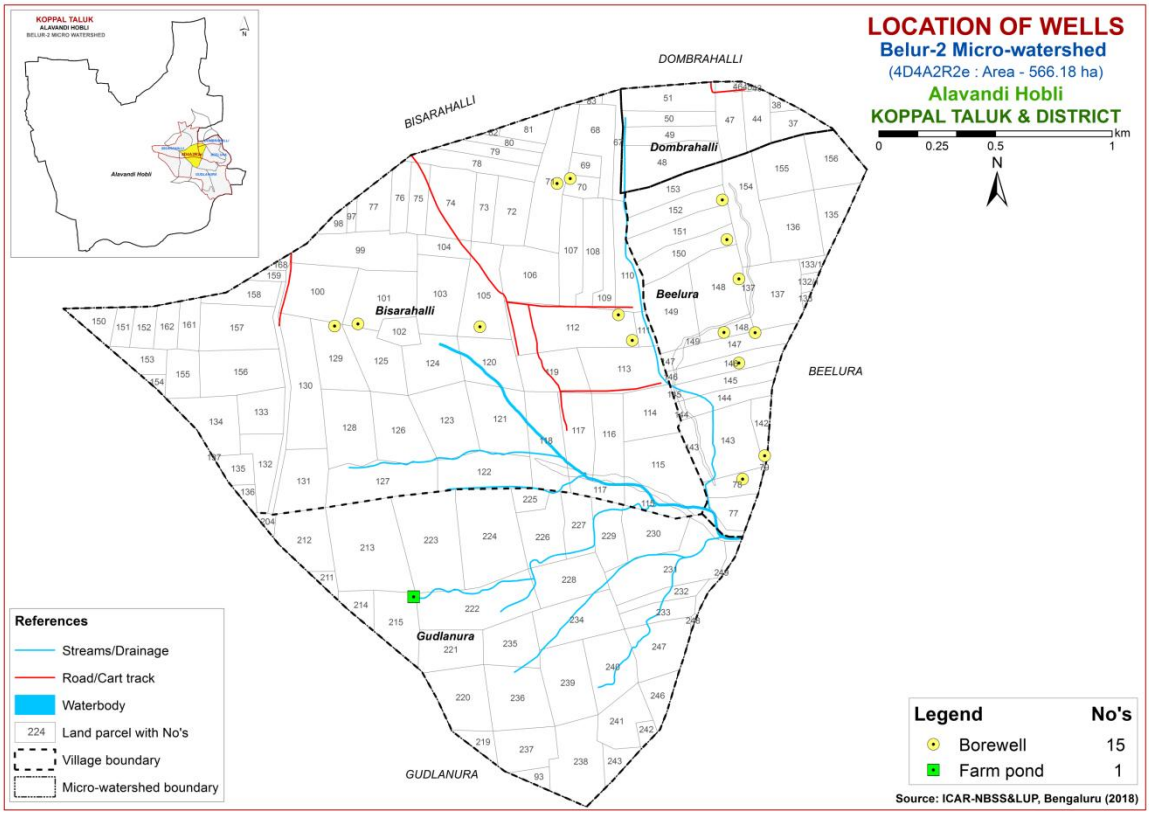


Fig.2.7 Location of wells and conservation structures map of Belur-2 Microwatershed

Chapter 3

SURVEY METHODOLOGY

The purpose of land resource inventory is to delineate similar areas (soil series and phases), which respond or expected to respond similarly for a given level of management. This was achieved in Belur-2 microwatershed by the detailed study of all the soil characteristics (depth, texture, colour, structure, consistence, coarse fragments, porosity, soil reaction, soil horizons etc.) and site characteristics (slope, erosion, drainage, occurrence of rock fragments etc.) followed by grouping of similar areas based on soil-site characteristics into homogeneous (management units) units and showing their extent and geographic distribution on the microwatershed cadastral map. The detailed soil survey at 1:7920 scale was carried out in 566 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 and alluvial landscapes and is divided into landforms such as ridges, mounds and uplands based on slope. They were further subdivided into physiographic/image interpretation units based on image characteristics. The image interpretation legend for physiography is given below.

Image Interpretation Legend for Physiography

G- Granite gneiss landscape

G1 Hills/ Ridges/ Mounds
- G11 Summits
- G12 Side slopes
  - G121 Side slopes with dark grey tones

G2 Uplands
- G21 Summits
- G22 Gently sloping uplands
  - G221 Gently sloping uplands, yellowish green (eroded)
  - G222 Gently sloping uplands, yellowish white (severely eroded)
- G23 Very gently sloping uplands
  - G231 Very gently sloping uplands, yellowish green
  - G232 Very gently sloping uplands, medium green and pink
  - G233 Very gently sloping uplands, pink and green (scrub land)
  - G234 Very gently sloping uplands, medium greenish grey
  - G235 Very gently sloping uplands, yellowish white (eroded)
  - G236 Very gently sloping uplands, dark green
  - G237 Very gently sloping uplands, medium pink (coconut garden)
  - G238 Very gently sloping uplands, pink and bluish white (eroded)

G3 Valleys/ lowlands
- G31 Valleys, pink tones
- G32 Valleys gray mixed with pink tones

DSe -Alluvial landscape

DSe 1 Summit
- DSe 11 Nearly level Summit with dark grey tone
- DSe 12 Nearly level Summit with medium grey tone
- DSe 13 Nearly level Summit with whitish grey tone
- DSe 14 Nearly level Summit with whitish tone (Calcareousness)
- DSe 15 Nearly level Summit with pinkish grey tone
- DSe 16 Nearly level Summit with medium pink tone
- DSe 17 Nearly level Summit with bluish white tone
- DSe 18 Nearly level Summit with greenish grey tone

DSe 2 Very genetly sloping
- DSe 21 Very gently sloping, whitish tone
- DSe 22 Very gently sloping, greyish pink tone
- DSe 23 Very gently sloping, whitish grey tone
- DSe 24 Very gently sloping, medium grey tone
- DSe 25 Very gently sloping, medium pink tone
- DSe 26 Very gently sloping, dark grey tone
- DSe 27 Very gently sloping, bluish grey tone
- DSe 28 Very gently sloping, greenish grey tone
- DSe 29 Very gently sloping, Pinkish grey

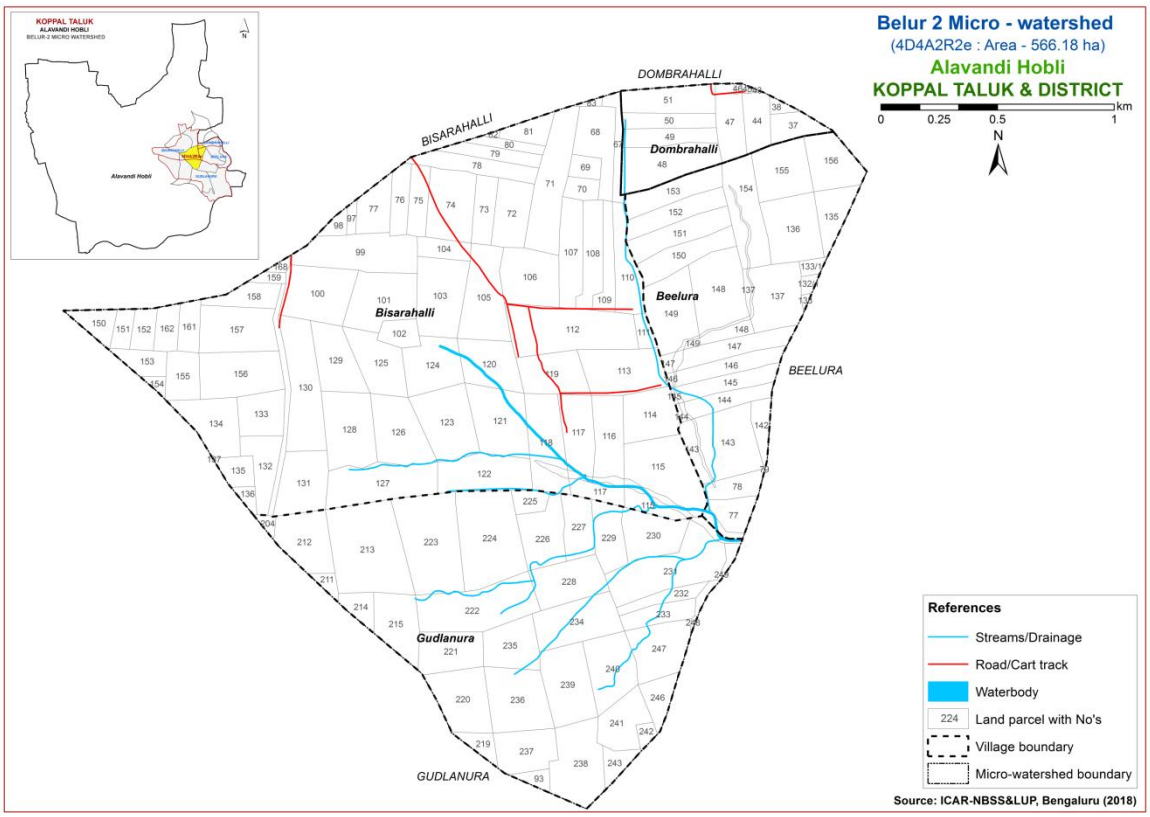


Fig 3.1 Scanned and Digitized Cadastral map of Belur-2 Microwatershed

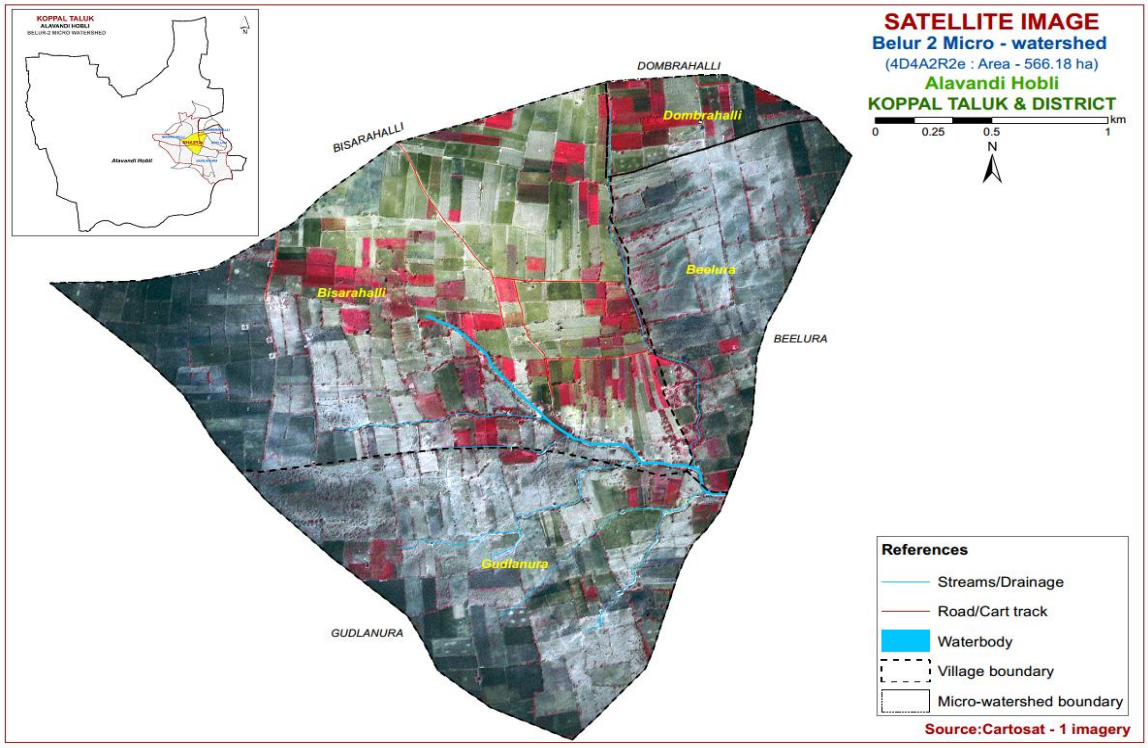


Fig.3.2 Satellite Image of Belur-2 Microwatershed

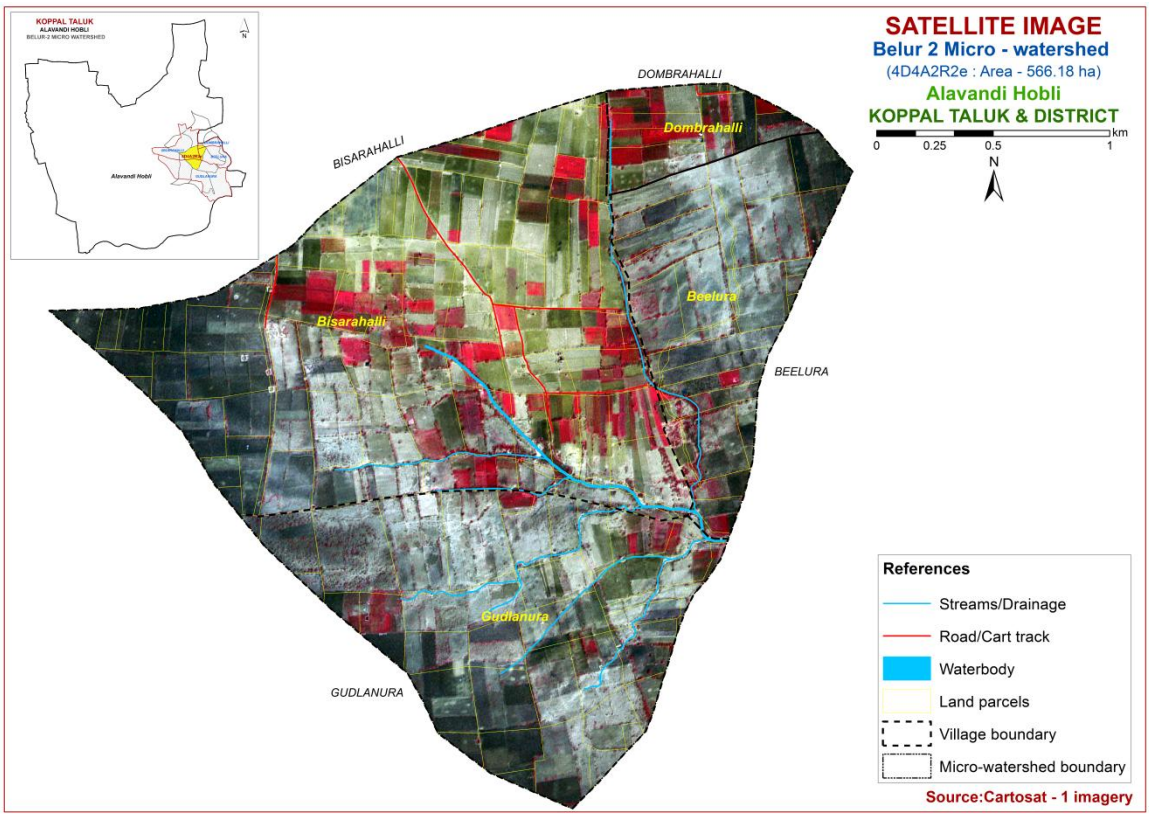


Fig.3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Belur-2 Microwatershed

3.3 Field Investigation

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

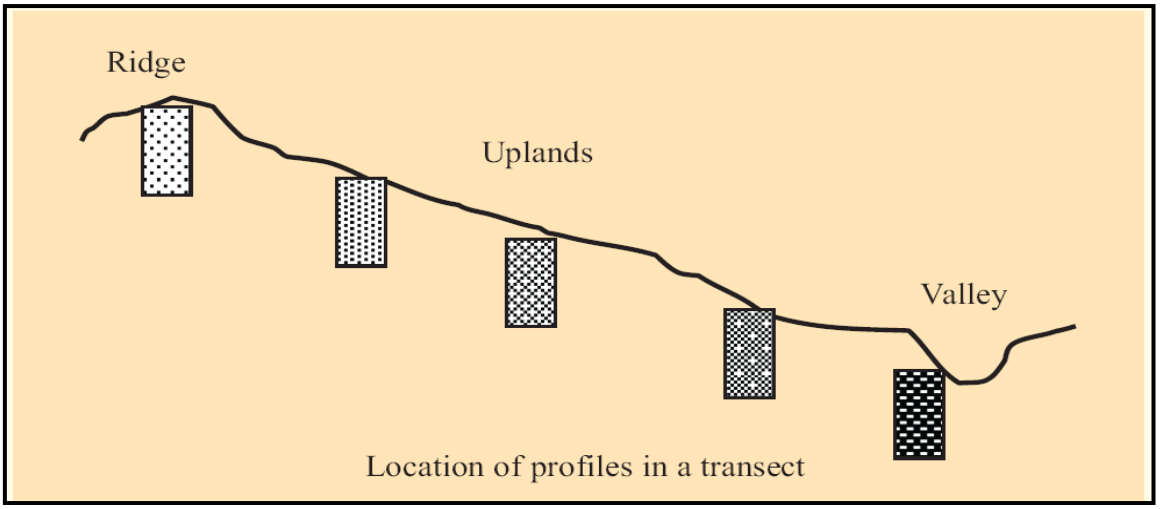


Fig: 3.4. Location of profiles in a transect

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

Based on the soil characteristics, the soils were grouped into different soil series. Soil series is the most homogeneous unit having similar horizons and properties and behaves similarly for a given level of management. Soil depth, texture, colour, kind of horizon and horizon sequence, amount and nature of gravel present, calcareousness, nature of substratum etc, were used as the major differentiating characteristics for identifying soil series occurring in the area. The differentiating characteristics used for identifying the soil series are given in Table 3.1. Based on the above characteristics, 14 soil series were identified in Belur-2 microwatershed.

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

Soils of Granite Gneiss Landscape							
Sl. No	**Soil Series**	**Depth (cm)**	**Colour (moist)**	**Texture**	**Gravel (%)**	**Horizon sequence**	**Calcareo-usness**
1	Chikkasavanur (CSR)	25-50	7.5YR3/2,3/3,3/4	scl	<15	Ap-Bw-Cr	-
2	Hatti (HTI)	50-75	5 YR 3/3, 3/4	gsc	15-35	Ap-Bt-Cr	-
3	Hooradhahalli (HDH)	75-100	2.5YR2.5/4,3/4,3/6	gsc-gc	>35	Ap-Bt-Cr	-
4	Bisarahalli (BSR)	75-100	5 YR 3/3, 3/4	gsc	15-35	Ap-Bt-Cr	-
5	Gollarahatti (GHT)	75-100	2.5YR3/4,3/6, 4/4,4/6	gscl	15-35	Ap-Bt-Cr	-
6	Kumchahalli (KMH)	100-150	2.5YR3/4,3/6	sc	<15	Bt-Cr	-
Soils of Alluvial landscape							
7	Muttal (MTL)	25-50	10YR 3/2, 3/3, 4/2 7.5YR3/2,3/3,6/4	gc	15-35	Ap-Bw-Ck	e-ev
8	Ravanaki (RNK)	50-75	7.5YR3/2,3/3,5/2,5/3 10YR3/1,3/2,4/1, 4/2, 5/1,6/1	c	<15	Ap-Bw-Cr	e-ev
9	Dambarahalli (DRL)	75-100	10YR 2/1, 3/1, 4/3	c	<15	Ap-Bss-Ck	e-es
10	Narasapura (NSP)	75-100	10YR 3/1, 3/2, 4/2	c	<15	Ap-Bw-Cr	e-es
11	Gatareddihal (GRH)	100-150	10YR 2/1, 3/1, 2.5Y 4/3, 5/4	c	<15	Ap-Bss-BC-C	es
12	Kavalur (KVR)	100-150	10 YR 2/2, 3/1, 3/2, 3/3, 4/4	c	<15	Ap-Bss-Bck-Cr	es-ev
13	Lakshmangudda (LGD)	100-150	10YR3/1,3/2,4/1,4/2, 7.5YR3/1,3/2,5/1, 2.5Y5/2, 5/3,6/3	c	<15	Ap-Bss-Ck	es
14	Bardur (BDR)	>150	10YR 2/1, 3/1, 3/2	c	<15	Ap-Bss	es

3.4 Soil Mapping

The area under each soil series was further separated into soil phases and their boundaries delineated on the cadastral map based on the variations observed in the texture of the surface soil, slope, erosion, presence of gravel, stoniness etc. A soil phase is a subdivision of soil series based mostly on surface features that affect its use and management. The soil mapping units are shown on the map (Fig.3.5) in the form of symbols. During the survey many soil profile pits, few mini pits and a few auger bores representing different landforms occurring in the microwatershed were studied. In addition to the profile study, spot observations in the form of mini pits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map.

The soil map shows the geographic distribution of 22 mapping units representing 14 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 22 phases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one soil phase will have similar management needs and have to be treated accordingly.

3.5 Land Management Units

The 22 soil phases identified and mapped in the microwatershed were regrouped into 7 Land Management Units (LMU's) for the purpose of preparing a Proposed Crop Plan for sustained development of the microwatershed. The database (soil phases) generated under LRI was utilized for identifying Land Management Units (LMU's) based on the management needs. One or more than one soil site characteristic having influence on the management have been chosen for identification and delineation of LMU's. For Belur-2 microwatershed, five soil and site characteristics, namely the soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The land use classes are expected to behave similarly for a given level of management.

3.6 Laboratory Characterization

Soil samples for each series were collected from representative master profiles for laboratory characterization by following the methods outlined in the Laboratory Manual (Sarma *et al*, 1987). Surface soil samples collected in the year 2018 from farmer's fields in Belur-2 microwatershed (55 samples) for fertility status (major and micronutrients) at 320 m grid interval were analyzed in the laboratory (Katyal and Rattan, 2003). By linking the soil fertility data to the survey numbers through GIS, soil fertility maps were generated using Kriging method for the microwatershed.

Table 3.2 Soil map unit description of Belur-2 Microwatershed

Soil map unit No*	Soil Series	Soil Phase	Mapping Unit Description	Area in ha (%)
Soils of Granite and Granite gneiss Landscape				
	CSR	Chikkasavanur soils are shallow (25-50 cm), well drained, have dark brown to light yellowish brown, red sandy clay loam soils occurring on nearly level to very gently sloping uplands under cultivation.		**3(0.6)**
39		CSRiB2	Sandy clay surface, slope 1-3%, moderate erosion	3(0.6)
	HTI	Hatti soils are moderately shallow (50-75 cm), well drained, have dark reddish brown, red gravelly sandy clay soils occurring on nearly level to very gently sloping uplands under cultivation		**10(1.74)**
94		HTIhB1g1	Sandy clay loam surface, slope 1-3%, slight	10(1.74)

Soil map unit No*	Soil Series	Soil Phase	Mapping Unit Description	Area in ha (%)
			erosion, gravelly (15-35%)	
	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.		**10(1.83)**
128		HDHiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	10(1.83)
	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.		**62(10.92)**
164		BSRiB1	Sandy clay surface, slope 1-3%, slight erosion	61(10.72)
165		BSRiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	1(0.2)
	GHT	Gollarahatti soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay loam soils occurring on nearly level very gently sloping uplands under cultivation.		**41(7.28)**
142		GHThB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	41(7.28)
	KMH	Kumchahalli soils are moderately shallow (100-150 cm), well drained, have dark brown to reddish brown, red sandy clay soils occurring on very gently to gently sloping uplands under cultivation.		**0.08(0.02)**
201		KMHiB2	Sandy clay surface, slope 1-3%, moderate erosion	0.09(0.02)
Soils of Alluvial Landscape				
	MTL	Muttal soils are shallow (25-50 cm), well drained, have very dark grayish brown to dark brown, calcareous black gravelly clay soils occurring on nearly level to gently sloping plains under cultivation.		**87(15.33)**
310		MTLmB2	Clay surface, slope 1-3%, moderate erosion	3(0.52)
311		MTLmB2g1	Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	84(14.81)
	RNK	Ravanaki soils are moderately shallow (50-75 cm), moderately well drained, have dark brown to very dark grayish brown and dark gray, calcareous clay black soils occurring on nearly level to very gently sloping plains under cultivation.		**108(19.11)**
329		RNKiA1	Sandy clay surface, slope 0-1%, slight erosion	41(7.31)
336		RNKmB2	Clay surface, slope 1-3%, moderate erosion	7(1.19)
337		RNKmB2g1	Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	60(10.61)

Soil map unit No*	Soil Series	Soil Phase	Mapping Unit Description	Area in ha (%)
	DRL	Dambarahalli soils are moderately deep (75-100 cm), moderately well drained, have dark brown to very dark gray, calcareous black cracking clay soils occurring on nearly level to very gently sloping plains under cultivation.		**40(7.13)**
350		DRLmB2	Clay surface, slope 1-3%, moderate erosion	24(4.27)
351		DRLmB2g1	Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	16(2.86)
	NSP	Narasapura soils are moderately deep (75-100 cm), moderately well drained, have dark grayish brown to very dark grayish brown and very dark gray, black calcareous cracking clay soils occurring on nearly level to very gently sloping plains under cultivation.		**68(12)**
363		NSPmB2g1	Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	58(10.27)
364		NSPmB2g2	Clay surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	10(1.73)
	GRH	Gatareddihal soils are deep (100-150 cm), moderately well drained, have light olive brown to very dark gray, calcareous black, sodic cracking clay soils occurring on nearly level to very gently sloping plains under cultivation.		**60(10.51)**
370		GRHmA1	Clay surface, slope 0-1%, slight erosion	2(0.3)
373		GRHmB2	Clay surface, slope 1-3%, moderate erosion	58(10.21)
	KVR	Kavalur soils are deep (100-150 cm), moderately well drained, have dark yellowish brown to very dark grayish brown, calcareous black cracking clay soils occurring on nearly level to very gently sloping plains under cultivation.		**22(3.85)**
388		KVRmB1	Clay surface, slope 1-3%, slight erosion	22(3.85)
	LGD	Lakshmangudda soils are deep (100-150 cm), moderately well drained, have light olive brown to very dark gray, calcareous cracking clay soils occurring on nearly level uplands under cultivation.		**45(8.0)**
393		LGDmB1	Clay surface, slope 1-3%, slight erosion	22(3.91)
477		LGDmB2g1	Clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	23(4.09)
	BDR	Bardur soils are very deep (>150 cm), moderately well drained, have very dark grayish brown to very dark gray, black cracking calcareous clay soils occurring on nearly level to very gently sloping plains under cultivation		**7(1.32)**
433		BDRmB2	Clay surface, slope 1-3%, moderate erosion	7(1.32)
1000	Others	Habitation and water body		**2(0.36)**

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

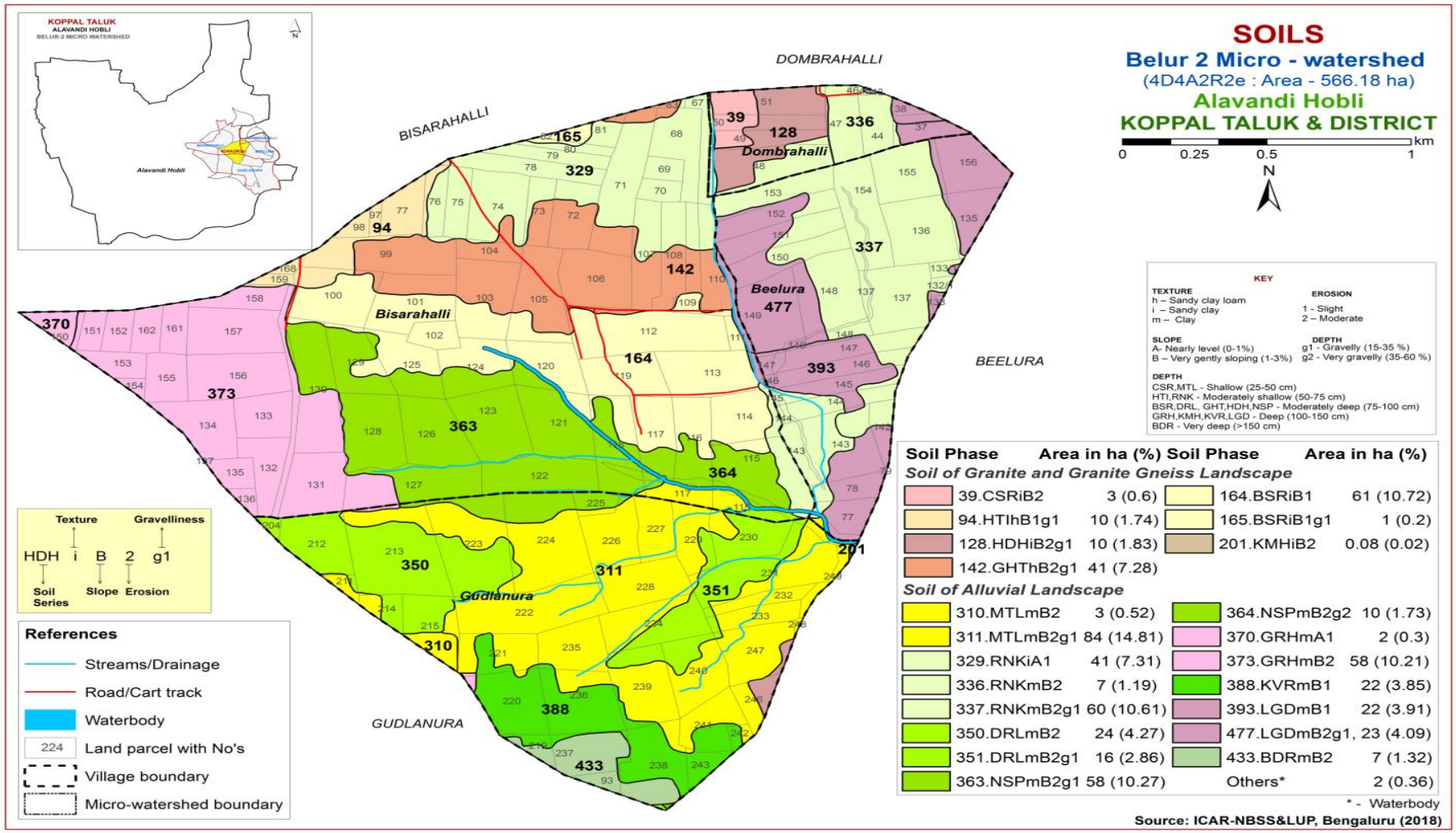


Fig 3.5 Soil Phase or Management Units of Belur-2 Microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Belur-2 microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscape based on geology. In all, 14 soil series were identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. The soil formation is dominantly influenced by the parent material, climate, time and relief.

A brief description of each of the 14 soil series identified followed by 22 soil phases (management units) mapped (Fig. 3.5) are furnished below. The physical and chemical characteristics of soil series identified in Belur-2 microwatershed are given in Table 4.1 along with soil classification. The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

4.1 Soils of Granite and Granite gneiss Landscape

In this landscape, 6 soil series were identified and mapped. Of these series, BSR series occupies maximum area of 62 ha (11%) followed by GHT 41 ha (7%), HTI 10 ha (2%), HDH 10 ha (2%), CSR 3 ha (1%) and KMH <1 ha (<1%).The brief description of the soil series along with the soil phases identified and mapped is given below.

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

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

Landscape and soil profile characteristics of Chikkasavanur (CSR) Series

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

The thickness of the solum ranges from 57 to 74 cm. The thickness of A horizon ranges from 16 to 20 cm. Its colour is in 5 YR hue with value and chroma 3 to 4. The texture varies from sandy loam to sandy clay loam and sandy clay with 15 to 60 per cent gravel. The thickness of B horizon ranges from 45 to 56 cm. Its colour is in 5 YR hue with value 3 and chroma 3 to 4. Texture is sandy clay with 15 to 35 per cent gravel. The available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Hatti (HTI) Series

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

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

Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

4.1.4 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 (51-100 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Bisarahalli (BSR) Series

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

The thickness of the solum ranges from 78 to 98 cm. The thickness of A-horizon ranges from 12 to 18cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture varies from gravelly sandy clay loam with 15 to 35 per cent gravel. The thickness of B horizon ranges from 66 to 81cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay loam with 15 to 35 per cent gravel. The available water capacity is medium (101-150 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Gollarahatti (GHT) Series

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

The thickness of the solum ranges from 102 to 150 cm. The thickness of A horizon ranges from 11 to 23 cm. Its colour is in 5 YR and 2.5 YR hue with value 2.5 to 3 and chroma 3 to 6. The texture is dominantly sandy clay. The thickness of B horizon ranges from 95 to 132 cm. Its colour is in 2.5 YR hue with value 3 and chroma 4 to 6. Its texture is dominantly sandy clay loam to sandy clay. The available water capacity is high (151-200 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Kumchahalli (KMH) Series

4.2 Soils of Alluvial Landscape

In this landscape, 8 soil series were identified and mapped. Of these series, RNK series occupies maximum area of 108 ha (19%) followed by MTL 87 ha (15%), NSP 68 ha (12%), GRH 60 ha (11%), LGD 45 ha (8%), DRL 40 ha (7%), KVR 22 ha (4%) and BDR 7 ha (1%).The brief description of the soil series along with the soil phases identified and mapped is given below.

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

The thickness of the solum ranges from 30 to 50 cm. The thickness of A horizon ranges from 15 to 18 cm. Its colour is in 7.5 YR and 10 YR hue with value 2 to 3 and

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

Landscape and soil profile characteristics of Muttal (MTL) Series

4.2.2 Ravanaki (RNK) Series: Ravanaki soils are moderately shallow (50-75 cm), well drained, have dark brown to very dark grayish brown, calcareous clayey soils. They have developed from alluvium and occur on nearly level to very gently sloping uplands. The Ravanaki soil series has been classified as a member of the very fine, smectitic, (calc) isohyperthermic family of Typic Haplustepts.

The thickness of the solum ranges from 50 to 75 cm. The thickness of A horizon ranges from 15 to 20 cm. Its colour is in 7.5 YR and 10 YR hue with value 2 to 3 and chroma 2.5 to 4. The texture varies from sandy clay to clay with 10 to 15 per cent gravel. The thickness of B horizon ranges from 35 to 60 cm. Its colour is in 10 YR and 7.5 YR hue with value 2 to 6 and chroma 2 to 4. Its texture is sandy clay to clay with gravel content of 10 to 20 per cent. The available water capacity is medium (51-100 mm/m). Three soil phases were identified and mapped.

Landscape and Soil Profile Characteristics of Ravanaki (RNK) Series

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

The thickness of the solum ranges from 75 to 99 cm. The thickness of A horizon ranges from 13 to 24 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. The texture is clay. The thickness of B horizon ranges from 54 to 85 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 3. Its texture is clay and is calcareous. The available water capacity is high (151-200 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Dambarahalli (DRL) Series

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

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

Landscape and soil profile characteristics of Narsapura (NSP) Series

4.2.5 Gatareddihal (GRH) Series: Gatareddihal soils are deep (100-150 cm), moderately well drained have black or dark grey to light olive brown, calcareous sodic clay soils. They are developed from alluvium and occur on nearly level to very gently sloping plains under cultivation. The Gatareddihal series has been classified as member of the very fine, smectitic, (calc) isohyperthermic family of Sodic Haplusterts.

The thickness of the solum ranges from 102 to 149 cm. The thickness of A-horizon ranges from 12 to 19 cm. Its colour is in 7.5 YR, 10 YR hue with value 3 to 4 and chroma 1 to 6. The texture is sandy clay loam to clay. The thickness of B-horizon ranges from 86 to 117 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 and chroma 2 to 6. Texture is clay with less than 15 per cent gravel. The available water capacity is very high (>200 mm/m). Two soil phases were identified and mapped..

Landscape and soil profile characteristics of Gatareddihal (GRH) Series

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

The thickness of the solum is 113 to 143 cm. The thickness of A horizon ranges from 9 to 24 cm. Its colour is in 10 YR hue with value 3 and chroma 1. The texture is clay with no gravel. The thickness of B horizon ranges from 89 to 134 cm. Its colour is in 10 YR hue with value 3 and chroma 1. Its texture is clay. The available water capacity is very high (>200 mm/m). Only one soil phase was identified and mapped.

Landscape and soil profile characteristics of Kavalur (KVR) series

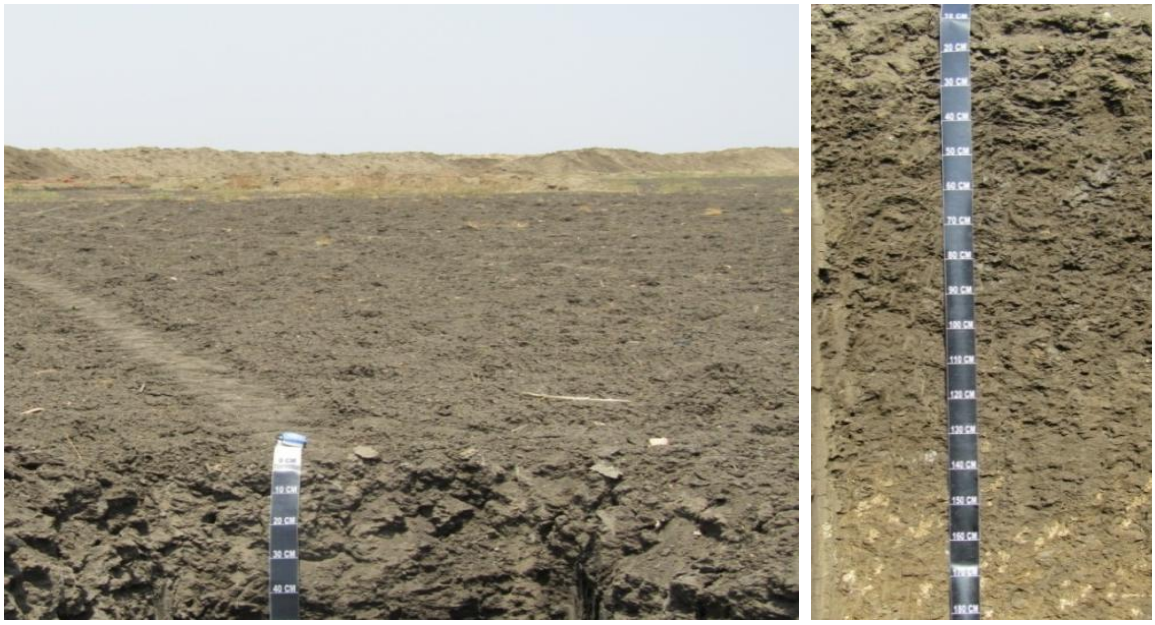
4.2.7 Lakshmangudda (LGD) Series: Lakshmangudda soils are deep (100-150 cm), well drained, have light olive brown to very dark gray calcareous clayey soils. They have developed from alluvium and occur on nearly level uplands. The Lakshmangudda series has been classified as a member of the fine, smectitic, (calc) isohyperthermic family of Typic Haplusterts.

The thickness of the solum ranges from 108 to 149 cm. The thickness of A horizon ranges from 16 to 20 cm. Its colour is in 7.5 YR and 10 YR hue with value and chroma 3 to 4. The texture varies from sandy clay to clay with 5 to 10 per cent gravel. The thickness of B horizon ranges from 90 to 132 cm. Its colour is in 2.5 Y, 10 YR and 7.5 YR hue with value 3 to 6 and chroma 1 to 3. Its texture is clay. The available water capacity is Very high (151-200 mm/m). Two soil phases were identified and mapped.

Landscape and Soil Profile Characteristics of Lakshmangudda (LGD) Series

4.2.8 Bardur (BDR) Series: Bardur soils are very deep (>150 cm), moderately well drained, have very dark grayish brown to very dark gray, black calcareous cracking clay soils. They are developed from alluvium and occur on nearly level to very gently sloping plains under cultivation. The Bardur series has been classified as a member of the very fine, smectitic, isohyperthermic (calcareous) family of Typic Haplusterts.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 15 to 19 cm. Its colour is in 10 YR hue with value 2 and chroma 1 with clay texture. The thickness of B horizon ranges from 146 to 180 cm. Its colour is in 10 YR hue with value 2 to 3 and chroma 1 to 2. Its texture is clay and is calcareous with less than 15 per cent gravel. The available water capacity is very high (>200 mm/m). Only one soil phase was identified and mapped.



Landscape and soil profile characteristics of Bardur (BDR) Series

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

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-16	Ap	65.33	12.19	22.48	13.79	11.32	13.37	18.31	8.54	15-20	scl	16.83	5.49
16-41	Bt1	41.54	14.04	44.42	6.47	6.26	9.50	13.36	5.95	15-20	c	27.26	16.64
41-64	Bt2	48.71	8.48	42.81	26.06	7.55	5.38	6.31	3.41	55-60	sc	27.22	12.63

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-16	7.11	-	-	0.109	0.92	-	21.06	8.23	0.39	0.06	29.74	20.19	0.90	147	0.30
16-41	7.54	-	-	0.220	0.92	-	21.93	8.47	0.23	0.27	30.90	31.31	0.70	99	0.85
41-64	7.82	-	-	0.168	0.55	-	19.43	7.09	0.31	0.47	27.30	26.57	0.62	103	1.77

Contd…

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-18	Ap	72.56	15.17	12.27	4.57	8.33	17.38	23.88	18.39	35	sl	-	-
18-33	Bt1	56.29	10.75	32.96	7.88	10.24	13.41	14.43	10.34	55	scl	-	-
33-58	Bt2	46.66	10.79	42.55	10.79	9.87	8.43	9.04	8.53	55	sc	-	-
58-90	Bt3	43.09	13.63	43.27	9.90	8.25	7.32	8.76	8.87	45	c	-	-

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-18	6.54	-	-	0.07	0.60	0.00	2.68	1.38	0.44	0.42	4.91	5.84	0.48	84.07	7.11
18-33	5.90	-	-	0.07	0.52	0.00	3.99	1.27	0.09	0.37	5.71	8.61	0.26	66.32	4.29
33-58	6.16	-	-	0.07	0.44	0.00	4.92	1.67	0.08	0.55	7.22	10.00	0.24	72.23	5.50
58-90	6.39	-	-	0.06	0.40	0.00	4.30	2.02	0.08	0.46	6.87	9.21	0.21	74.61	5.05

Contd…

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…

V cSoil Series: Gollarahatti (GHT), **Pedon:** RM-2
Location: $50^0$04'88.8"N, $75^0$37'65.2"E, (4D4A3I1f), Belhatti village, Shirahatti taluk, Gadag district.
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine- loamy, mixed, isohyperthermic Typic Rhodustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-26	Ap	83.22	5.74	11.05	9.71	11.73	16.68	27.10	16.58	30	ls	-	-
26-63	Bt1	55.91	13.36	30.73	13.05	9.66	11.10	14.29	7.81	20	scl	-	-
63-84	Bt2	57.17	11.38	31.45	10.53	10.11	12.28	13.83	10.42	20	scl	-	-

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-26	5.70	-	-	0.06	0.20	0.00	1.50	0.60	0.09	0.13	2.32	3.17	0.29	73.00	4.10
26-63	6.26	-	-	0.04	0.24	0.00	7.35	1.55	0.09	0.17	9.15	9.89	0.32	93.00	1.72
63-84	6.50	-	-	0.05	0.20	0.47	-	-	0.09	0.21	0.30	10.18	0.32	100.00	2.06

Contd…

S**eries Name:** Kumchahalli (KMH), **Pedon:** RM-9
Location: $15^0$20'05"N, $76^0$13'21"E, Basapura village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Typic Rhodustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-13	Ap	51.76	9.05	39.19	7.99	8.84	13.42	14.38	7.14	-	sc	20.08	13.69
13-27	A21	53.50	8.12	38.38	7.00	11.05	15.21	14.33	5.91	-	sc	17.05	12.32
27-43	A22	63.60	5.01	31.40	3.85	11.56	24.52	18.52	5.14	-	scl	11.76	9.09
43-64	Bt1	48.74	5.91	45.35	8.87	9.31	12.49	12.27	5.81	10	sc	16.68	13.35
64-84	Bt2	45.13	8.90	45.97	9.86	7.12	10.95	10.62	6.57	20	sc	17.45	13.42
84-114	BC	65.04	6.94	28.02	10.49	16.21	17.80	13.88	6.67	40	scl	13.20	9.75

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-13	7.2	-	-	0.193	0.81	3.00	9.69	3.93	1.41	0.08	15.10	15.07	0.38	100	0.54
13-27	7.13	-	-	0.161	0.7	3.00	8.69	3.57	1.29	0.16	13.70	13.75	0.36	100	1.14
27-43	7.31	-	-	0.096	0.89	2.64	5.19	2.36	1.07	0.24	8.86	9.46	0.30	94	2.51
43-64	7.65	-	-	0.089	1.16	2.52	8.25	2.88	0.72	0.35	12.20	12.65	0.28	96	2.79
64-84	7.98	-	-	0.1	0.38	3.12	10.49	2.88	0.26	0.41	14.04	14.63	0.32	96	2.78
84-114	8.23	-	-	0.121	0.58	2.88	8.02	1.87	0.09	0.43	10.41	10.67	0.38	98	4.02

Contd…

Series Name: Muttal (MTL), **Pedon:** RM-13
Location: $15^0$14'30.8"N, $75^0$56'50.6"E, Gatareddihalla village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Clayey, mixed, (calc) isohyperthermic (Paralithic) Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-20	Ap	39.05	13.74	47.21	3.05	5.05	8.21	14.63	8.11	15-30	c	29.95	17.94
20-34	Bwk	28.77	19.57	51.66	4.81	4.71	4.92	9.09	5.24	10	c	33.44	21.56

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

Contd…

Series Name: Ravanaki (RNK), **Pedon:** RM-20
Location: $15^0$14'22.7"N, $75^0$57'45.8"E, Gatareddihalla village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Very fine, smectitic, (calc) 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
0-28	Ap	24.43	17.76	57.81	5.30	3.89	3.78	7.14	4.32	20	c	41.40	29.60
28-55	Bw	18.77	15.59	65.64	2.74	3.73	2.85	4.83	4.61	10	c	46.71	35.18
55-80	Bc	12.53	15.43	72.04	2.60	1.92	1.47	3.16	3.39	10	c	56.82	43.73

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}							%	%
0-28	8.86	-	-	0.483	0.63	15.48	-	-	0.86	6.27	-	37.00	0.64	-	6.78
28-55	8.61	-	-	1.4	0.23	13.68	-	-	0.68	12.27	-	53.20	0.81	-	9.22
55-80	8.35	-	-	4.53	0.91	11.40	-	-	0.75	28.97	-	54.80	0.76	-	21.14

Contd…

Series Name: Dombarahalli (DRL), **Pedon:** R-8
Location: $15^0$13'96.2"N, $75^0$57'48.6" E Ragunathanahalli village, Koppal taluk and district
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Very fine, smectitic, (calc) isohyperthermic Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-15	Ap	28.25	19.48	52.27	4.76	4.44	4.87	8.23	5.95	-	c	39.86	27.20
15-27	BA1	21.55	20.00	58.45	3.76	2.76	3.43	6.30	5.30	-	c	46.35	34.84
27-45	Bss1	14.86	20.89	64.25	2.46	2.23	2.23	3.91	4.02	-	c	57.99	41.06
45-80	Bss2	10.42	19.04	70.54	1.74	1.97	1.27	2.78	2.66	-	c	66.36	36.24

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}							%	%
0-15	8.78	-	-	0.42	0.32	12.35	-	-	0.59	4.25	-	49.70	0.95	100.00	5.62
15-27	9.03	-	-	0.61	0.30	12.48	-	-	0.30	8.96	-	57.23	0.98	100.00	10.07
27-45	9.10	-	-	0.67	0.34	11.70	-	-	0.25	11.85	-	60.71	0.95	100.00	14.05
45-80	9.18	-	-	0.86	0.32	13.39	-	-	0.27	15.40	-	63.33	0.90	100.00	18.45

Contd…

Series Name: Narsapura (NSP), **Pedon:** A2/RM-2
Location: $15^0$19'86.9"N, $75^0$57'86.1"E, Kavalura village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Very fine, smectitic, (calc) isohyperthermic Vertic Haplustepts

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

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-29	9.16	-	-	0.615	0.23	9.36	-	-	0.72	10.98	-	51.09	0.98	-	8.60
29-52	8.69	-	-	2.01	0.5	8.64	-	-	0.55	24.42	-	60.63	0.94	-	16.11
52-77	8.52	-	-	2.68	0.46	7.68	-	-	0.50	25.65	-	60.74	0.88	-	16.90

Contd…

Series Name: Gatareddihal (GRH), **Pedon:** R-7
Location: $15^0$14'20.8"N, $76^0$04'28.4" E Gudlanur village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Very fine, smectitic, (calc) isohyperthermic Sodic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-18	Ap	20.07	19.71	60.23	1.76	3.75	3.64	3.42	7.50	-	c	41.70	29.56
18-51	Bss1	15.11	17.47	67.42	3.16	3.04	2.25	3.38	3.27	-	c	59.43	38.52
51-80	Bss2	13.19	18.74	68.07	1.80	2.93	2.37	3.04	3.04	-	c	60.69	40.91
80-107	Bss3	17.54	19.50	62.96	2.46	4.13	3.24	4.25	3.46	-	c	57.25	37.31
107-131	BC	9.42	17.48	73.10	1.48	1.82	1.36	1.93	2.84	-	c	64.62	43.98

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	9.08	-	-	0.23	0.33	6.89	-	-	0.70	6.36	-	63.21	1.05	100.00	7.11
18-51	9.19	-	-	0.61	0.49	9.10	-	-	0.54	14.20	-	66.05	0.98	100.00	15.98
51-80	9.27	-	-	0.56	0.29	9.36	-	-	0.49	14.75	-	65.63	0.96	100.00	17.07
80-107	9.28	-	-	0.57	0.39	9.62	-	-	0.44	14.64	-	63.95	1.02	100.00	17.49
107-131	9.04	-	-	1.08	0.31	8.32	-	-	0.52	16.40	-	68.36	0.94	100.00	17.30

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Series Name: Kavalura (KVR), **Pedon:** A2/RM-9
Location: $15^0$18'86.8"N, $75^0$56'56.3"E, Kavalura village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, smectitic, (calc) isohyperthermic Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-24	Ap	36.18	17.80	46.02	7.04	7.47	6.62	9.28	5.76	10	c	28.20	18.75
24-50	Bss1	38.79	15.36	45.85	6.25	6.25	9.70	10.67	5.93	05	c	27.16	18.81
50-85	Bss2	36.80	14.66	48.54	9.63	8.23	7.03	7.58	4.33	<5	c	30.16	22.17
85-124	Bss3	22.66	17.24	60.09	4.18	3.85	5.28	5.06	4.29	<5	c	40.34	31.42

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}							%	%
0-24	8.4	-	-	0.265	0.2	8.04	-	-	0.97	0.65		43.25	0.94		0.60
24-50	9.27	-	-	0.23	0.37	8.04	-	-	0.31	3.21		41.66	0.91		3.08
50-85	9.44	-	-	0.297	0.41	8.64	-	-	0.35	6.43		43.99	0.91		5.85
85-124	9.37	-	-	0.46	0.41	11.40	-	-	0.42	7.99		51.09	0.85		6.26

Contd…

Series Name: Lakshmangudda (LGD), **Pedon:** R-2

Location: $15^0$13'08.2"N, $76^0$15'27.3" E Raghunathanahalli village, Koppal Taluk and District

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-17	Ap	50.60	14.29	35.11	4.53	7.86	12.49	5.18	20.54	-	sc	28.99	18.05
17-40	Bss1	40.22	16.89	42.89	3.03	7.03	9.95	13.84	6.38	-	c	34.09	23.60
40-65	Bss2	37.58	17.32	45.10	2.94	6.86	10.24	11.55	5.99	-	c	35.23	24.68
65-92	Bss3	30.69	19.33	49.97	2.09	5.06	8.03	8.25	7.26	-	c	40.92	29.53
92-124	Bss4	29.82	21.09	49.09	2.99	5.76	7.65	3.33	10.09	-	c	44.40	31.52
124-145	Bss5	28.77	22.78	48.44	2.63	5.36	7.44	8.86	4.49	-	c	43.05	30.08

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-17	8.03	-	-	1.93	0.94	8.84	-	-	0.35	5.02	-	32.37	0.92	100.00	1.82
17-40	7.68	-	-	1.85	0.98	8.97	-	-	0.16	4.38	-	42.18	0.98	100.00	1.66
40-65	7.61	-	-	1.75	0.94	9.36	-	-	0.16	3.77	-	42.84	0.95	100.00	1.32
65-92	7.82	-	-	1.65	1.07	9.23	-	-	0.22	5.02	-	47.85	0.96	100.00	2.82
92-124	8.46	-	-	1.10	1.13	10.40	-	-	0.23	6.72	-	47.31	0.96	100.00	7.95
124-145	8.66	-	-	0.94	0.88	14.17	-	-	0.22	6.48	-	44.80	0.92	100.00	8.17

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Series Name: Bardur (BDR), **Pedon:** R-4
Location: $15^0$14'31.7"N, $76^0$01'19.1"E, Moranali village, Koppal Taluk and District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Very fine, smectitic, (calc) isohyperthermic Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-25	Ap	21.78	22.78	55.44	2.17	3.68	4.44	6.61	4.88	-	c	36.78	26.95
25-53	BA	18.62	18.56	62.82	2.23	4.24	3.46	5.24	3.46	-	c	41.25	29.87
53-90	Bss1	15.87	18.60	65.53	2.23	1.34	4.25	3.91	4.13	-	c	44.73	33.64
90-126	Bss2	13.66	20.02	66.32	1.68	2.80	2.35	3.70	3.14	-	c	49.24	38.37
126-152	Bss3	11.64	20.79	67.57	1.69	1.81	1.81	3.50	2.82	-	c	53.50	41.90
152-210	Bss4	11.38	22.78	65.42	2.16	2.16	1.93	3.07	2.05	-	c	51.53	39.64

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-25	8.73	-	22.78	0.203	0.24	5.76	-	-	0.65	4.43	-	40.56	0.73	-	4.37
25-53	9.17	-	18.56	0.295	0.45	4.92	-	-	0.32	10.47	-	74.70	1.19	-	5.61
53-90	9.27	-	18.60	0.388	0.66	6.00	-	-	0.24	10.49	-	76.20	1.16	-	5.51
90-126	9.22	-	20.02	0.608	0.57	5.88	-	-	0.21	15.93	-	77.20	1.16	-	8.25
126-152	9.21	-	20.79	0.936	0.33	6.60	-	-	0.37	20.88	-	80.90	1.20	-	10.32
152-210	9.03	-	23.21	1.47	0.33	8.16	-	-	0.24	15.34	-	73.10	1.12	-	8.39

Chapter 5

INTERPRETATION FOR LAND RESOURCE MANAGEMENT

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

5.1 Land Capability Classification

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The 22 soil map units identified in the Belur-2 microwatershed are grouped under 2 land capability classes and 4 land capability subclasses (Fig. 5.1).

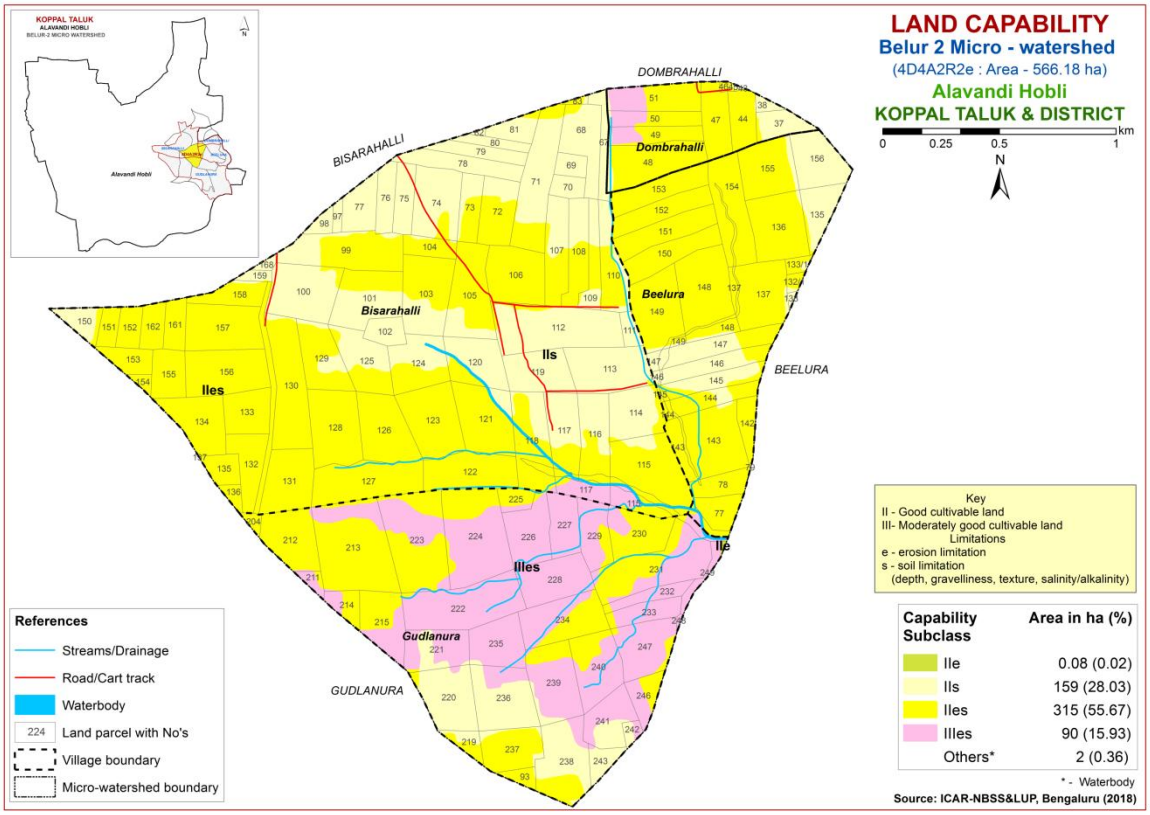


Fig. 5.1 Land Capability classification map of Belur-2 Microwatershed

Entire cultivated area in the microwatershed is suitable for agriculture. Good lands (Class II) cover a maximum area of about 474 ha (84%) and are distributed in all parts of the microwatershed with minor problems of soil and erosion. Moderately good (Class III) lands covers an area of about 90 ha (16%) and are distributed in the northern and southern part of the microwatershed with major problems of soil and erosion. An area of about 2 ha (<1%) is covered by others (habitation and water body).

5.2 Soil Depth

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

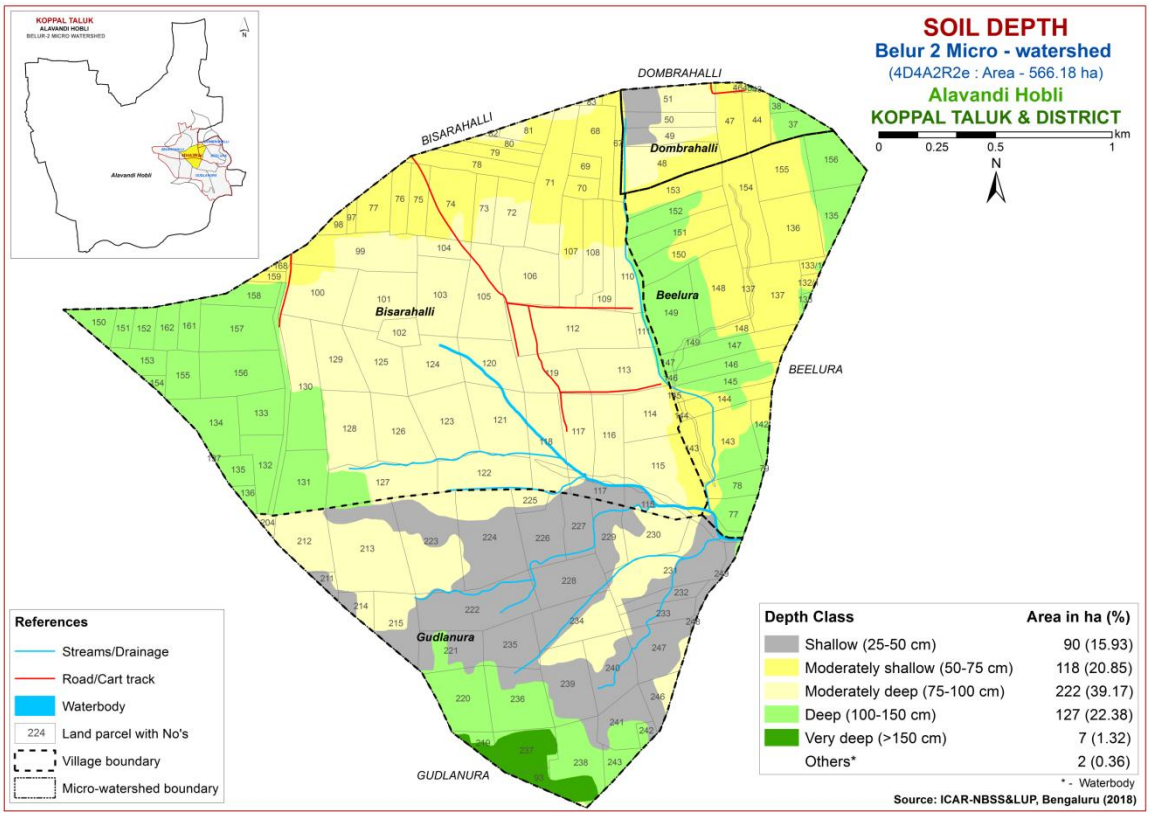


Fig. 5.2 Soil Depth map of Belur-2 Microwatershed

Shallow (25-50 cm) soils cover an area of about 90 ha (16%) and are distributed in the northern and southern part of the microwatershed. Moderately shallow (50-75 cm) soils cover an area of about 118 ha (21%) and distributed in the northern and eastern part

of the microwatershed. Maximum area of about 222 ha (39%) is moderately deep soils (75-100 cm) and are distributed in all parts of the microwatershed. Deep to very deep (100 to >150 cm) soils occupy an area of about 134 ha (23%) and are distributed in the northern, eastern, western and southern part of the microwatershed.

The most productive lands cover about 134 ha (23%) where all climatically adopted long duration crops can be grown. Problem soils cover about 90 ha (16%) where only short duration crops can be grown.

5.3 Surface Soil Texture

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

An area of about 51 ha (9%) is loamy at the surface and are distributed in the northern part of the microwatershed. Maximum area of about 513 ha (91%) is clayey at the surface and are distributed in all parts of the microwatershed.

The most productive lands with respect to surface soil texture are clayey soils that (91%) have high potential for soil-water retention and availability and nutrient retention and availability, but have more problems of drainage, infiltration, workability and other physical problems. The other productive lands are loamy (9%) soils which also have high potential for soil- water retention and nutrient availability but have no drainage or other physical problems.

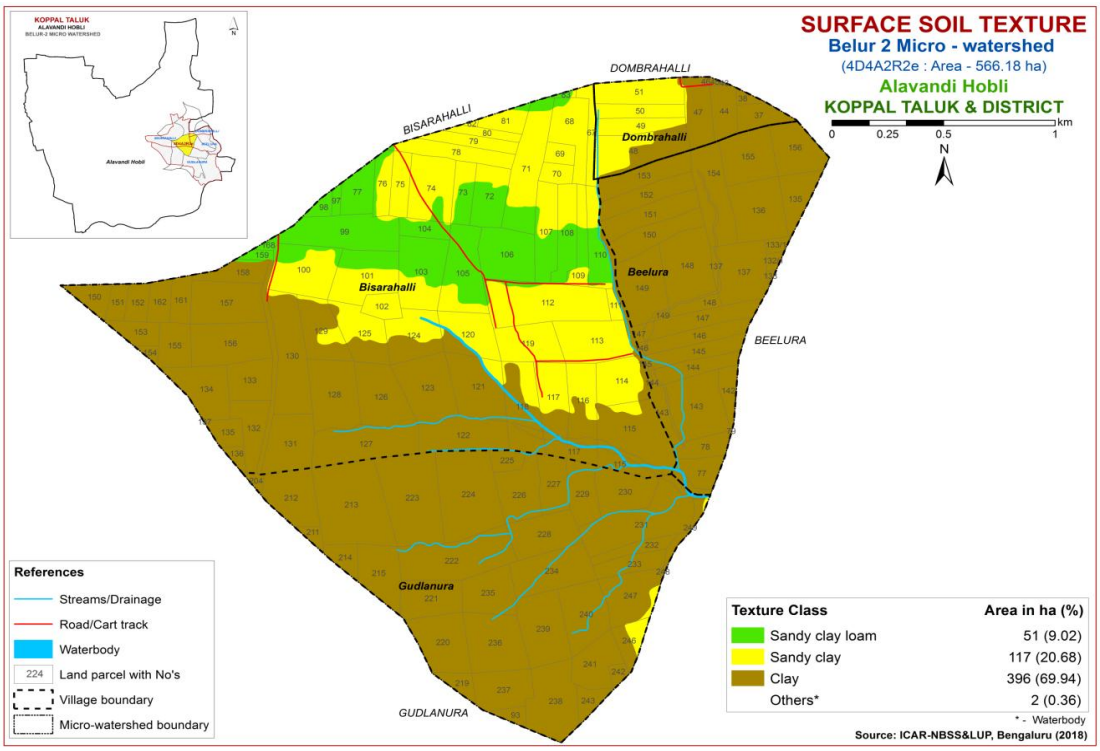


Fig. 5.3 Surface Soil Texture map of Belur-2 Microwatershed

5.4 Soil Gravelliness

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

The soils that are non-gravelly (<15% gravel) cover an area of about 250 ha (44%) and distributed in the northern, eastern, western and southern part of the microwatershed. Maximum area of about 304 ha (54%) is covered by gravelly (15-35% gravel) soils and are distributed in all parts of the microwatershed. Very gravelly (35-60%) soils cover an area of about 10 ha (2%) and are distributed in the central part of the microwatershed (Fig. 5.4).

The most productive lands with respect to gravelliness are found to be 44 per cent that are non gravelly (<15%) soils. These are most productive soils and have potential for growing both annual and perennial crops. The problem soils that are very gravelly (35-60%) cover an area of about 2 per cent where only short duration crops can be grown.

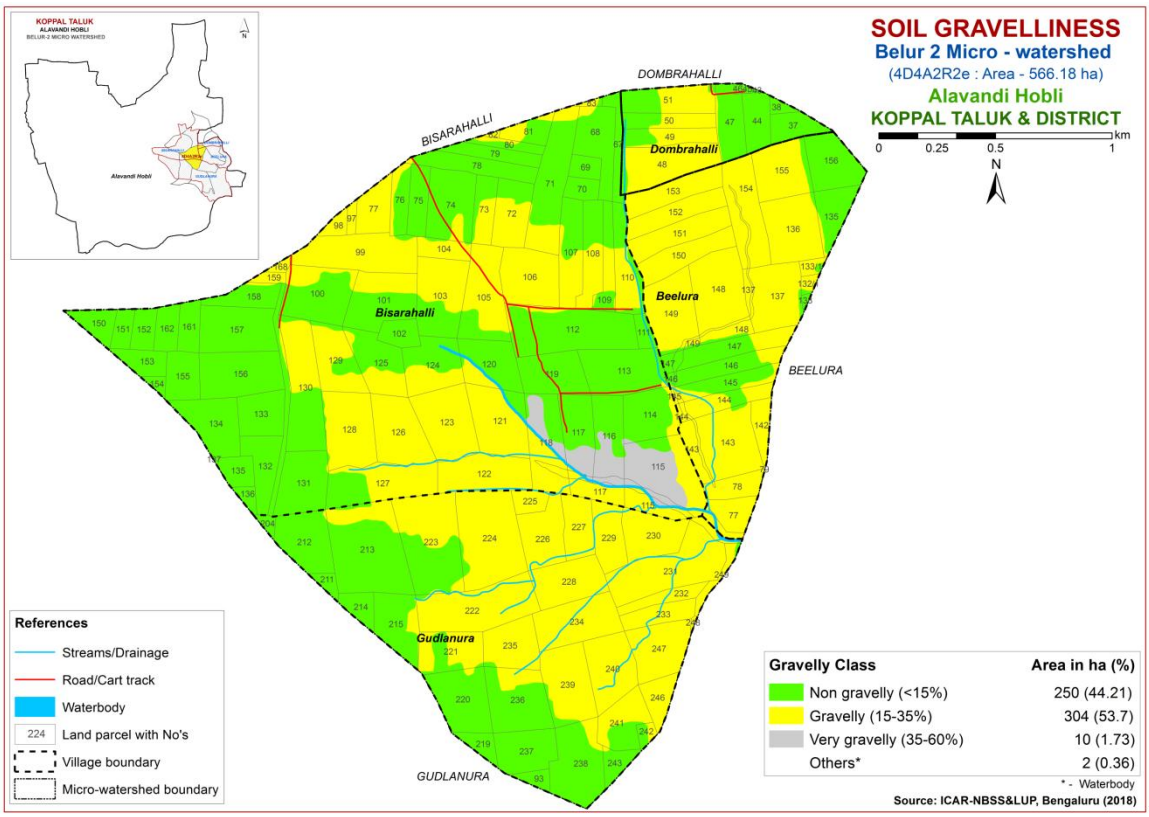


Fig. 5.4 Soil Gravelliness map of Belur-2 Microwatershed

5.5 Available Water Capacity

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

An area of about 14 ha (2%) in the microwatershed has soils that are very low (<50 mm/m) in available water capacity and are distributed in the northern part of the microwatershed. Maximum area of about 308 ha (54%) has soils that are low (51 to 100 mm/m) in available water capacity and are distributed in all parts of the microwatershed. An area of about 108 ha (19%) has soils that are medium (101-150 mm/m) in available water capacity and are distributed in the western, central and southern part of the microwatershed. An area of about 134 ha (24%) is very high (>200 mm/m) in available water capacity and are distributed in the northeastern, western, southern and eastern part of the microwatershed.

An area of about 322 ha (56%) 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 134 ha (24%) has soils that have high potential (>200 mm/m) with regard to available water capacity where all climatically adapted long duration crops can be grown successfully.

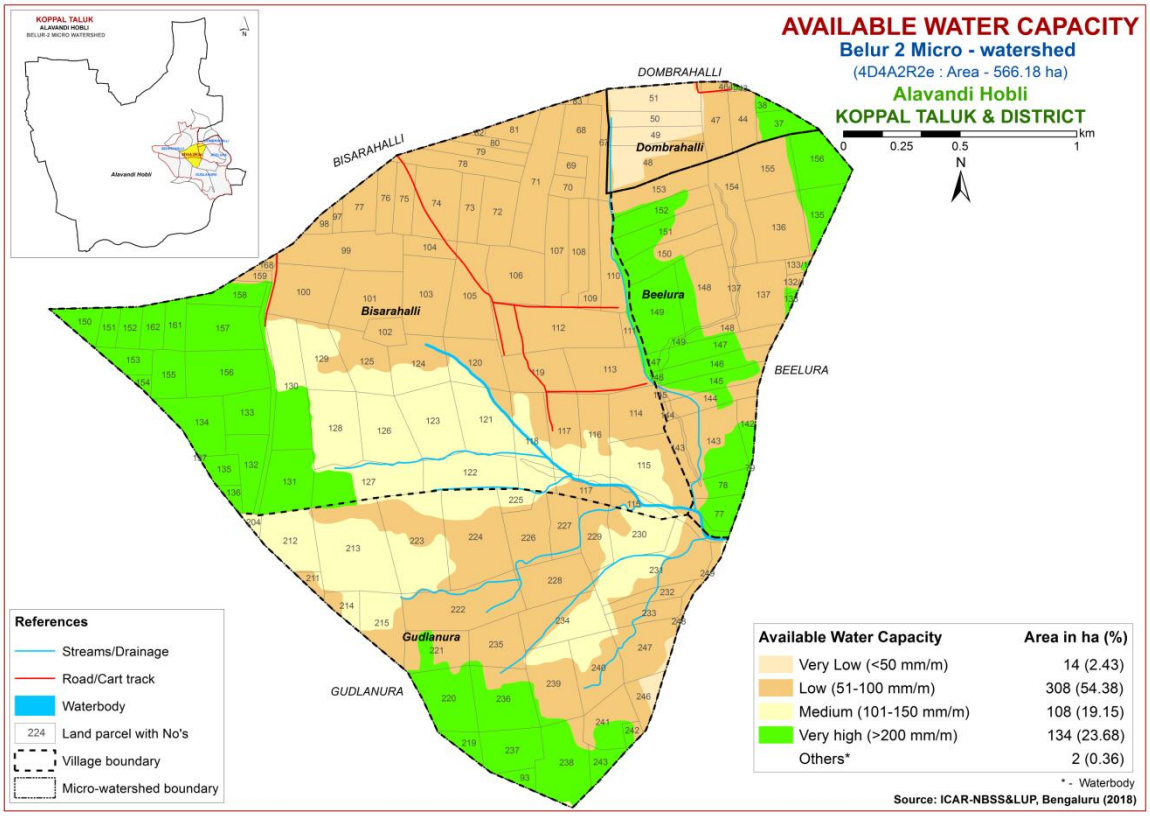


Fig. 5.5 Soil Available Water Capacity map of Belur-2 Microwatershed

5.6 Soil Slope

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

An area of about 43 ha (8%) is nearly level (0-1%) and distributed in the northern part of the microwatershed. Maximum area of about 521 ha (92%) is very gently sloping (1-3%) lands and are distributed in all parts of the microwatershed. In these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

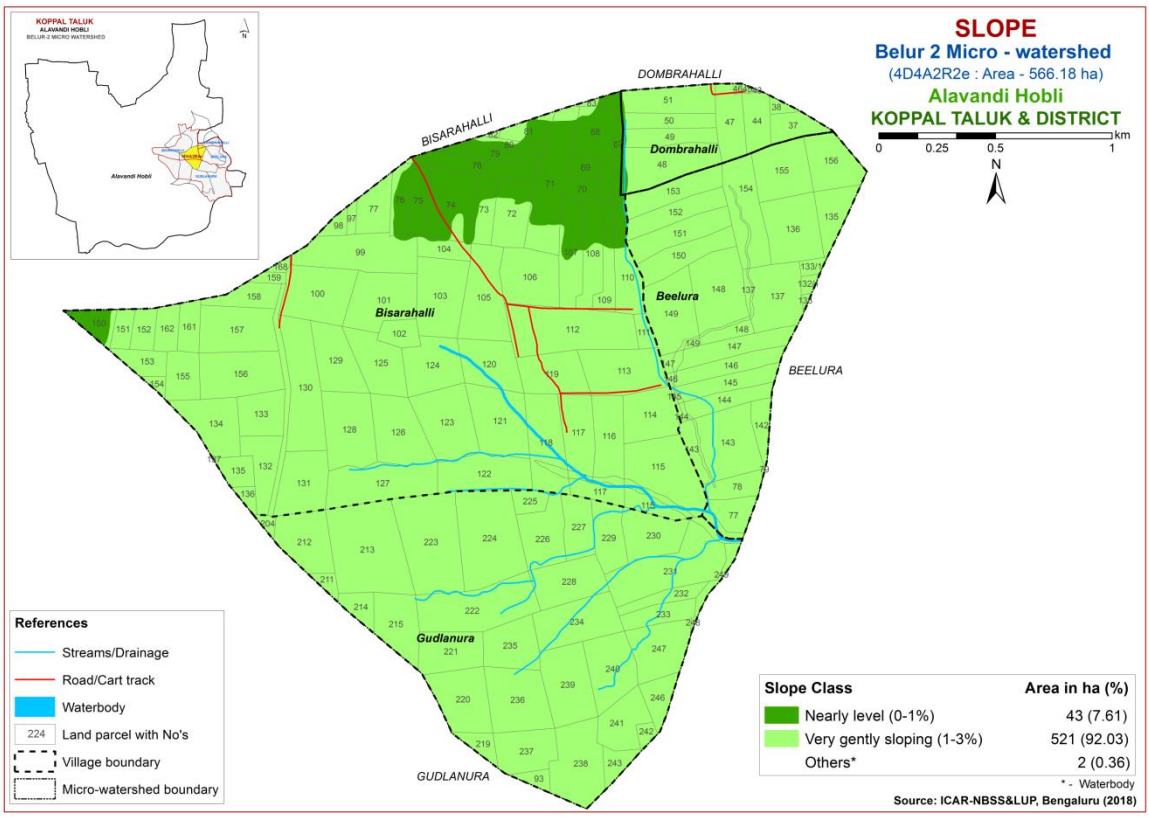


Fig. 5.6 Soil Slope map of Belur-2 Microwatershed

5.7 Soil Erosion

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

Slightly eroded (e1 class) lands cover an area of about 159 ha (28%) and are distributed in the northern, eastern and southern part of the microwatershed. Maximum area of about 405 ha (72%) is moderately eroded (e2 class) and distributed in all parts of the microwatershed. Moderately eroded lands are problematic and need appropriate soil and water conservation and other land development measures.

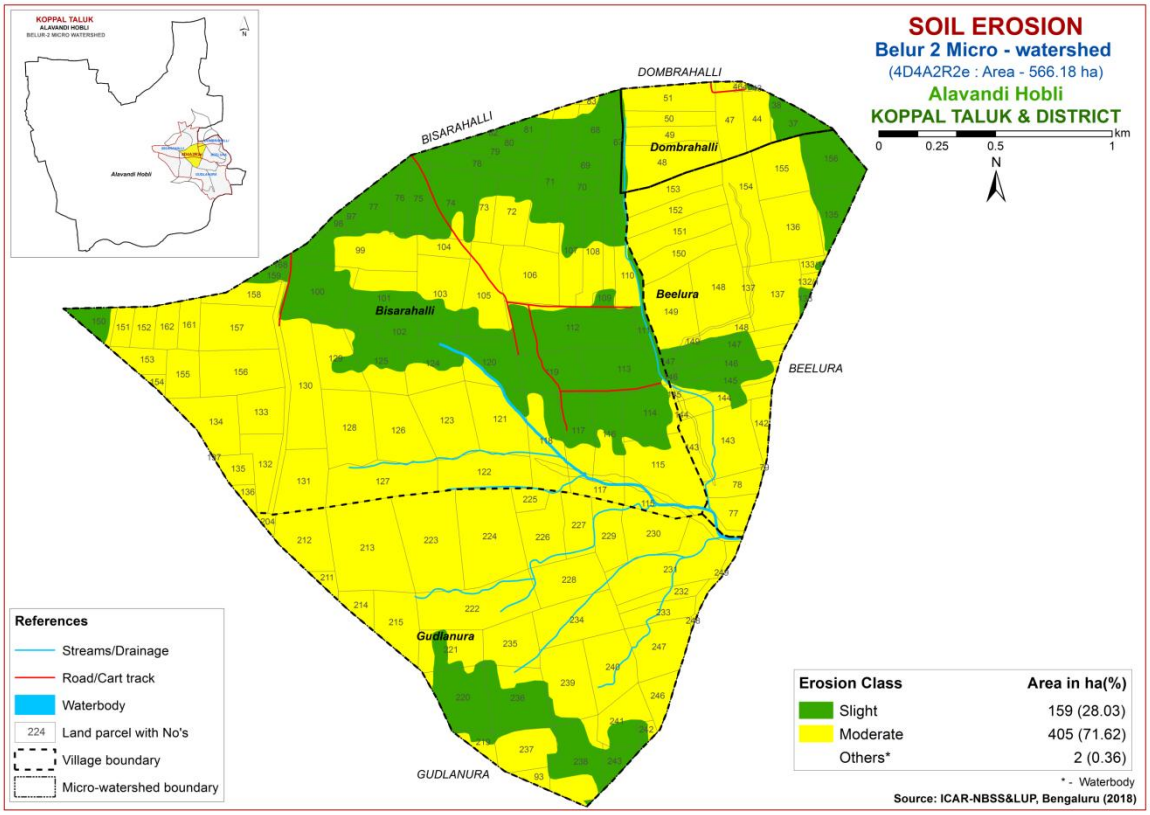


Fig. 5.7 Soil Erosion map of Belur-2 Microwatershed

Chapter 6

FERTILITY STATUS

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

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

6.1 Soil Reaction (pH)

An area of about 22 ha (4%) is neutral (pH 6.5-7.3) and distributed in the northern part of the microwatershed. An area of about 55 ha (10%) is slightly alkaline (pH 7.3-7.8) and distributed in the northern part of the microwatershed. An area of 107 ha (19%) is moderately alkaline (pH 7.8-8.4) and are distributed in the northern part of the microwatershed. Maximum area of about 213 ha (38%) is strongly alkaline (pH 8.4-9.0) and are distributed in all parts of the microwatershed. An area of about 167 ha (29%) is very strongly alkaline (pH>9.0) and are distributed in the western and southern part of the microwatershed. Thus, major soils in the microwatershed are alkaline in reaction (Fig.6.1).

6.2 Electrical Conductivity (EC)

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

6.3 Organic Carbon

An area of about 91 ha (16%) is low (<0.5%) and distributed in the western and southern part of the microwatershed. Maximum area of about 473 ha (83%) is medium (0.5-0.75%) in organic carbon content and distributed in all parts of the microwatershed (Fig.6.3).

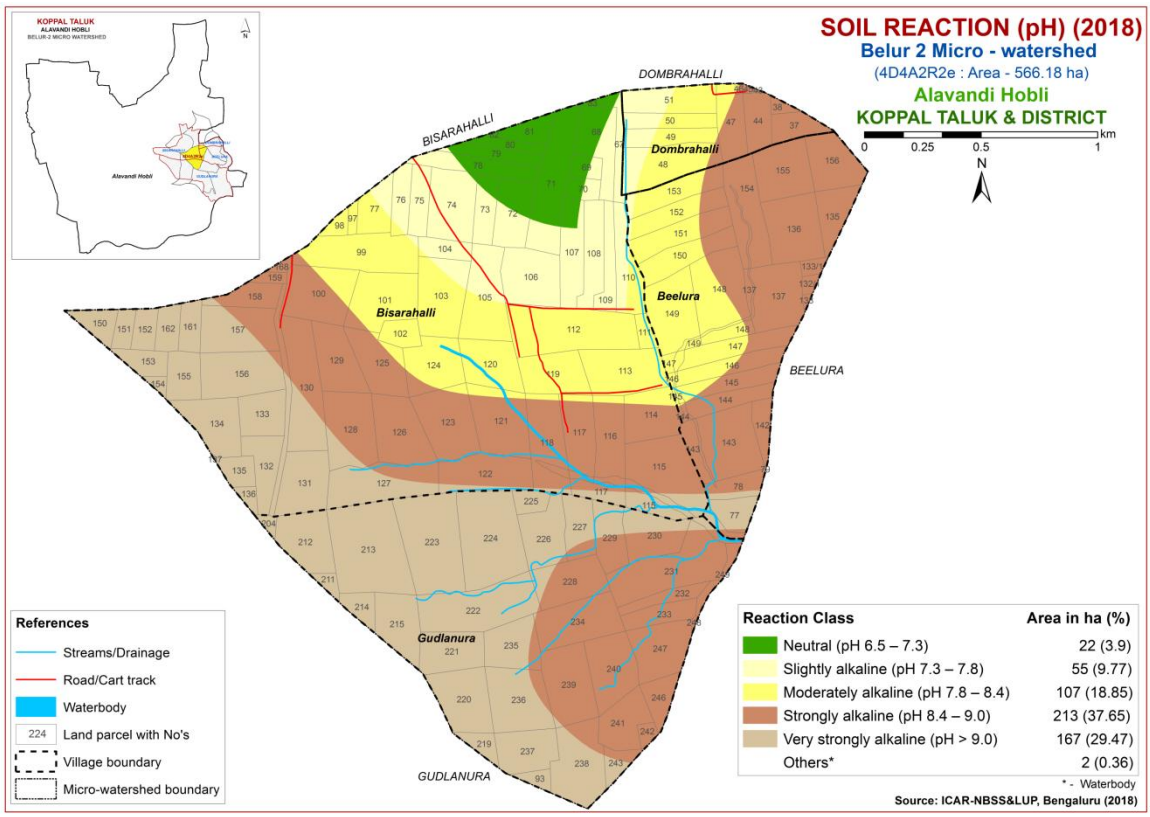


Fig.6.1 Soil Reaction (pH) map of Belur-2 Microwatershed

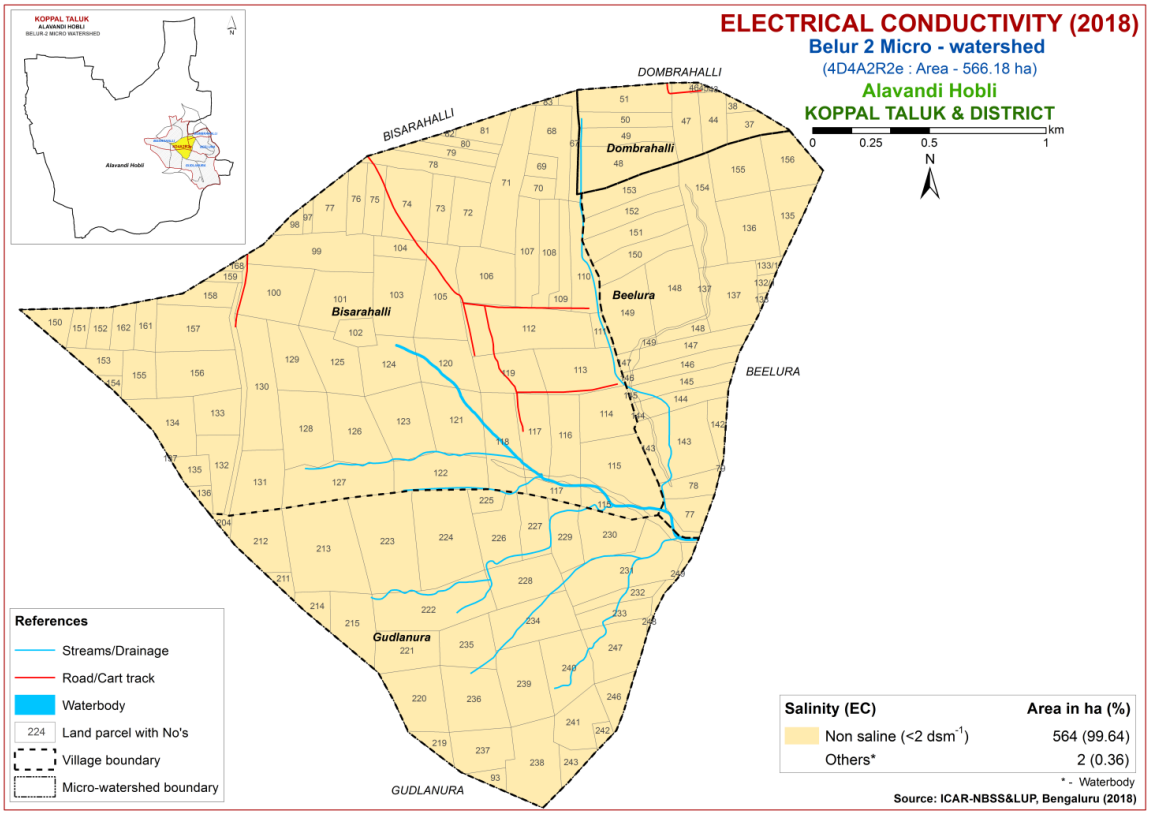


Fig.6.2 Electrical Conductivity (EC) map of Belur-2 Microwatershed

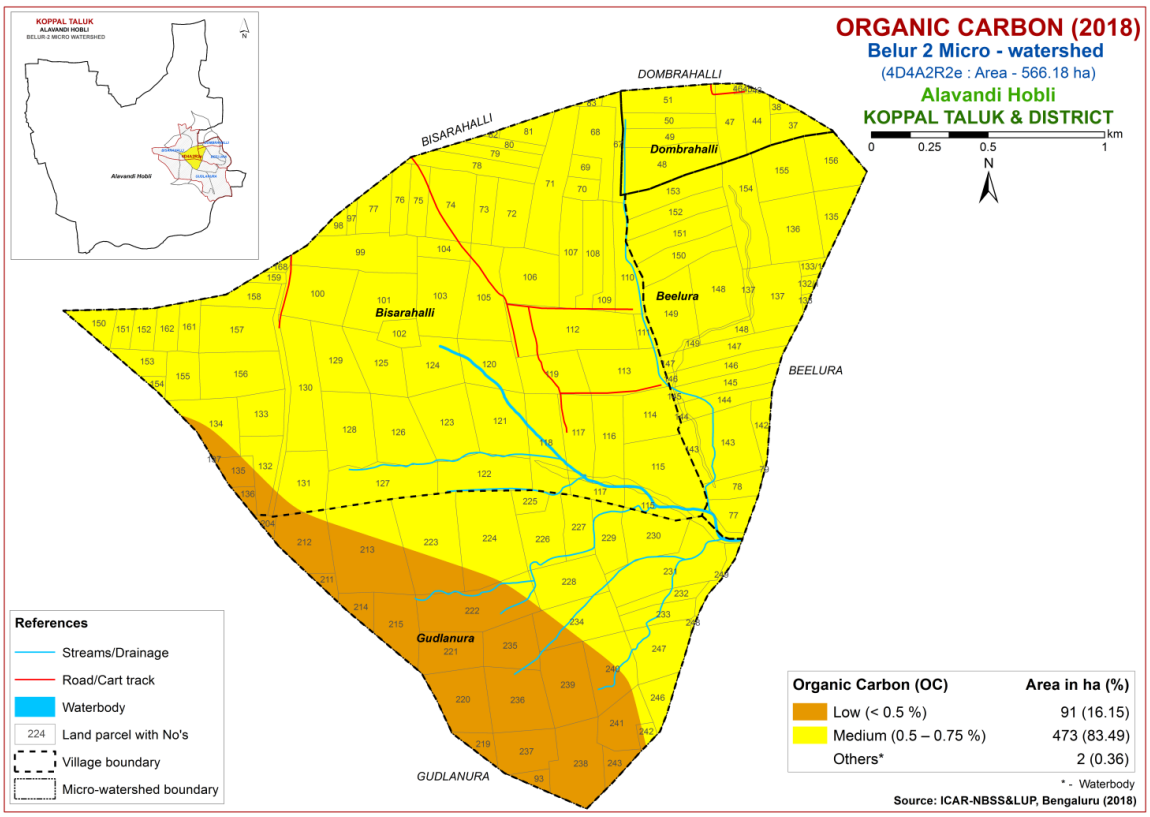


Fig.6.3 Soil Organic Carbon map of Belur-2 Microwatershed

6.4 Available Phosphorus

Available phosphorus content is low (<23 kg/ha) in a maximum area of 352 ha (62%) in available phosphorous and distributed in all parts of the microwatershed. Medium (23-57 kg/ha) in an area of about 212 ha (37%) and are distributed in the northern, eastern and southern part of the microwatershed. Apply additional 25% phosphorous in areas where it is low and medium in available phosphorous (Fig 6.4).

6.5 Available Potassium

Medium (145-337 kg/ha) in a maximum area of about 491 ha (87%) and are distributed in all parts of the microwatershed. An area of about 73 ha (13%) is high (>337 kg/ha) in available potassium and are distributed in the western and southern part of the microwatershed (Fig. 6.5). Apply additional 25% potassium in areas where it is low and medium in available potassium.

6.6 Available Sulphur

Available sulphur content is low (<10 ppm) in an area of about 168 ha (30%) and are distributed in the southern part of the microwatershed. Maximum area of about 373 ha (66%) is medium (10-20 ppm) in available sulphur and are distributed in all parts of the microwatershed. High (>20 ppm) in 24 ha (4%) and distributed in the eastern part of the microwatershed.The areas that are low and medium in available sulphur need to be

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

6.7 Available Boron

Available boron content in Belur-2 microwatershed is low (< 0.5ppm) in a maximum area of about 305 ha (54%) and distributed in all parts of the microwatershed. An area of about 259 ha (46%) is medium (0.5-1.0 ppm) and distributed in the northern, western, central and southern part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content is deficient (<4.5 ppm) in an area of about 271 ha (48%) and are distributed in the northern, western and southern part of the microwatershed. Sufficient (>4.5 ppm) in a maximum area of about 294 ha (52%) and are distributed in all parts of the microwatershed (Fig 6.8).

6.9 Available Manganese

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

6.10 Available Copper

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

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in the entire microwatershed area (Fig 6.11).

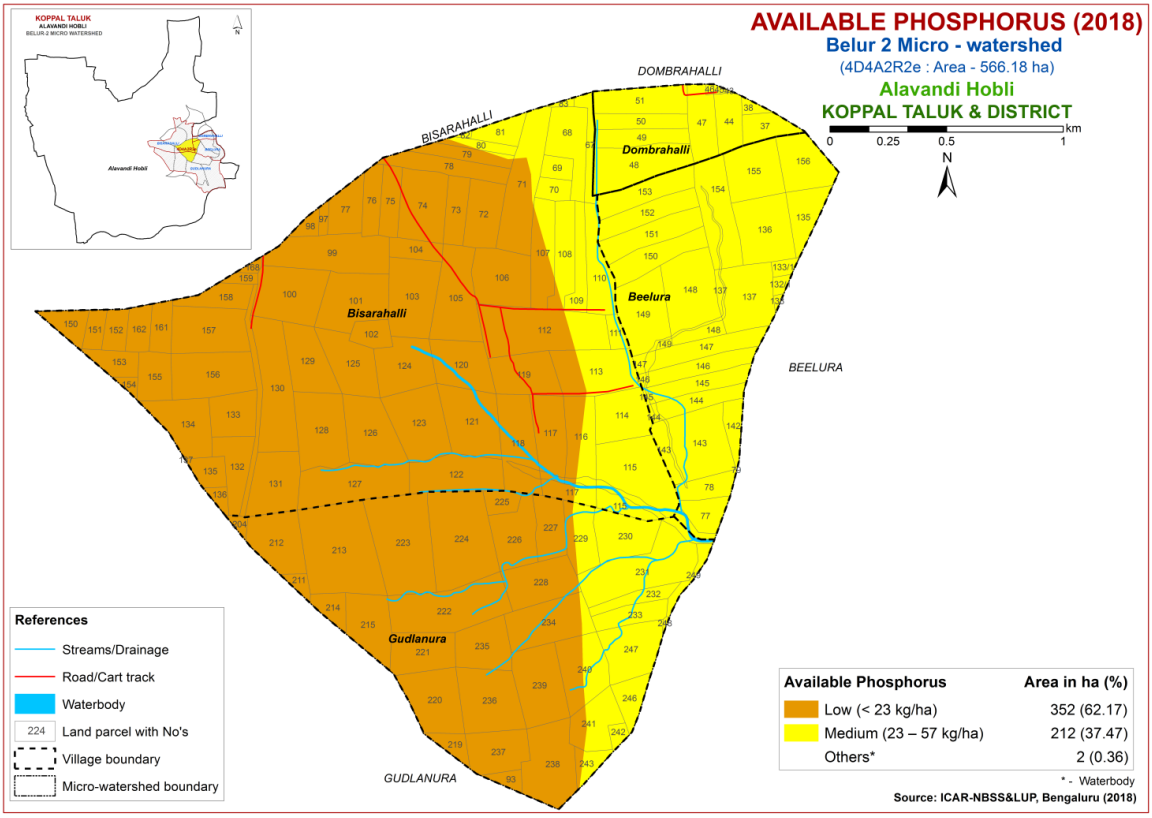


Fig.6.4 Soil Available Phosphorus map of Belur-2 Microwatershed

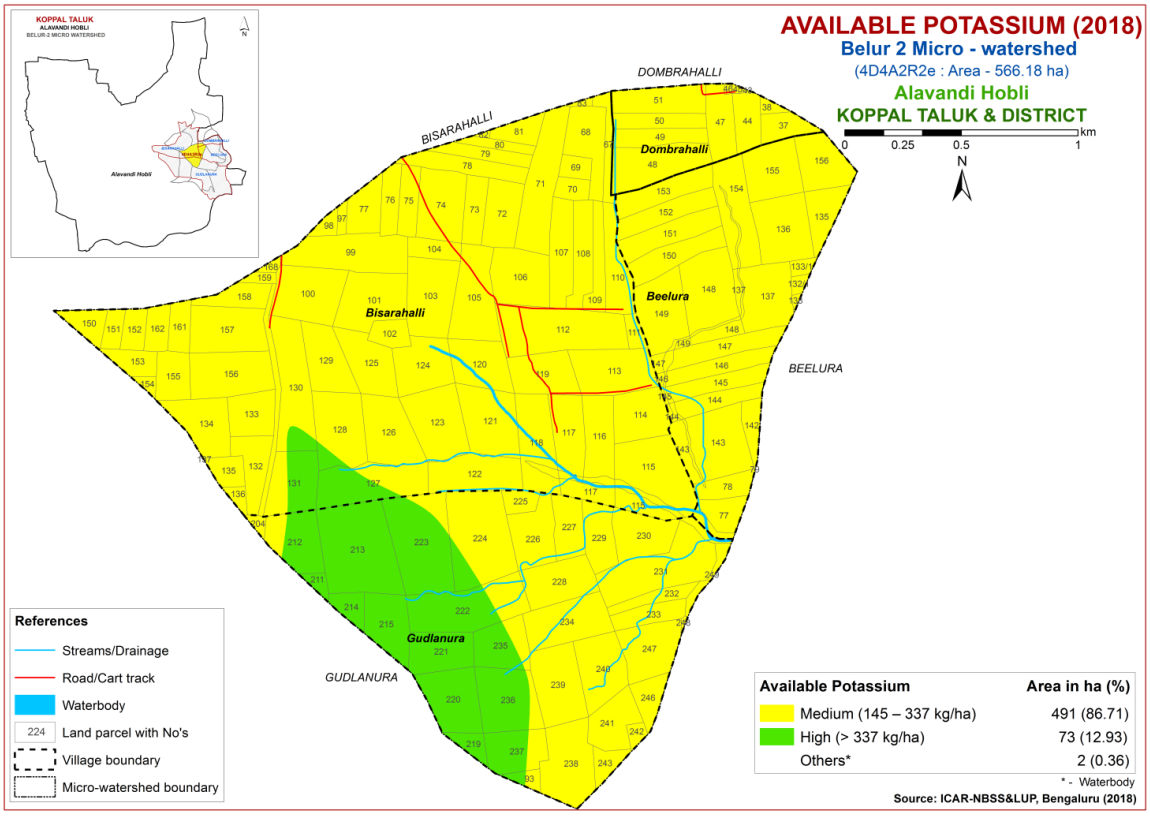


Fig.6.5 Soil Available Potassium map of Belur-2 Microwatershed

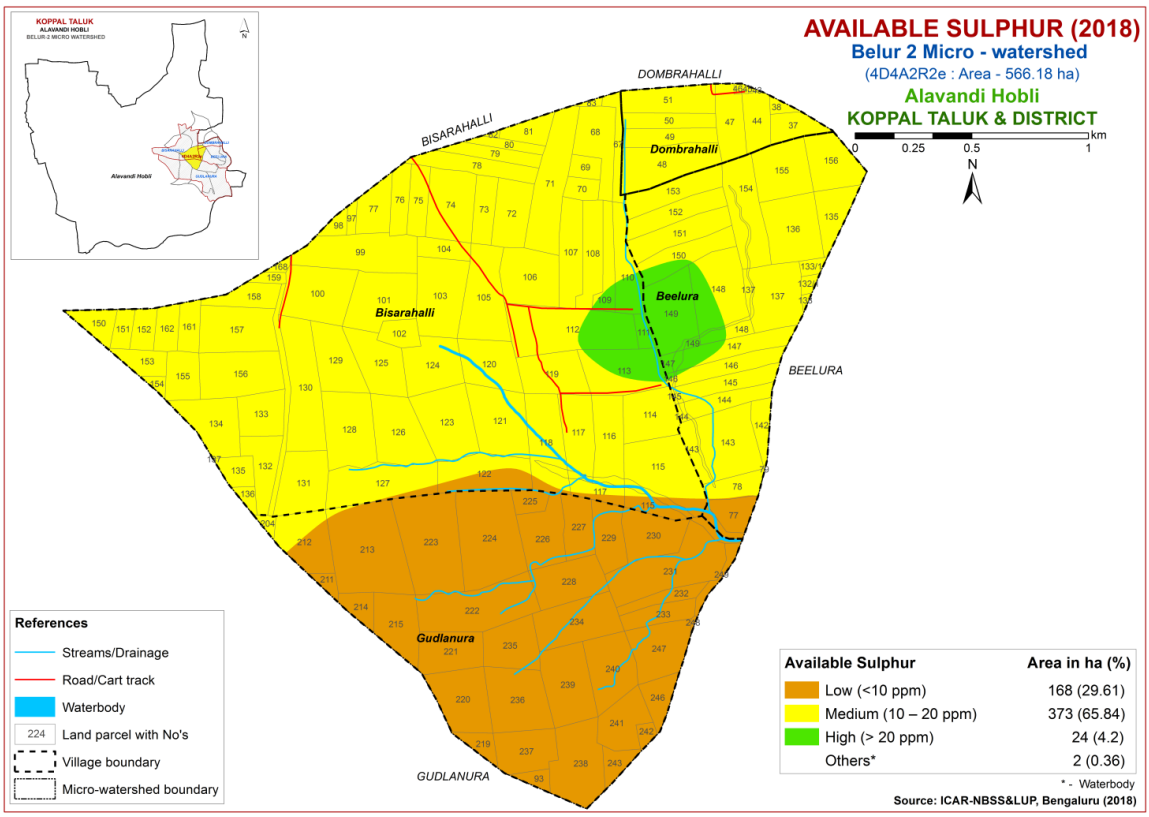


Fig.6.6 Soil Available Sulphur map of Belur-2 Microwatershed

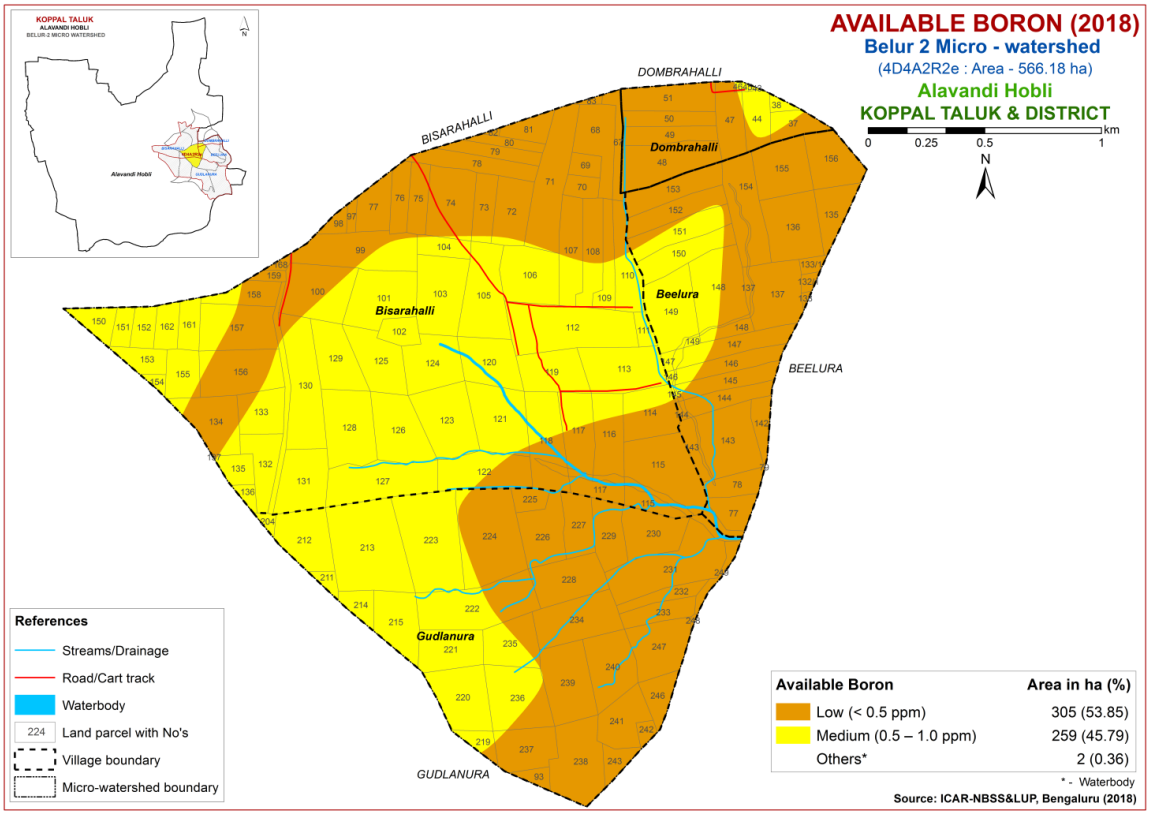


Fig.6.7 Soil Available Boron map of Belur-2 Microwatershed

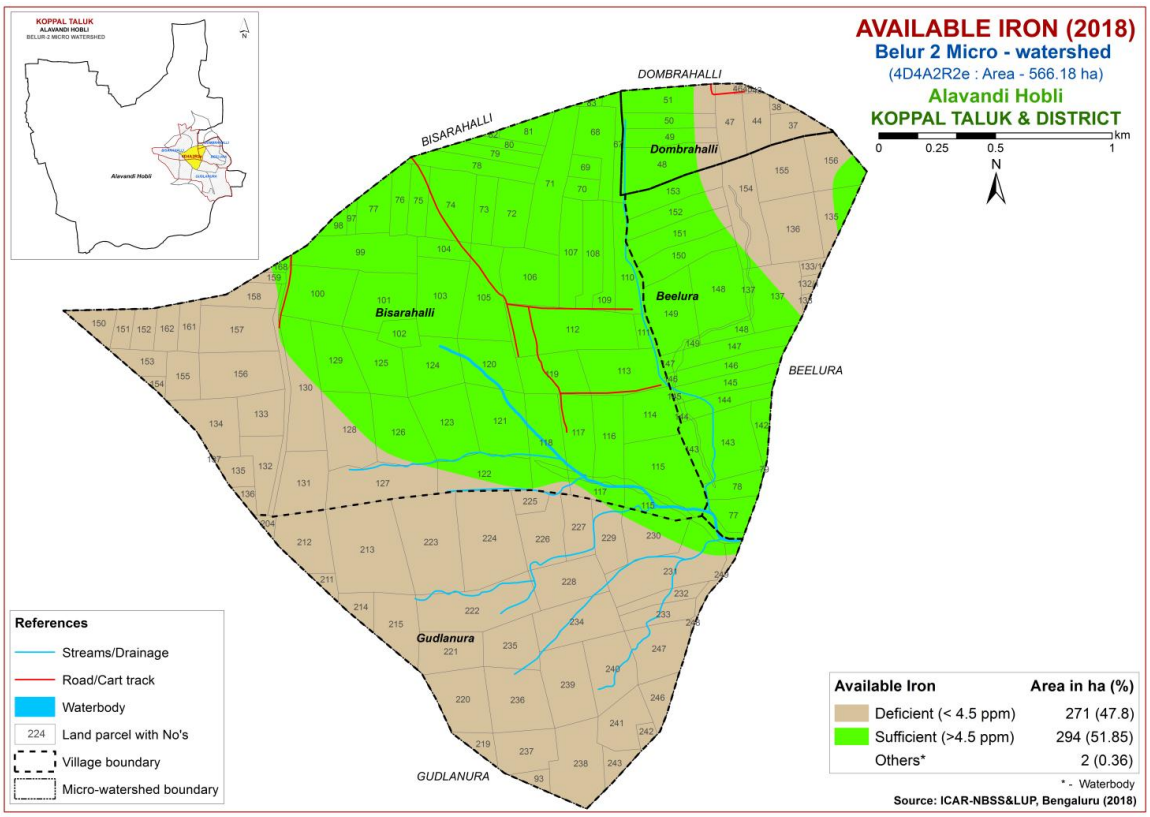


Fig.6.8 Soil Available Iron map of Belur-2 Microwatershed

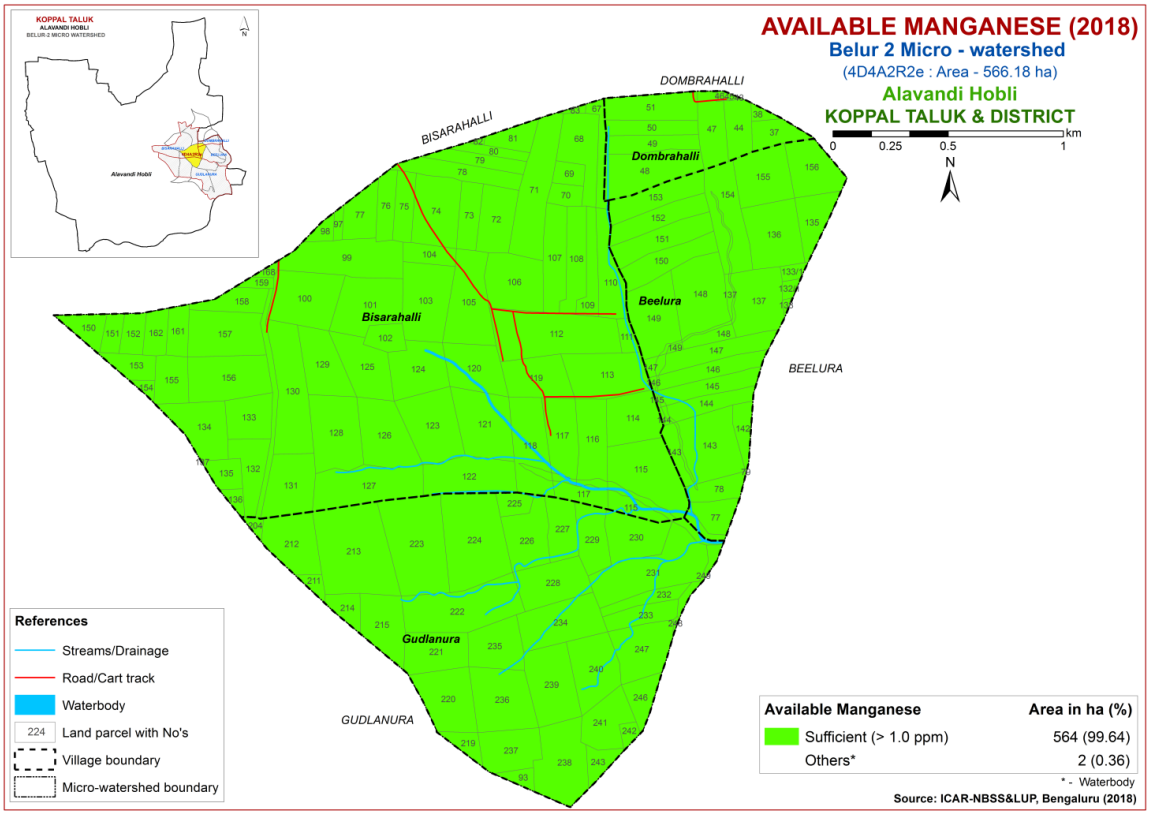


Fig.6.9 Soil Available Manganese map of Belur-2 Microwatershed

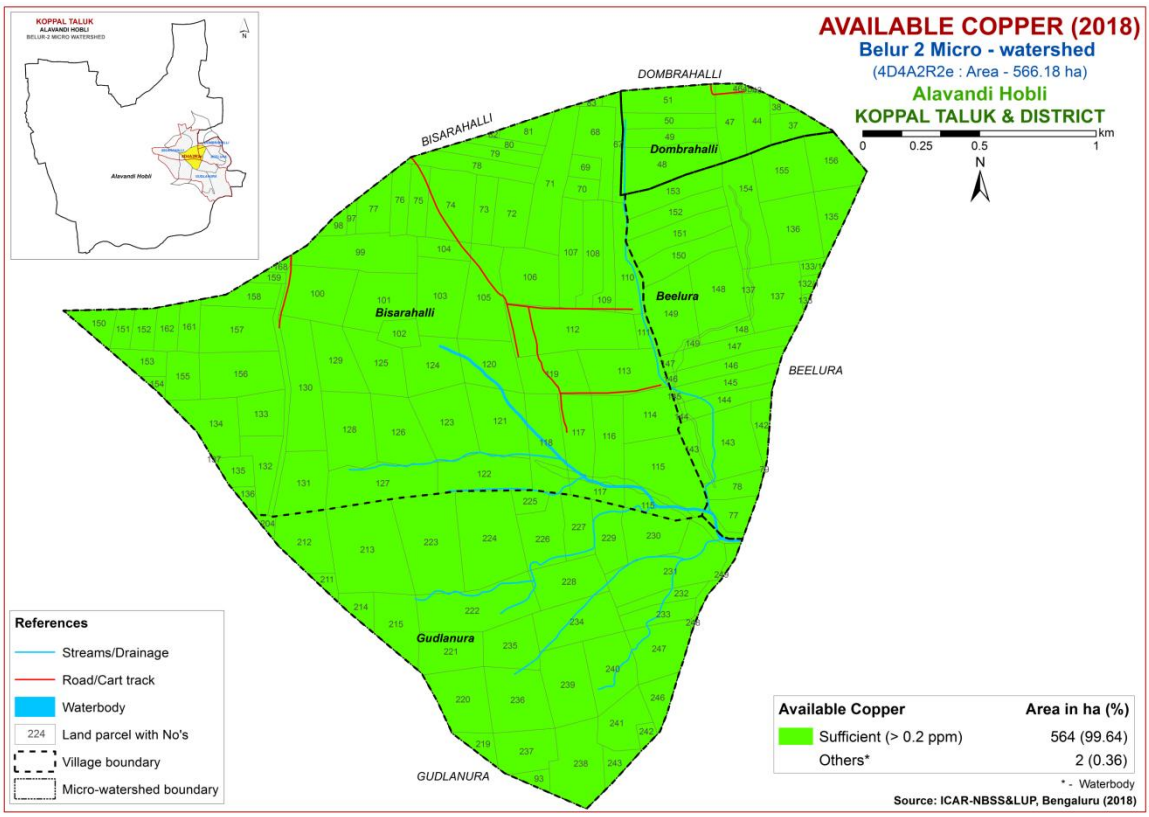


Fig.6.10 Soil Available Copper map of Belur-2 Microwatershed

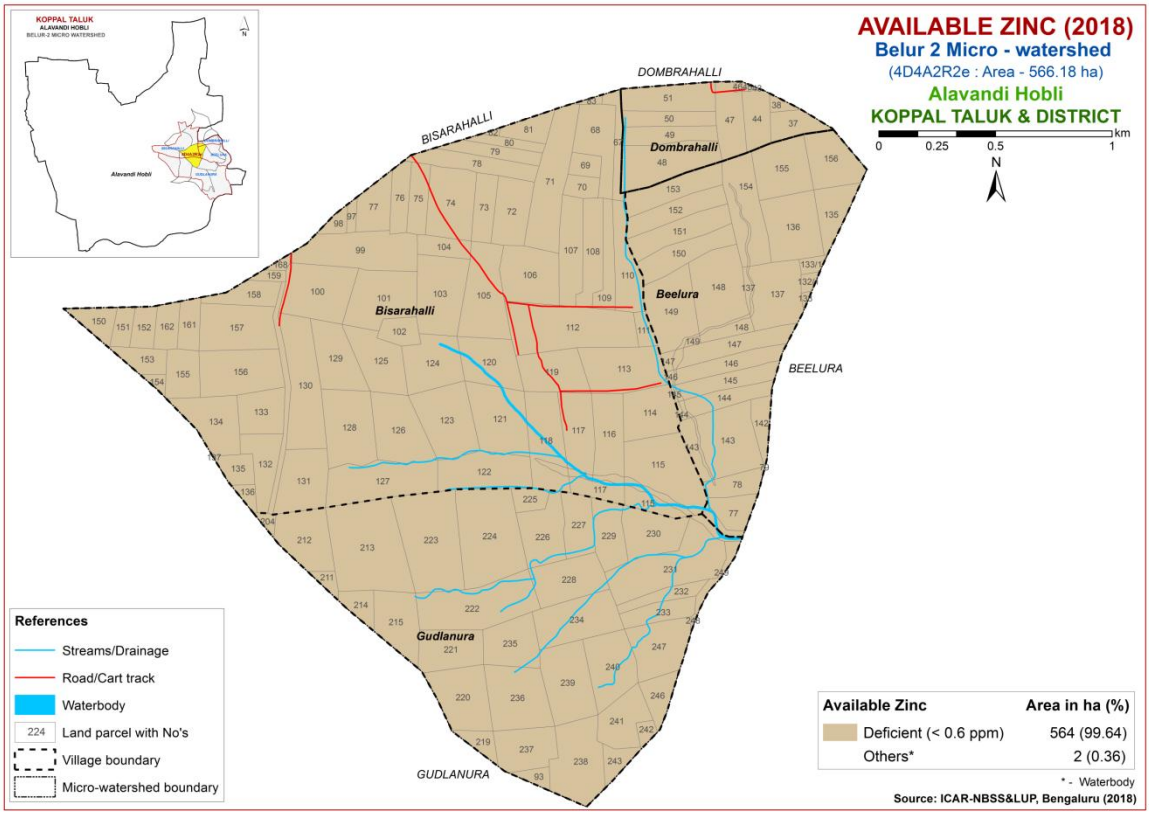


Fig.6.11 Soil Available Zinc map of Belur-2 Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Belur-2 microwatershed were assessed for their suitability for growing food, fodder, fibre and other horticulture crops by following the procedure as outlined in FAO, 1976 and 1983. Crop requirements were developed for each of the crop from the available research data and also by referring to Naidu *et. al.* (2006) and Natarajan *et. al* (2015). The soil and land characteristics were matched with the crop requirements to arrive at the crop suitability. The soil and land characteristics table (Table 7.1) were matched with the crop requirements (Tables 7.2-7.32) to arrive at the crop suitability and the criteria 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 and N1 are divided into subclasses based on the kinds of limitations encountered. The limitations that affect crop production are 'c' for erratic rainfall and its distribution and length of growing period (LGP), 'e' for erosion hazard, 'r' for rooting condition, 't' for lighter or heavy texture, 'g' for gravelliness or stoniness, 'n' for nutrient availability, 'l' for topography, 'm' for moisture availability, 's' for sodium 'z' for calcareousness and 'w' for drainage. These limitations are indicated as lower case letters to the class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

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

7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

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

Highly suitable (Class S1) lands occupy an area of about 209 ha (37%) for growing sorghum and occur in the northern, central, western, eastern and southern part of

the microwatershed. Maximum area of about 244 ha (43%) is moderately suitable (Class S2) for growing sorghum and distributed in all parts of the microwatershed with minor limitations of nutrient availability, rooting depth, calcareousness and gravelliness. An area of about 110 ha (20%) is marginally suitable (Class S3) for growing sorghum and distributed in the northern, central and southern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth.

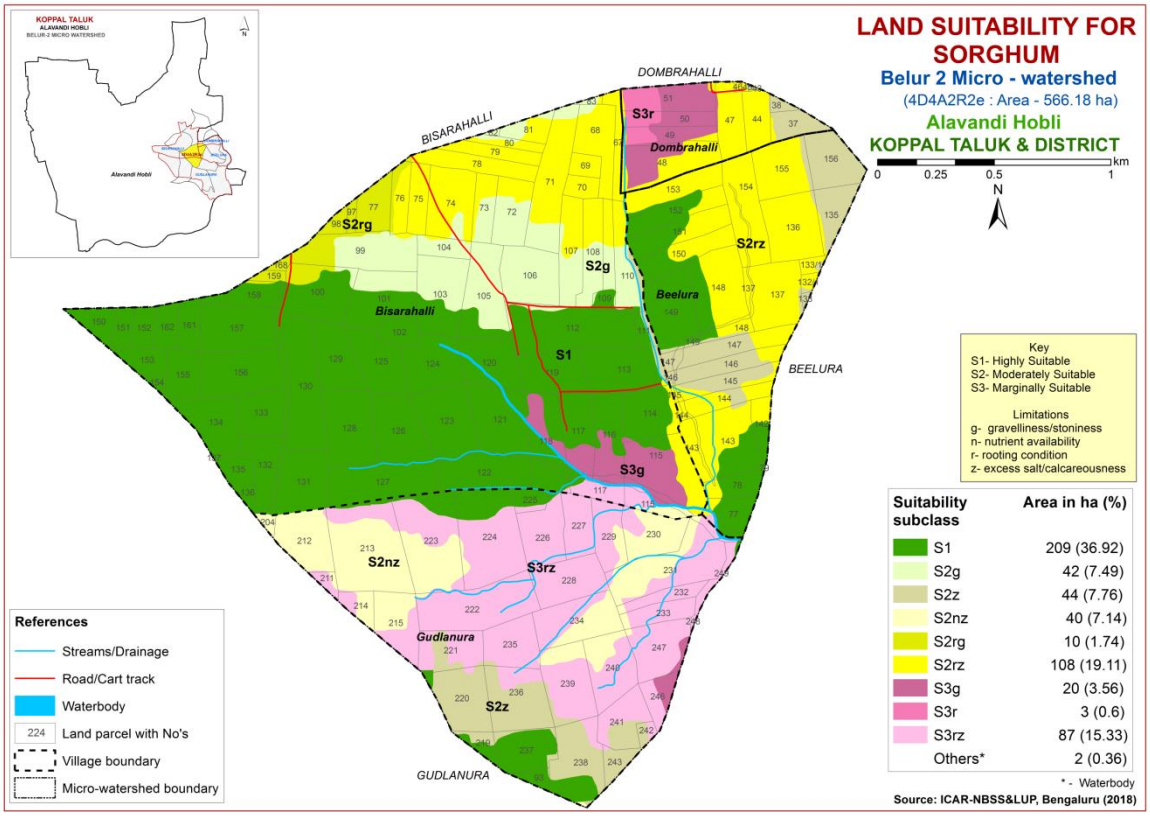


Fig. 7.1 Land Suitability map of Sorghum

7.2 Land Suitability for Maize (*Zea mays*)

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

Highly suitable (Class S1) lands occupy an area of about 61 ha (11%) for growing Maize and occur in the western and central part of the microwatershed. Maximum area of about 393 ha (69%) is moderately suitable (Class S2) for growing sorghum and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth, calcareousness and gravelliness. An area of about 110 ha (20%) is marginally suitable (Class S3) for growing Maize and distributed in the northern, central and southern part of the microwatershed. They have moderate limitations of gravelliness, texture, calcareousness and rooting depth.

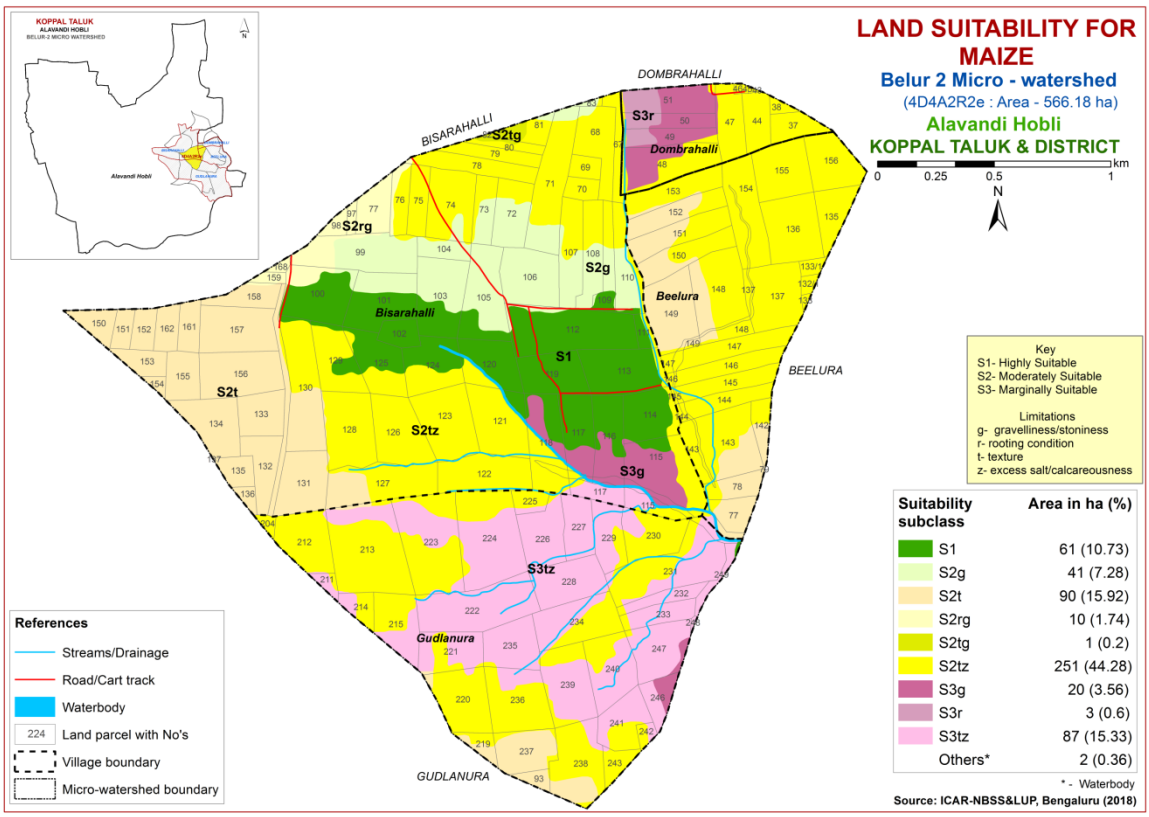


Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

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

Highly suitable (Class S1) lands occupy an area of about 126 ha (22%) for growing Bajra and occur in the northern and western part of the microwatershed. Maximum area of about 331 ha (59%) is moderately suitable (Class S2) for growing Bajra and distributed in all parts of the microwatershed with minor limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 107 ha (19%) is marginally suitable (Class S3) for growing Bajra and distributed in the northern and southern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness, texture and rooting depth.

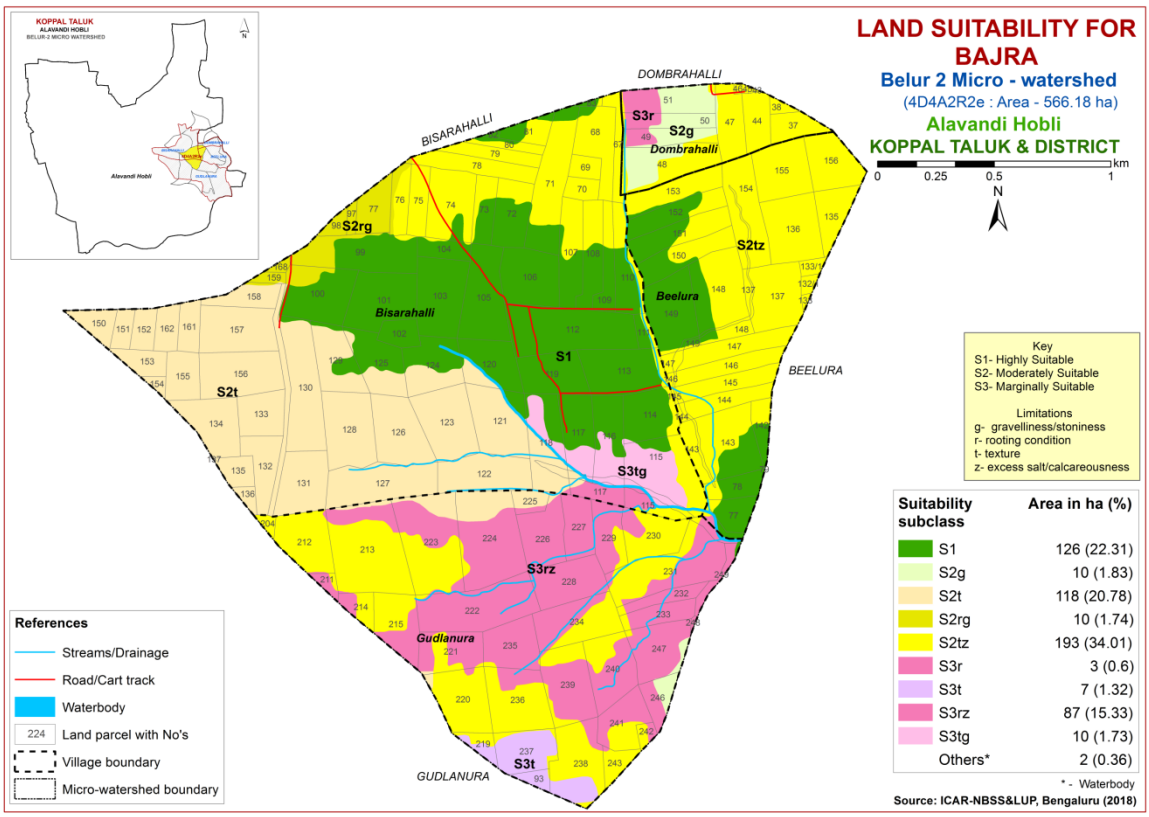


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

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

An area of about 41 ha (7%) is highly suitable (Class S1) lands for growing Groundnut and distributed in the northern part of the microwatershed. An area of about 82 ha (15%) is moderately suitable (Class S2) for growing Groundnut and distributed in the northern part of the microwatershed with minor limitations of rooting depth, texture and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 440 ha (78%) and occur in all parts of the microwatershed with major limitations of gravelliness, texture, calcareousness and rooting depth.

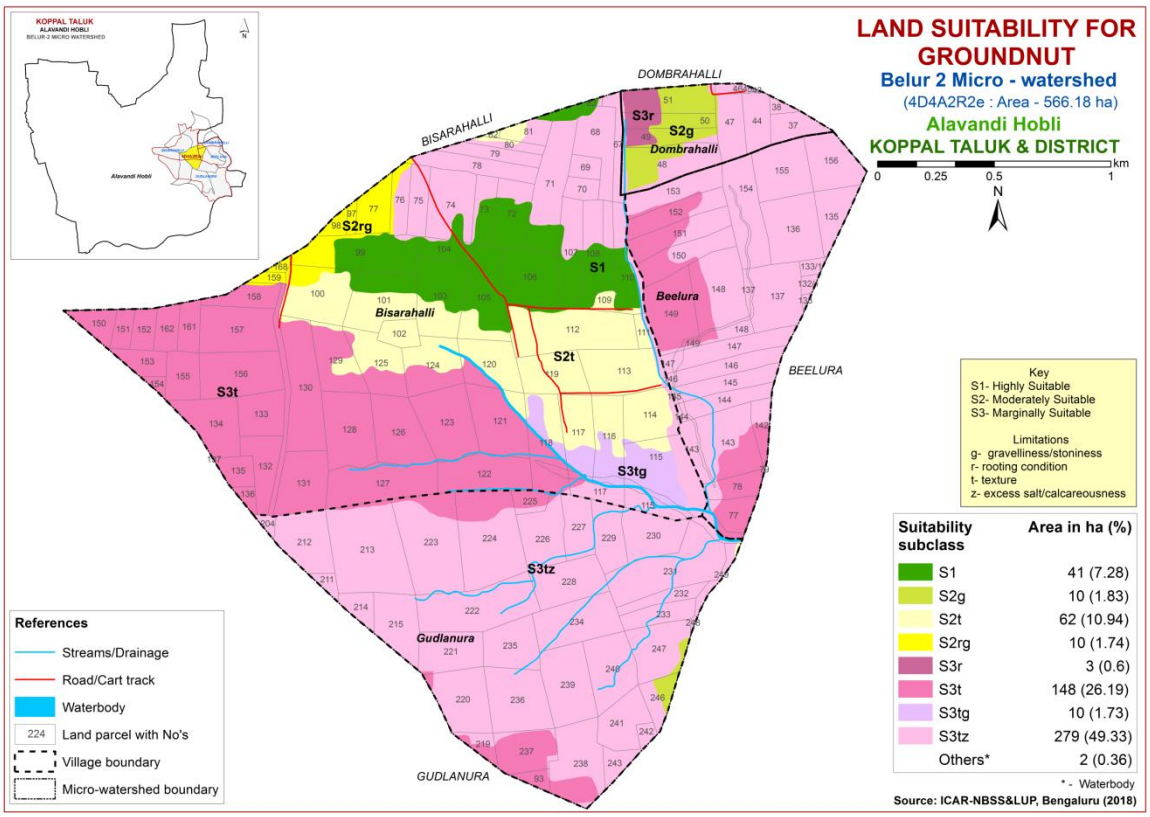


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annus*)

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

An area of about 90 ha (16%) is highly suitable (Class S1) lands for growing Sunflower and distributed in the northwestern, western, eastern and southern part of the microwatershed. Maximum area of about 245 ha (43%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of rooting depth, gravelliness and calcareousness. Marginally suitable (Class S3) lands cover an area of about 138 ha (25%) and distributed in the northern and eastern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Sunflower and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

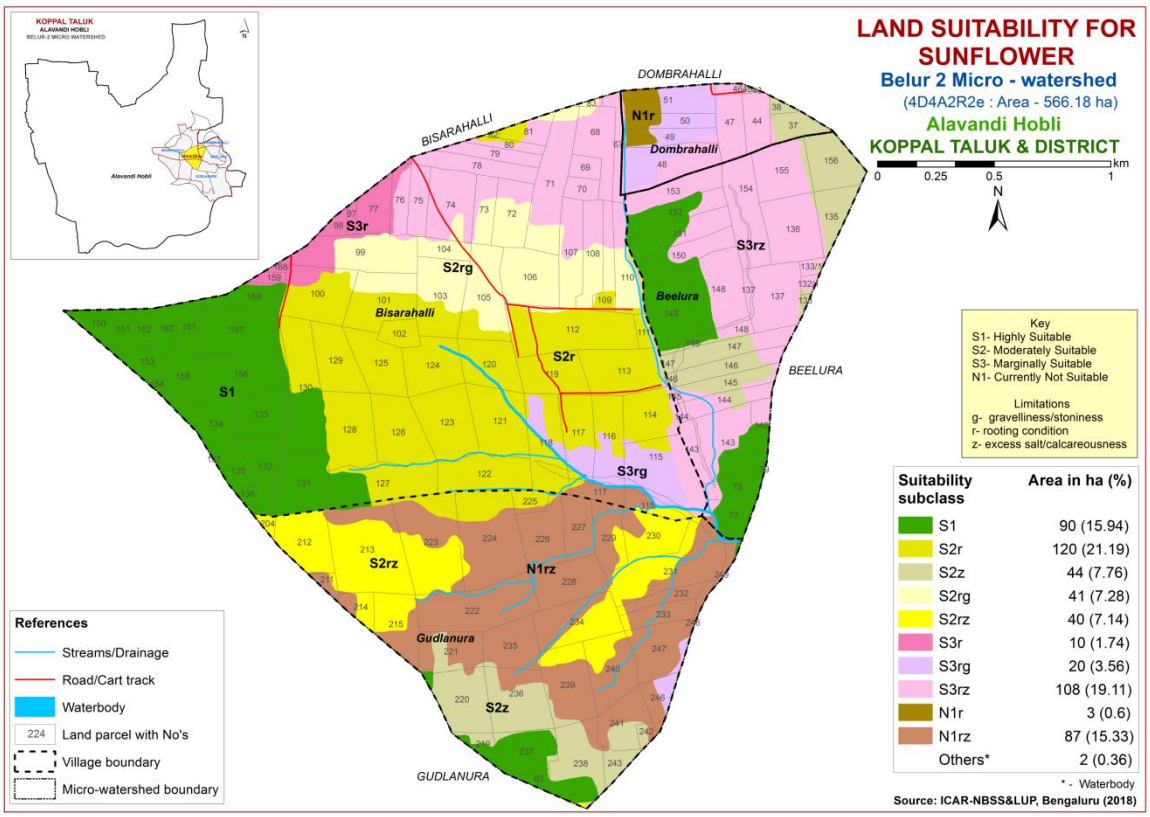


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land Suitability for Redgram (*Cajanus cajan*)

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

No highly suitable (Class S1) lands for growing Redgram in the microwatershed. Maximum area of about 305 ha (54%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover an area of about 169 ha (30%) and distributed in the northern, eastern, western and southern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Redgram and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

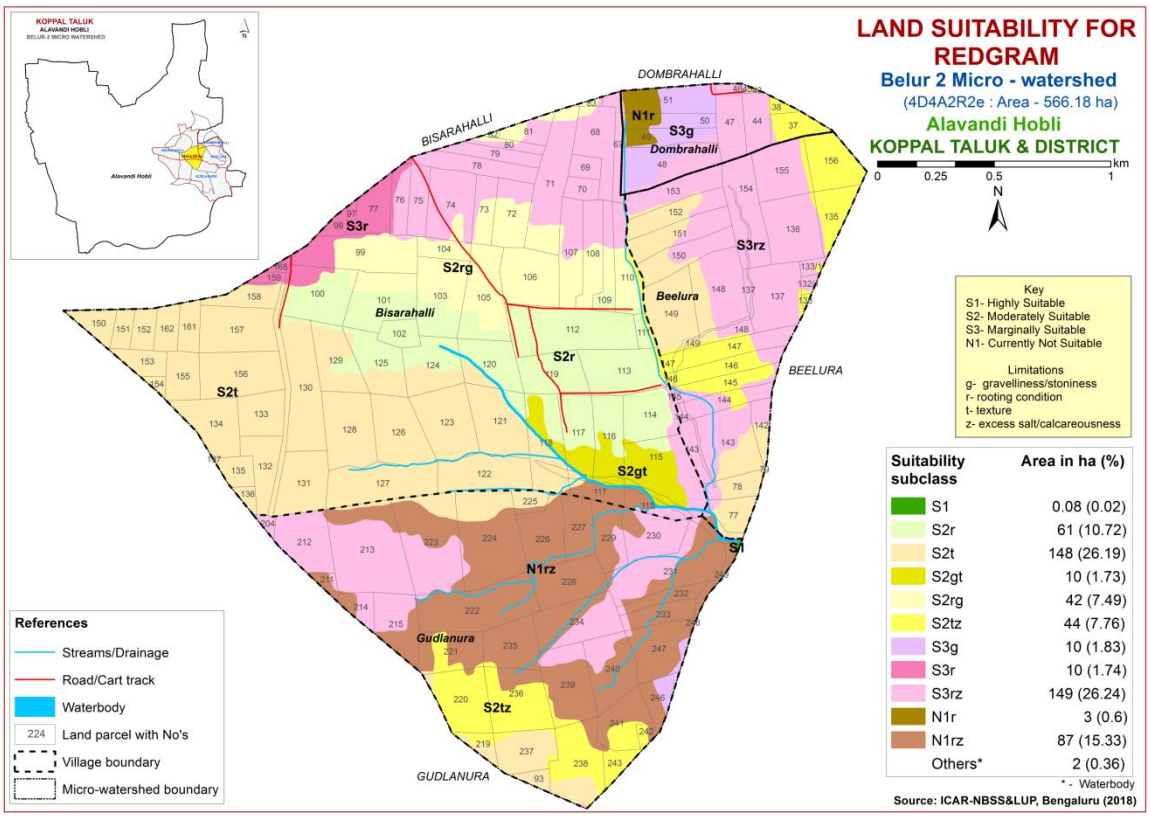


Fig. 7.6 Land Suitability map of Redgram

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

Bengal gram is one of the major pulse crop grown in an area of 9.39 lakh ha in northern Karnataka in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad and Bell ary districts. The crop requirements for growing Bengal gram (Table 7.8) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing Bengal gram was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.7.

Highly suitable (Class S1) lands occupy an area of about 148 ha (26%) for growing Bengal gram and occur in the northern, western, eastern and southern part of the microwatershed. Maximum area of about 296 ha (52%) is moderately suitable (Class S2) for growing Bengal gram and distributed in all parts of the microwatershed with minor limitations of calcareousness, rooting depth, texture and gravelliness. An area of about 120 ha (22%) is marginally suitable (Class S3) for growing Bengal gram and distributed in the northern and southern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness, texture and rooting depth.

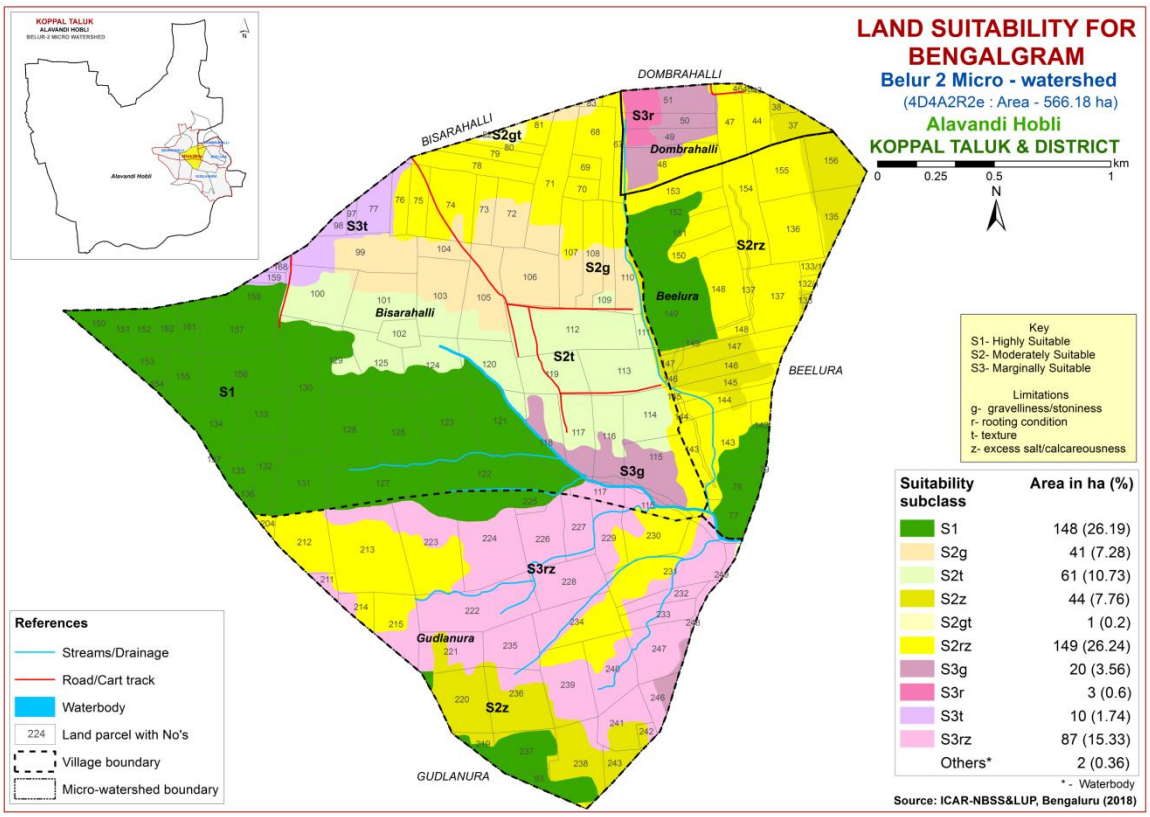


Fig. 7.7 Land Suitability map of Bengal gram

7.8 Land Suitability for Cotton (*Gossypium hirsutum*)

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

Highly suitable (Class S1) lands occupy an area of about 148 ha (26%) for growing Cotton and occur in the northern, western, eastern and southern part of the microwatershed. Maximum area of about 306 ha (54%) is moderately suitable (Class S2) for growing Cotton and distributed in all parts of the microwatershed with minor limitations of calcareousness, rooting depth, texture and gravelliness. An area of about 110 ha (20%) is marginally suitable (Class S3) for growing Cotton and distributed in the northern and southern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth.

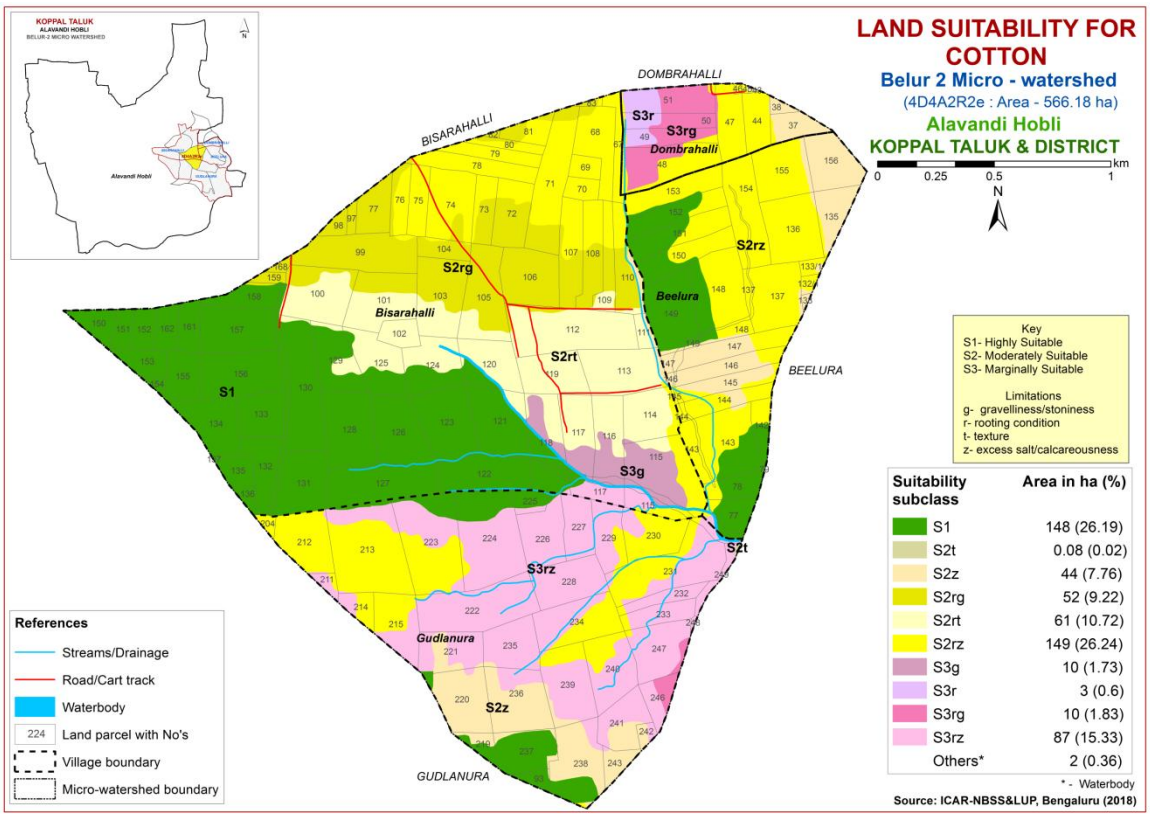


Fig. 7.8 Land Suitability map of Cotton

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

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

An area of 62 ha (11%) is highly suitable (Class S1) lands for growing Chilli and distributed in the northwestern and central part of the microwatershed. An area of about 74 ha (13%) is moderately suitable (Class S2) and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness, rooting depth and texture. Marginally suitable (Class S3) lands occupy a maximum area of about 428 ha (76%) and are distributed in all parts of the microwatershed with moderate limitations of rooting depth, texture, calcareouness and gravelliness.

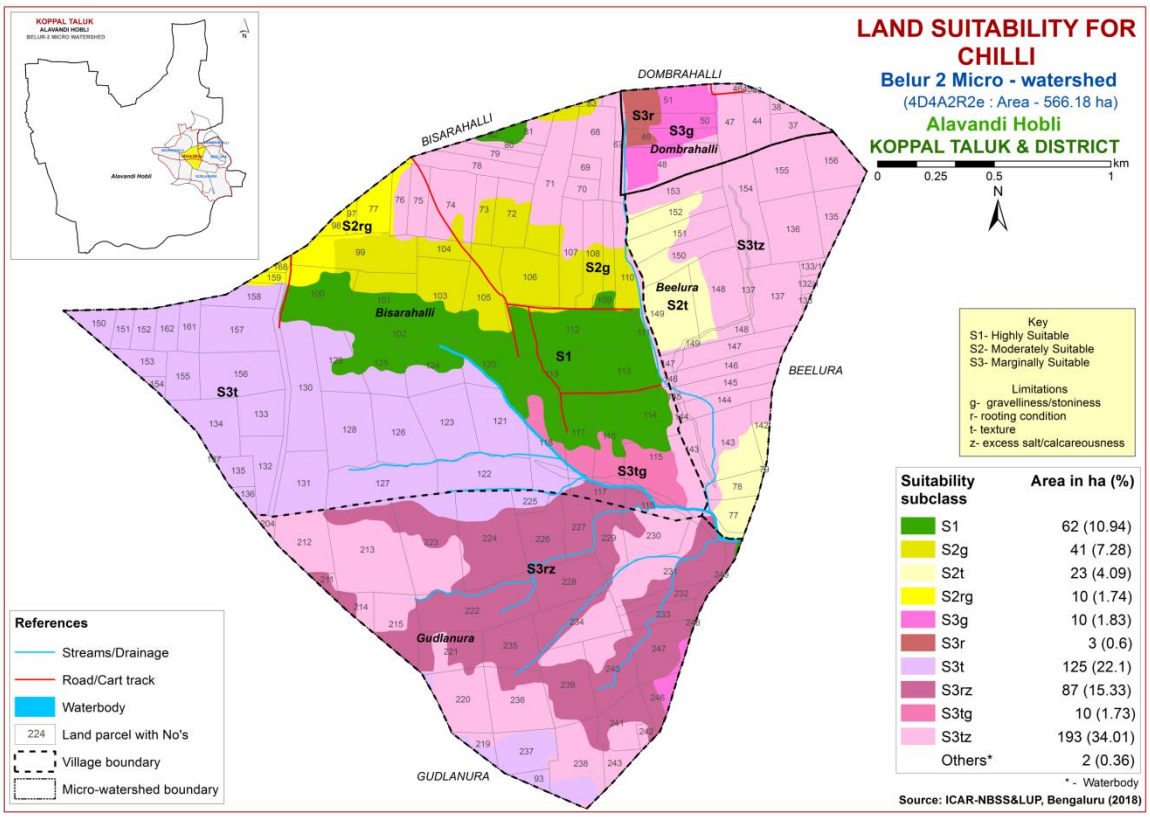


Fig. 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Solanum lycopersicum*)

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

An area of 62 ha (11%) is highly suitable (Class S1) lands for growing Tomato and distributed in the northwestern and central part of the microwatershed. An area of about 51 ha (9%) is moderately suitable (Class S2) and are distributed in the northern part of the microwatershed. They have minor limitations of gravelliness and rooting depth. Marginally suitable (Class S3) lands occupy a maximum area of about 451 ha (80%) and are distributed in all parts of the microwatershed with moderate limitations of rooting depth, texture, calcareouness, drainage and gravelliness.

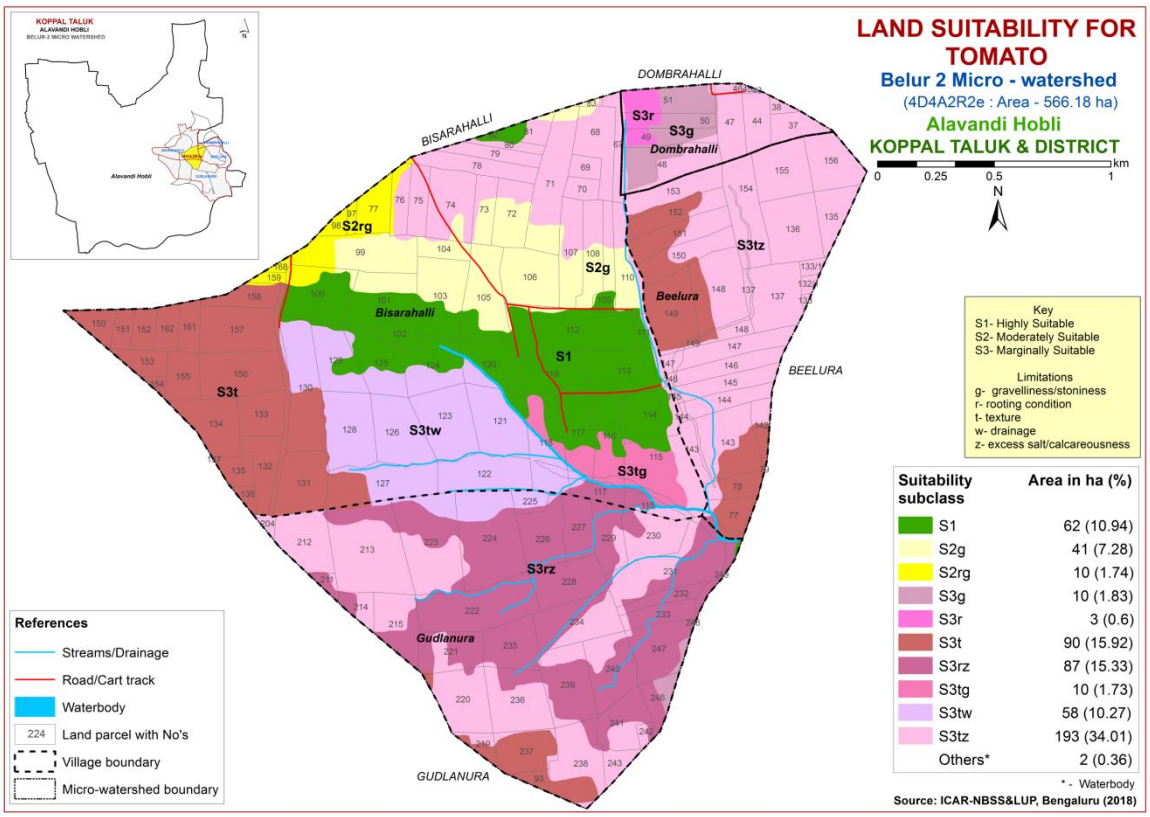


Fig. 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Brinjal (*Solanum melongena*)

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

An area of about 103 ha (18%) is highly suitable (Class S1) lands for growing Brinjal and distributed in the northern, northwestern and central part of the microwatershed. Maximum area of about 360 ha (64%) is moderately suitable (Class S2) for growing Brinjal and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth and calcareousness. Marginally suitable (Class S3) lands cover an area of about 100 ha (18%) and occur in the northern and southern part of the microwatershed with major limitations of gravelliness and rooting depth.

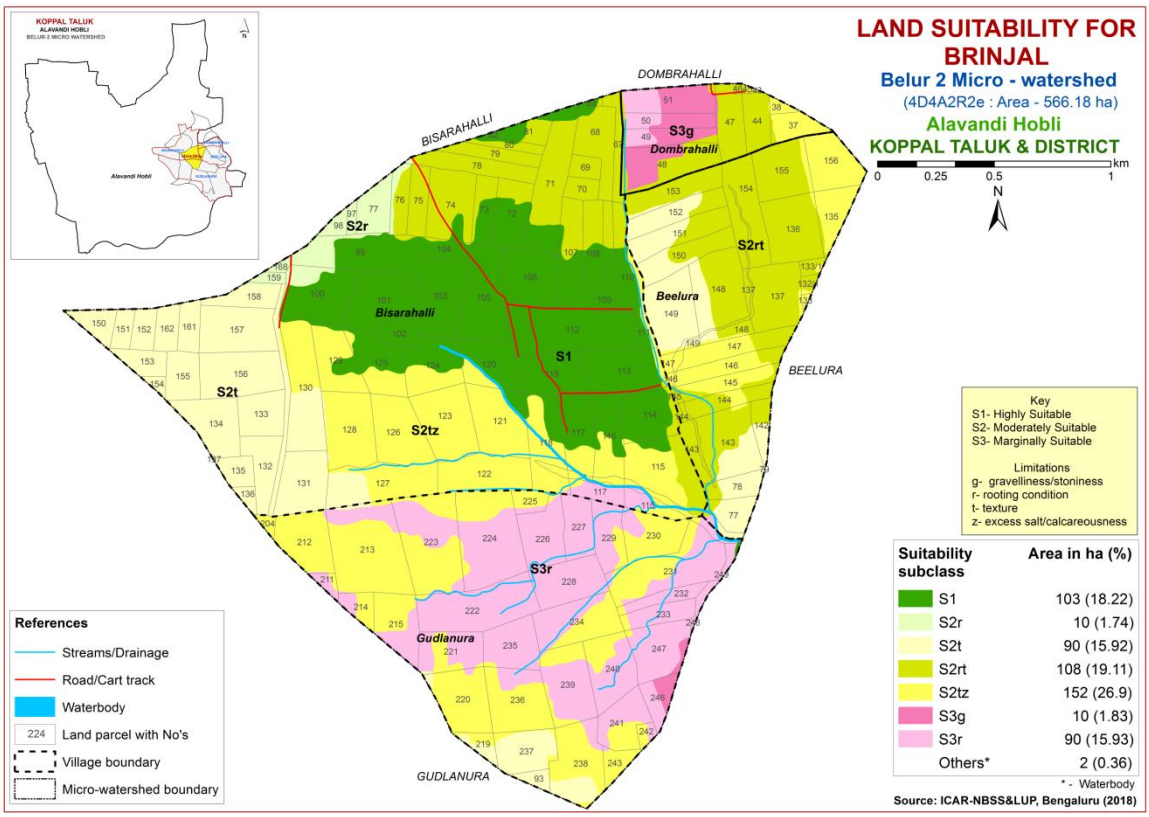


Fig 7.11 Land Suitability map of Brinjal

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

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

An area of about 41 ha (7%) is highly suitable (Class S1) lands for growing Onion and distributed in the northern part of the microwatershed. An area of about 72 ha (13%) is moderately suitable (Class S2) for growing Onion and distributed in the northern and central part of the microwatershed with minor limitations of texture and rooting depth. Marginally suitable (Class S3) lands cover a maximum area of about 450 ha (80%) and occur in all parts of the microwatershed with major limitations of texture, calcareousness and rooting depth.

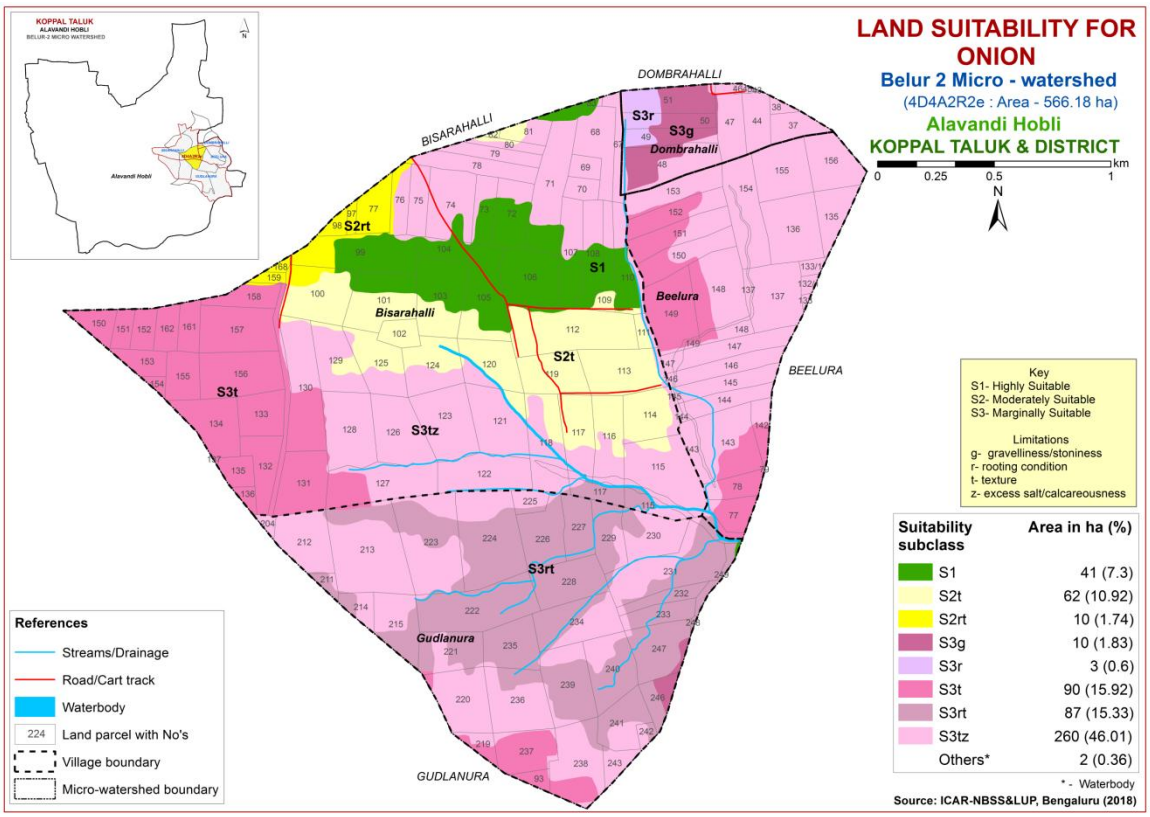


Fig 7.12 Land Suitability map of Onion

7.13 Land Suitability for Bhendi (*Abelmoschus esculentus*)

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

An area of about 41 ha (7%) is highly suitable (Class S1) lands for growing Bhendi and distributed in the northern part of the microwatershed. Maximum area of about 422 ha (75%) is moderately suitable (Class S2) for growing Bhendi and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth and calcareousness. Marginally suitable (Class S3) lands cover an area of about 100 ha (18%) and occur in the northern and southern part of the microwatershed with major limitations of gravelliness and rooting depth.

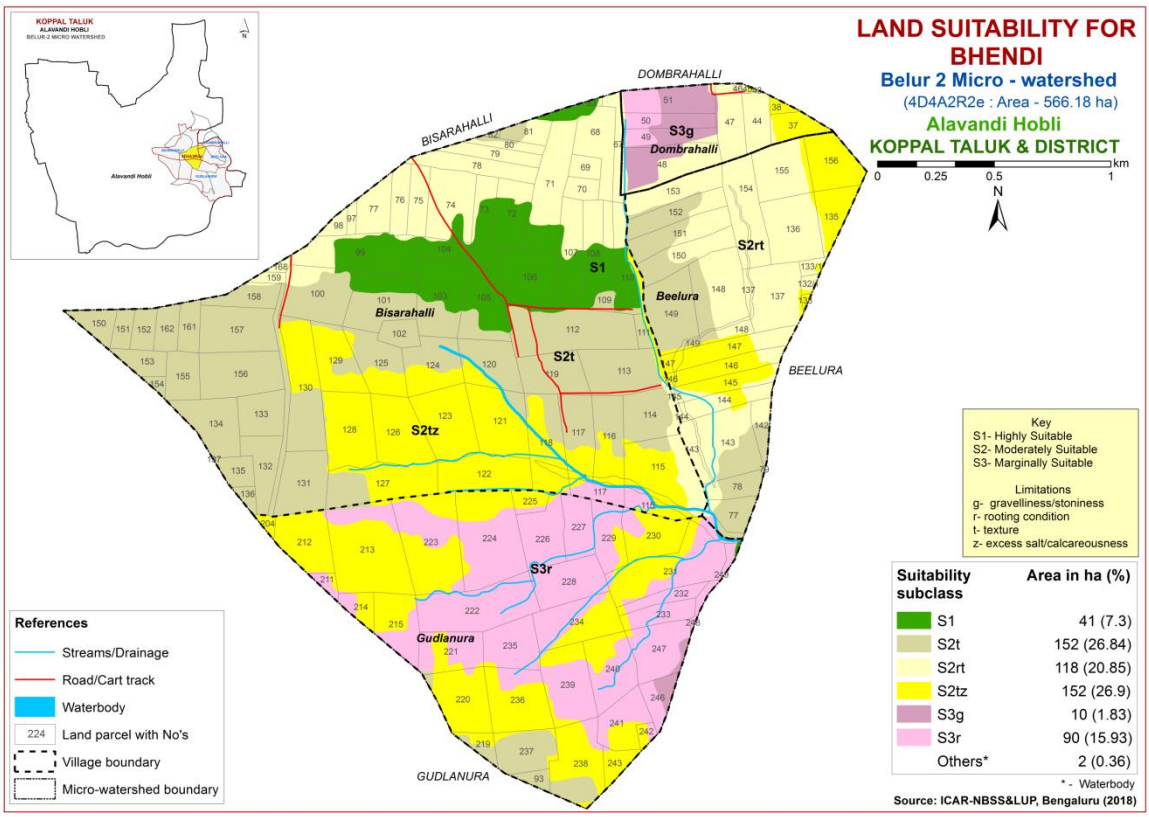


Fig 7.13 Land Suitability map of Bhendi

7.14 Land Suitability for Drumstick (*Moringa oleifera)*

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

No highly suitable (Class S1) lands for growing Drumstick in the microwatershed. Maximum area of about 345 ha (61%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover an area of about 128 ha (23%) and distributed in the northern, eastern and southern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Drumstick and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

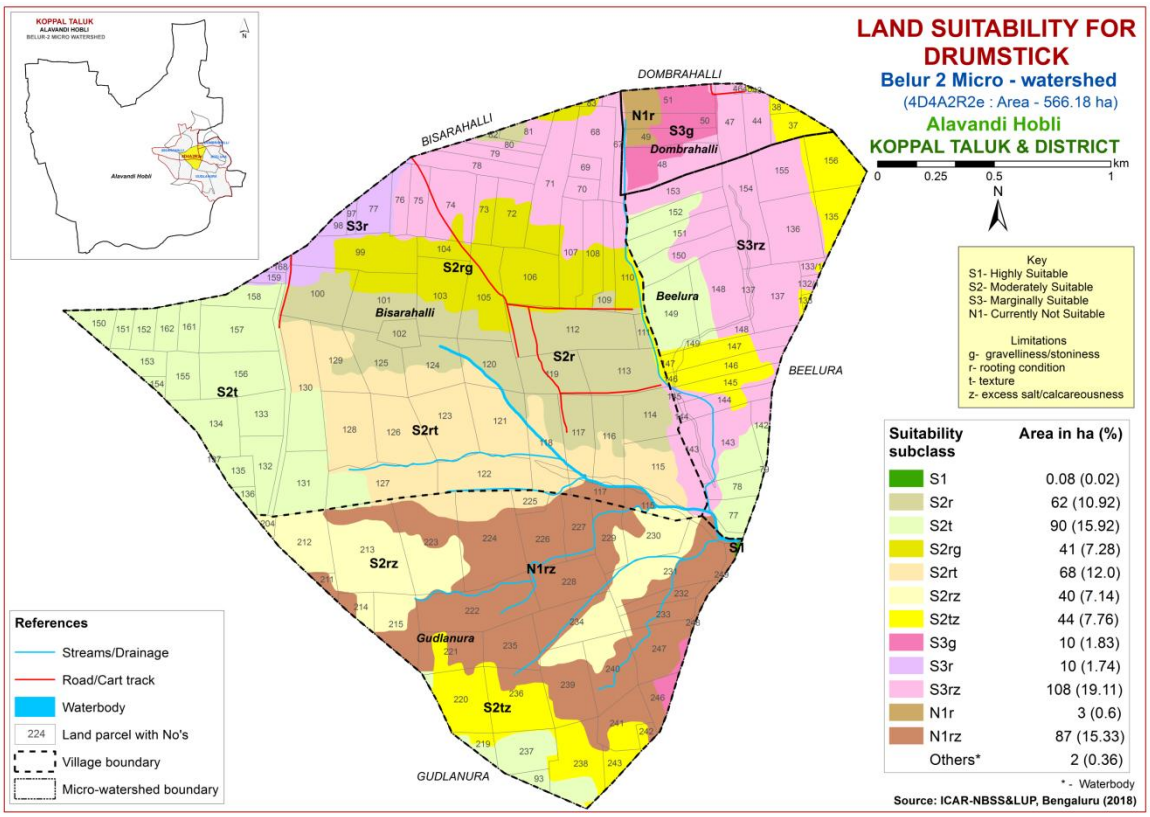


Fig. 7.14 Land Suitability map of Drumstick

7.15 Land Suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in about 1.73 lakh ha in almost all the districts of the State. The crop requirements (Table 7.16) for growing mango were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mango was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.15.

No highly suitable (Class S1) lands for growing Mango in the microwatershed. An area of about 22 ha (4%) is moderately suitable (Class S2) and distributed in the southern part of the microwatershed. Marginally suitable (Class S3) lands cover a maximum area of about 285 ha (59%) and distributed in all parts of the microwatershed. They have moderate limitations of gravelliness, texture, calcareousness and rooting depth. An area of about 208 ha (37%) is currently not suitable (Class N1) for growing Mango and are distributed in the northern, eastern and southern part of the microwatershed with severe limitations of rooting depth, texture and calcareousness.

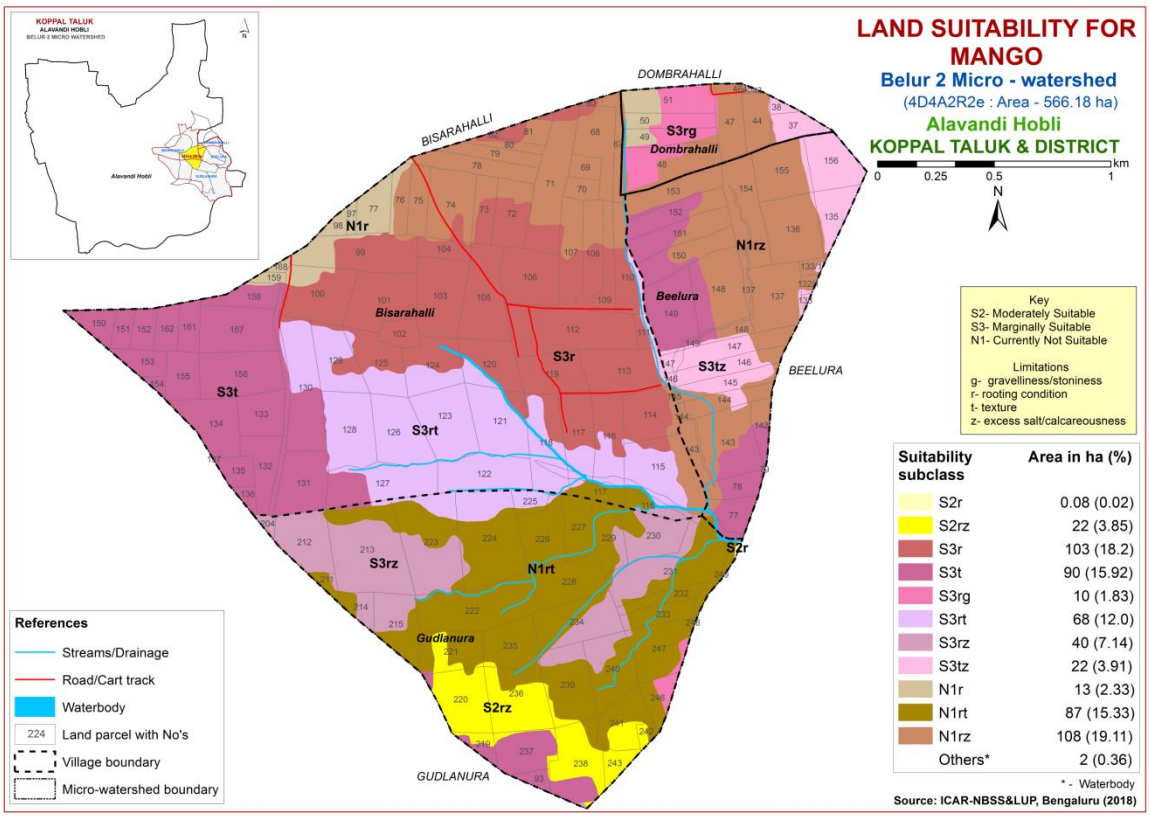


Fig. 7.15 Land Suitability map of Mango

7.16 Land Suitability for Guava (*Psidium guajava*)

Guava is one of the most important fruit crop grown in an area of about 6558 ha in almost all the districts of the state. The crop requirements (Table 7.17) for growing guava were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing guava was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.16.

No highly suitable (Class S1) lands for growing Guava and distributed in the northern part of the microwatershed. An area of about 113 ha (20%) is moderately suitable (Class S2) and distributed in the northern part of the microwatershed with minor limitations of rooting depth, texture and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 361 ha (64%) and distributed in all parts of the microwatershed. They have moderate limitations of gravelliness, texture, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Guava and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and texture.

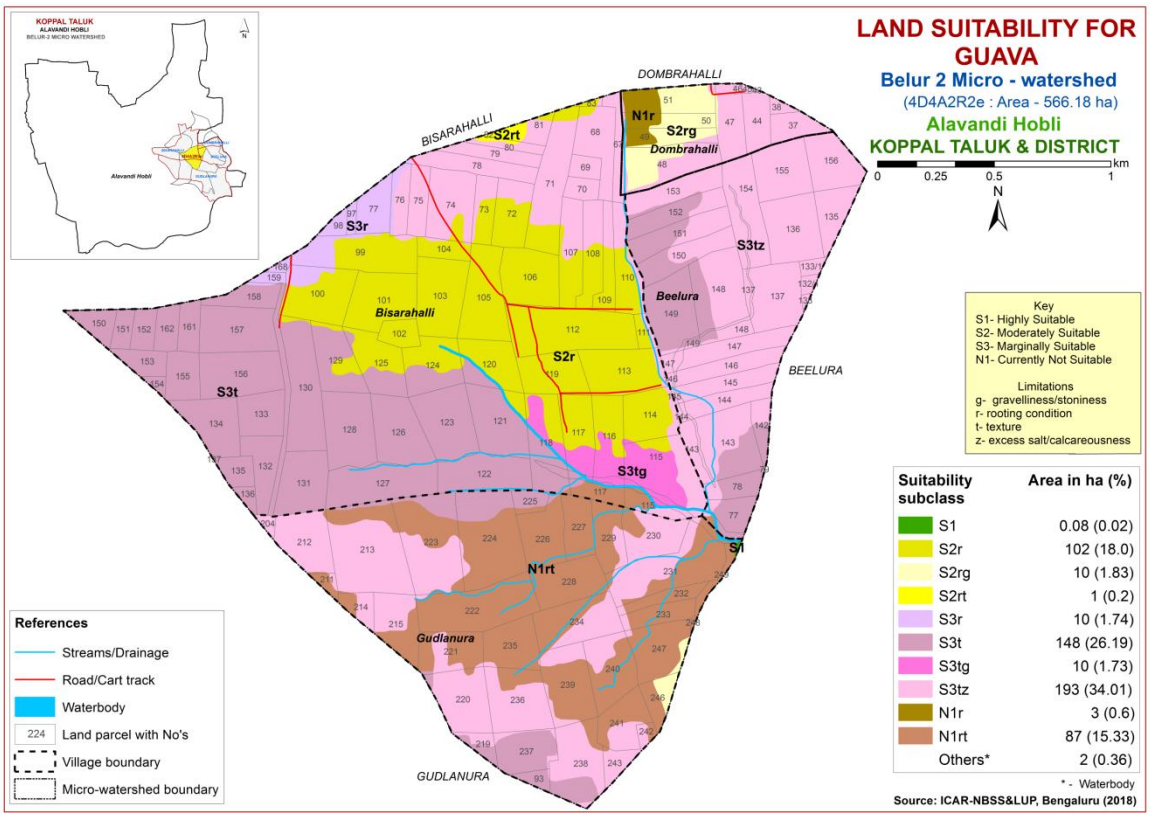


Fig. 7.16 Land Suitability map of Guava

7.17 Land Suitability for Sapota (*Manilkara zapota*)

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

No highly suitable (Class S1) lands for growing Sapota in the microwatershed. An area of about 114 ha (20%) is moderately suitable (Class S2) and distributed in the northern part of the microwatershed with minor limitations of rooting depth, texture, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 360 ha (64%) and distributed in all parts of the microwatershed. They have moderate limitations of texture, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Sapota and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

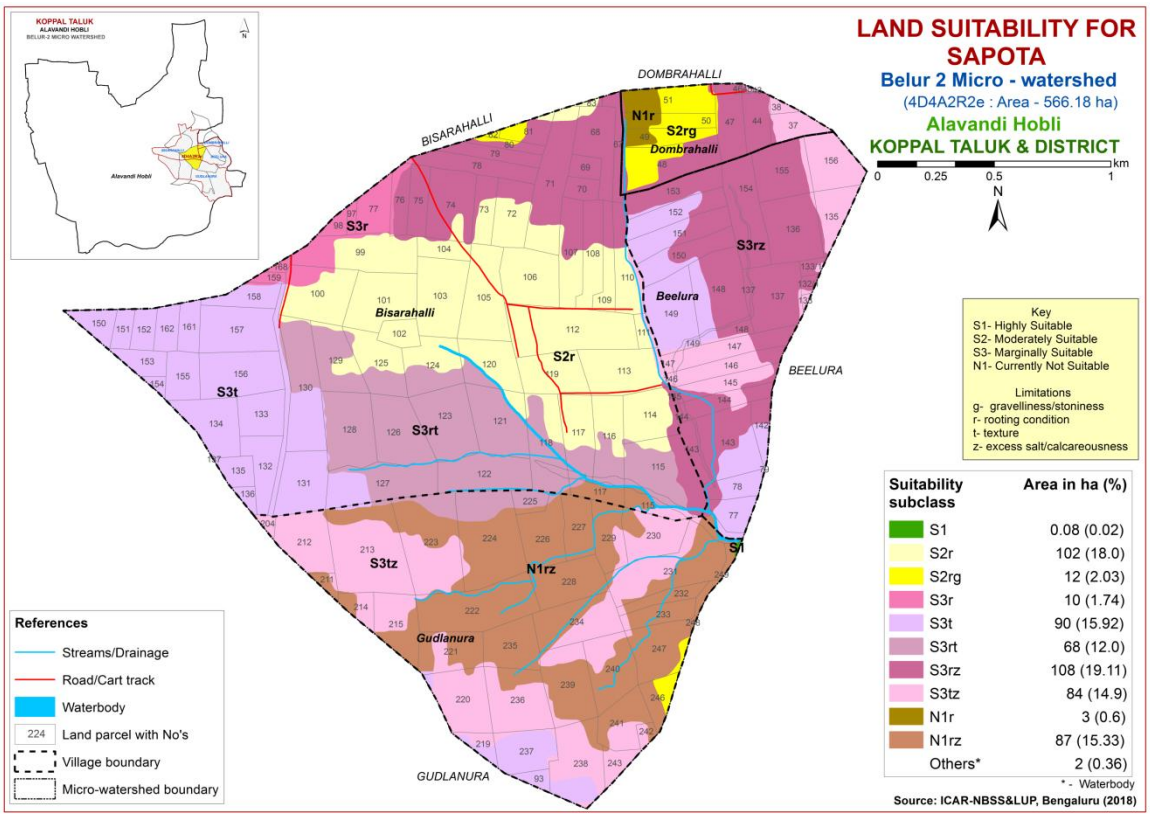


Fig. 7.17 Land Suitability map of Sapota

7.18 Land Suitability for Pomegranate (*Punica granatum*)

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

No highly suitable (Class S1) lands for growing Pomegranate in the microwatershed. Maximum area of about 356 ha (63%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover an area of about 118 ha (21%) and distributed in the northern and eastern part of the microwatershed. They have moderate limitations of calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Pomegranate and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

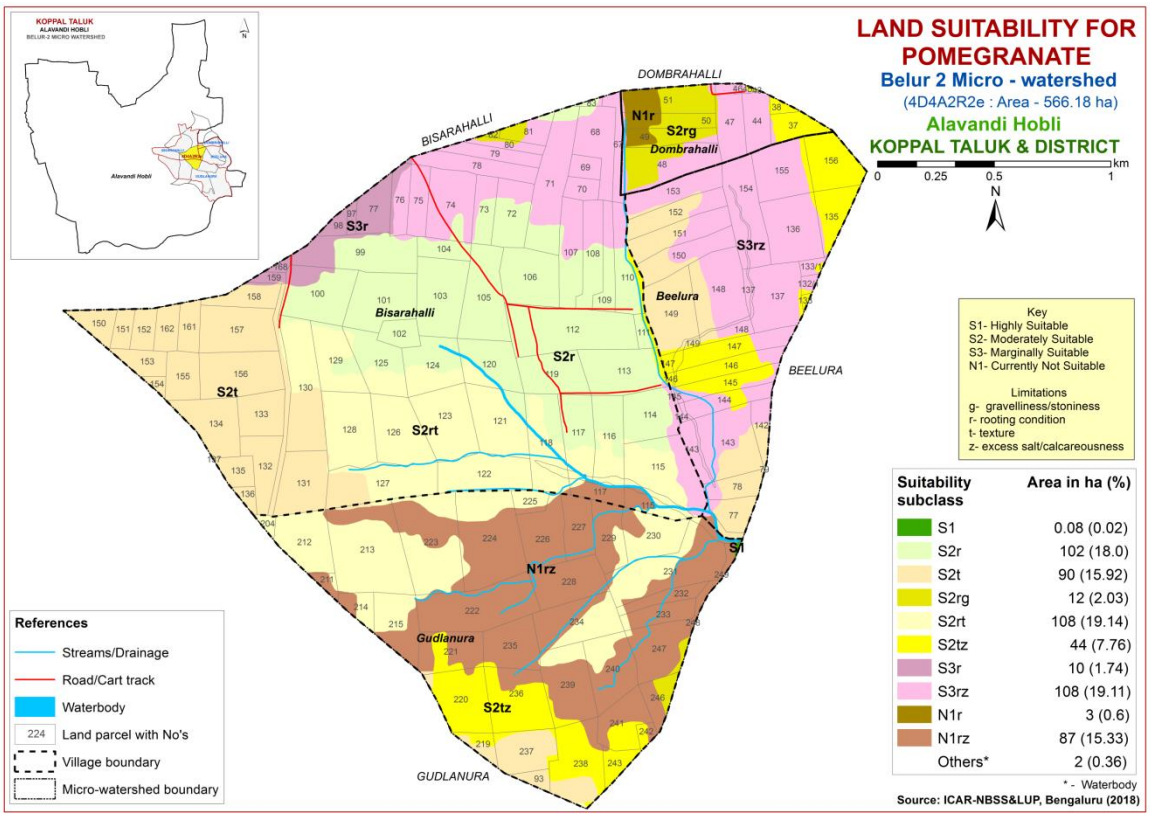


Fig. 7.18 Land Suitability map of Pomegranate

7.19 Land Suitability for Musambi (*Citrus limetta*)

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

An area of about 90 ha (16%) is highly suitable (Class S1) lands for growing Musambi and distributed in the northern, western, southern and eastern part of the microwatershed. Maximum area of about 256 ha (45%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of rooting depth, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover an area of about 128 ha (23%) and distributed in the northern and eastern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Musambi and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

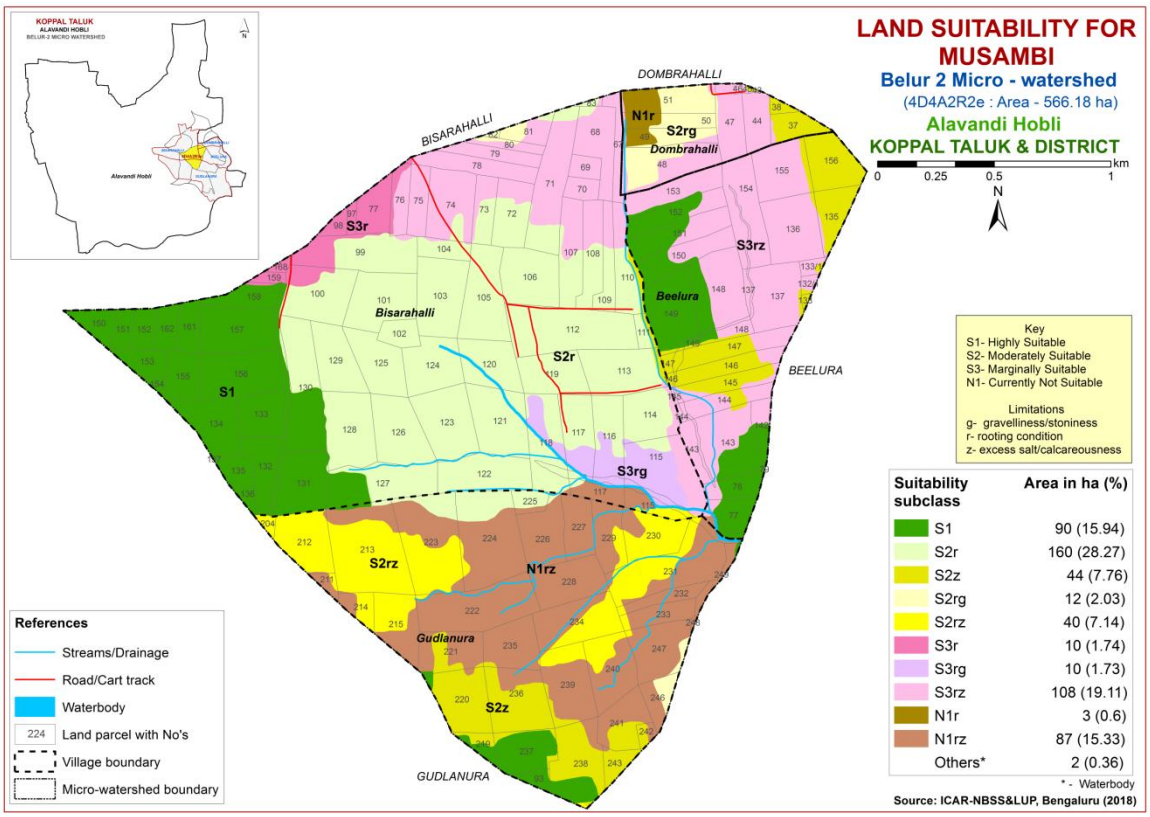


Fig. 7.19 Land Suitability map of Musambi

7.20 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 11752 ha in almost all the districts of the State. The crop requirements for growing lime (Table 7.21) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing lime was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.20.

An area of about 90 ha (16%) is highly suitable (Class S1) lands for growing Lime and distributed in the northern, western, southern and eastern part of the microwatershed. Maximum area of about 256 ha (45%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of rooting depth, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover an area of about 128 ha (23%) and distributed in the northern and eastern part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Lime and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

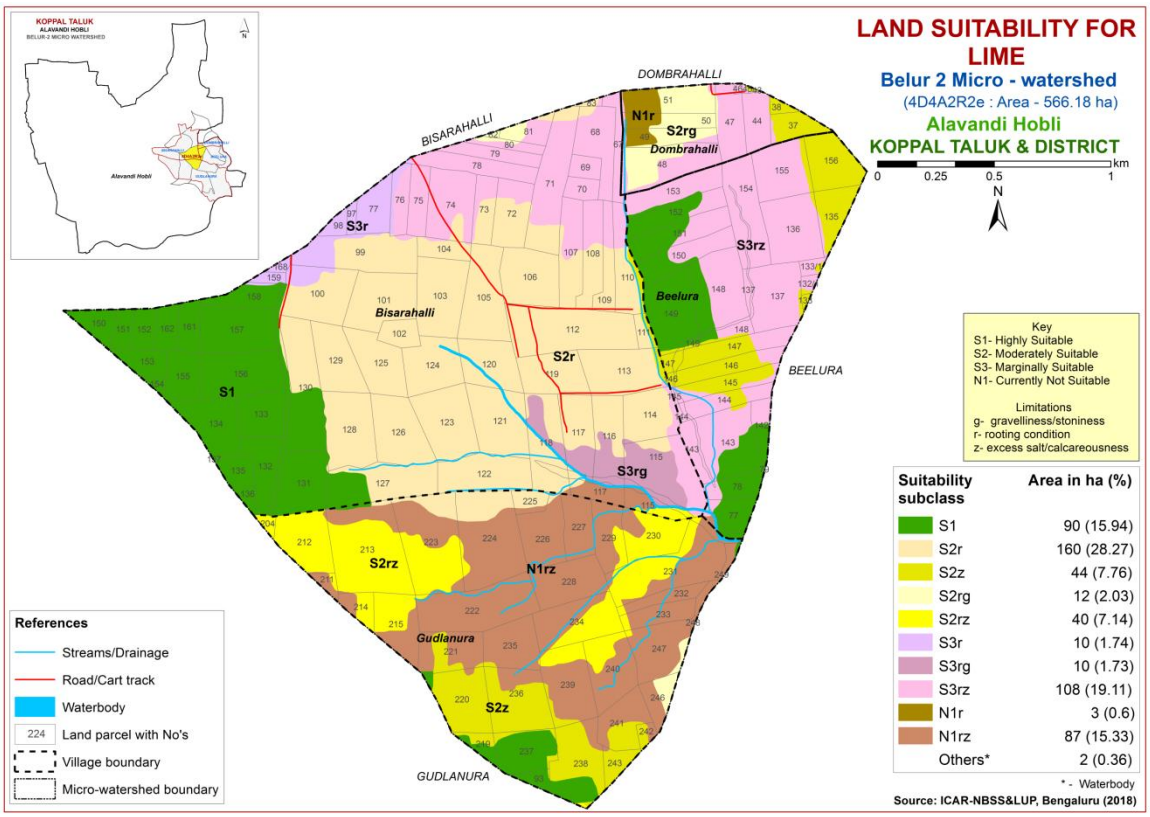


Fig. 7.20 Land Suitability map of Lime

7.21 Land Suitability for Amla (*Phyllanthus emblica*)

Amla is one of the most important fruit and medicinal crop grown in an area of 151 ha and distributed in almost all the districts of the state. The crop requirements (Table 7.22) for growing amla were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing amla was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.21.

An area of about 103 ha (18%) is highly suitable (Class S1) for growing Amla and are distributed in the northern and central part of the microwatershed. Maximum area of about 370 ha (66%) is moderately suitable (Class S2) and are distributed in all parts of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture and calcareousness. Marginally suitable (Class S3) lands occupy an area of about 90 ha (16%) and are distributed in the northern and southern part of the microwatershed with moderate limitations of rooting depth, texture and calcareousness.

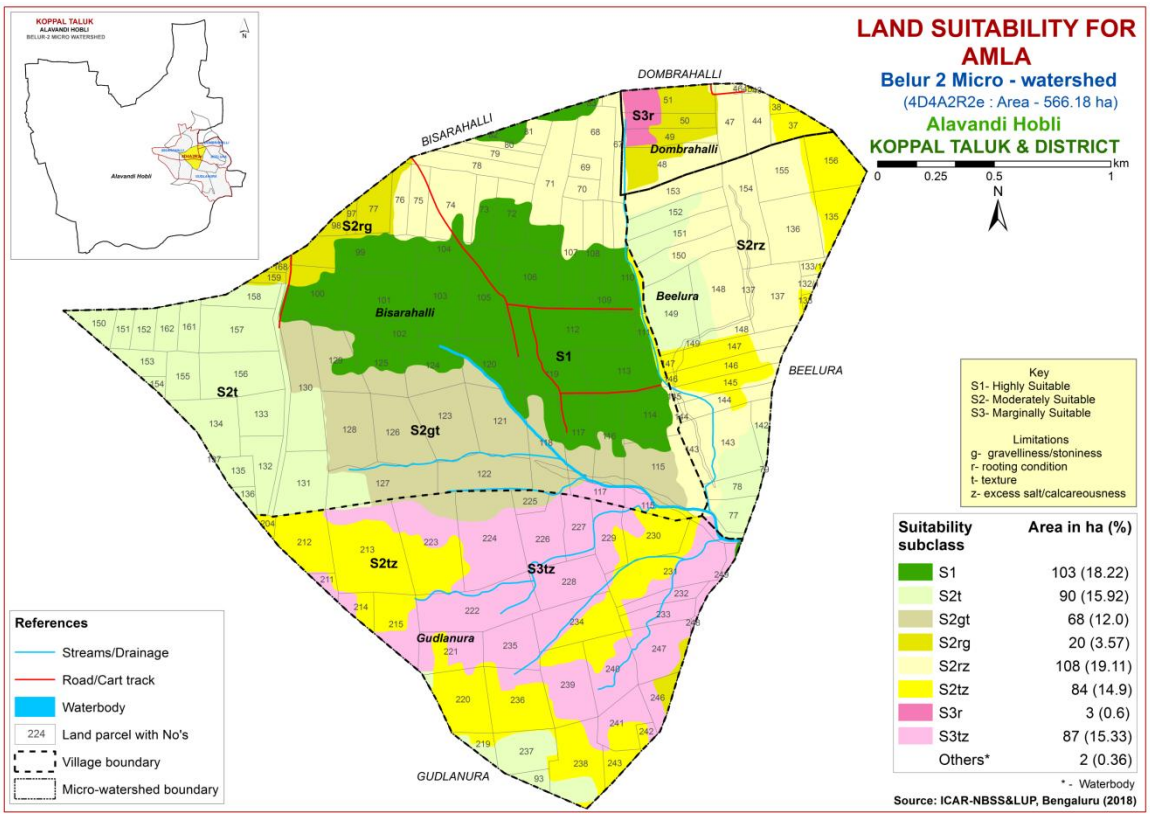


Fig. 7.21 Land Suitability map of Amla

7.22 Land Suitability for Cashew (*Anacardium occidentale)*

Cashew is one of the most important nut crop grown in an area of 7052 ha in almost all the districts of the State. The crop requirements for growing cashew (Table 7.23) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cashew was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.22.

An area of about 61 ha (11%) is highly suitable (Class S1) lands for growing Cashew and distributed in the northwestern and central part of the microwatershed. An area of about 52 ha (9%) is moderately suitable (Class S2) and distributed in the northern part of the microwatershed with minor limitations of rooting depth, texture and gravelliness. Marginally suitable (Class S3) lands cover an area of about 10 ha (2%) and distributed in the northwestern part of the microwatershed. They have moderate limitations of rooting depth. Maximum area of about 441 ha (78%) is currently not suitable (Class N1) for growing Cashew and are distributed in all parts of the microwatershed with severe limitations of rooting depth, texture and calcareousness.

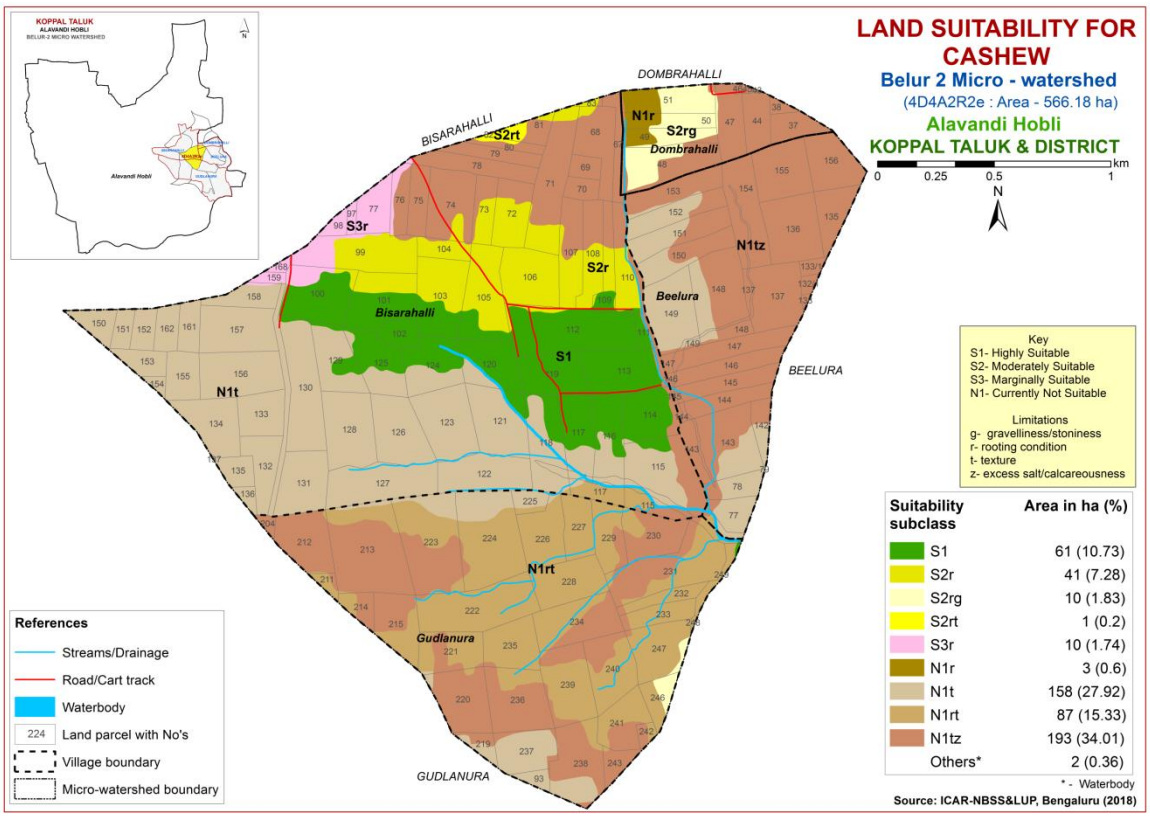


Fig. 7.22 Land Suitability map of Cashew

7.23 Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

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

No highly suitable (Class S1) lands for growing Jackfruit in the microwatershed. An area of about 114 ha (20%) is moderately suitable (Class S2) and distributed in the northern and southern part of the microwatershed with minor limitations of rooting depth and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 361 ha (64%) and distributed in all parts of the microwatershed. They have moderate limitations of texture, calcareousness, gravelliness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Jackfruit and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and texture.

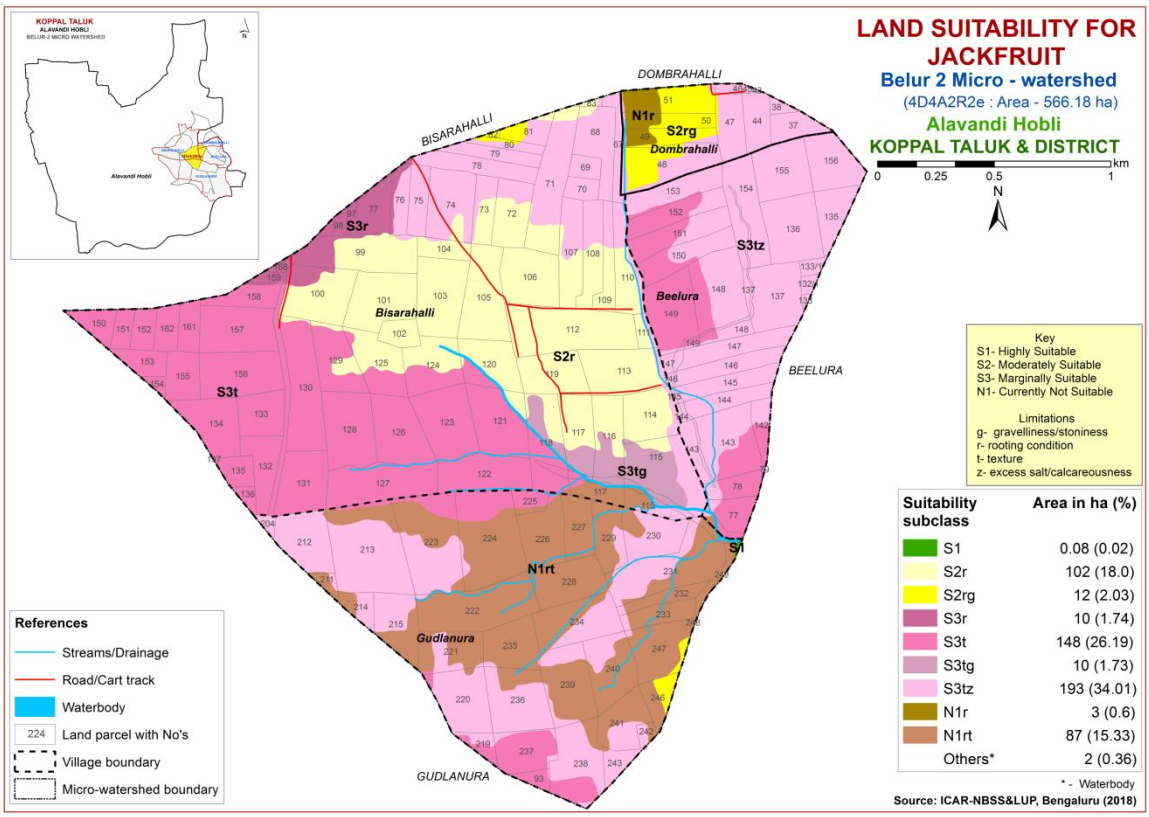


Fig. 7.23 Land Suitability map of Jackfruit

7.24 Land Suitability for Jamun (*Syzygium cumini*)

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

No highly suitable (Class S1) lands for growing Jamun in the microwatershed. An area of about 164 ha (29%) is moderately suitable (Class S2) and distributed in the northern, western, eastern and southern part of the microwatershed with minor limitations of rooting depth, texture, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover a maximum area of about 310 ha (55%) and distributed in all parts of the microwatershed. They have moderate limitations of texture, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Jamun and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and texture.

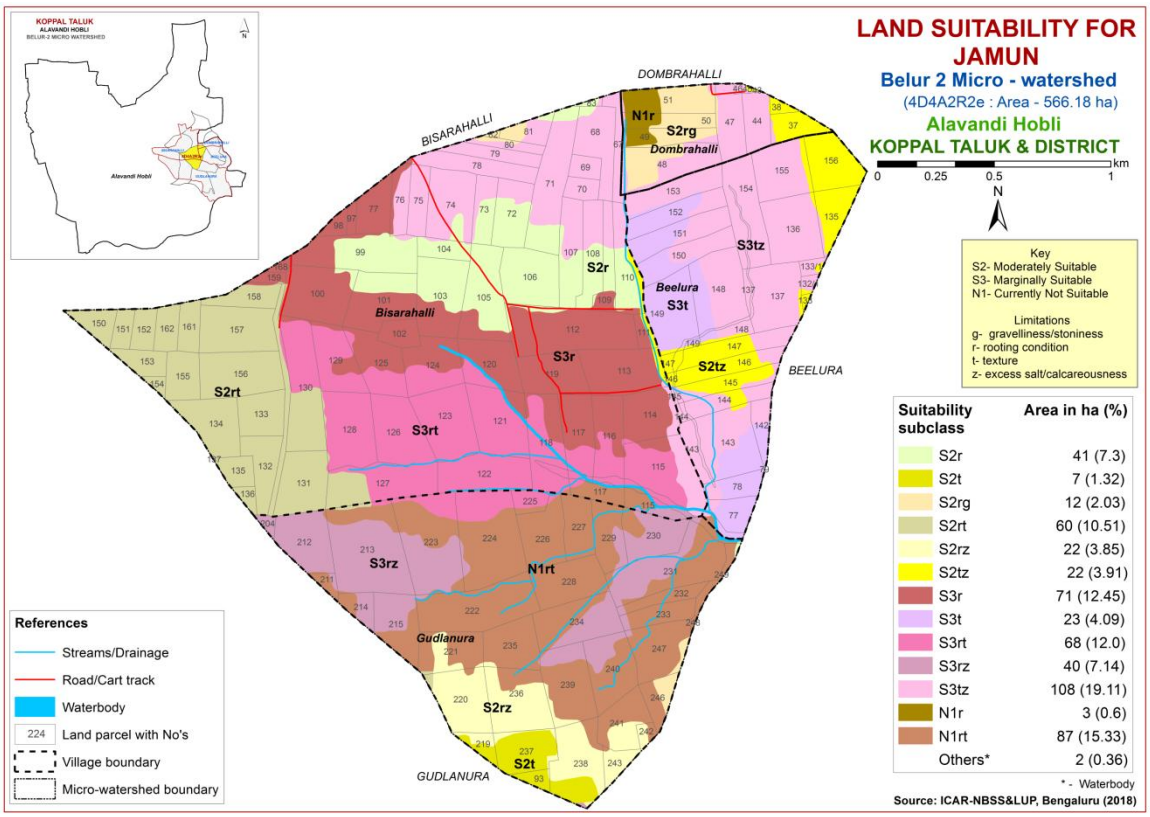


Fig. 7.24 Land Suitability map of Jamun

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

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

Maximum area of about 251 ha (44%) is highly suitable (Class S1) for growing Custard Apple and are distributed in all part of the microwatershed. An area of about 222 ha (40%) is moderately suitable (Class S2) and are distributed in the northern, western, eastern and southern part of the microwatershed. They have minor limitations of gravelliness, rooting depth and calcareousness. Marginally suitable (Class S3) lands occupy an area of about 90 ha (16%) and are distributed in the northern and southern part of the microwatershed with moderate limitations of gravelliness, rooting depth and calcareousness.

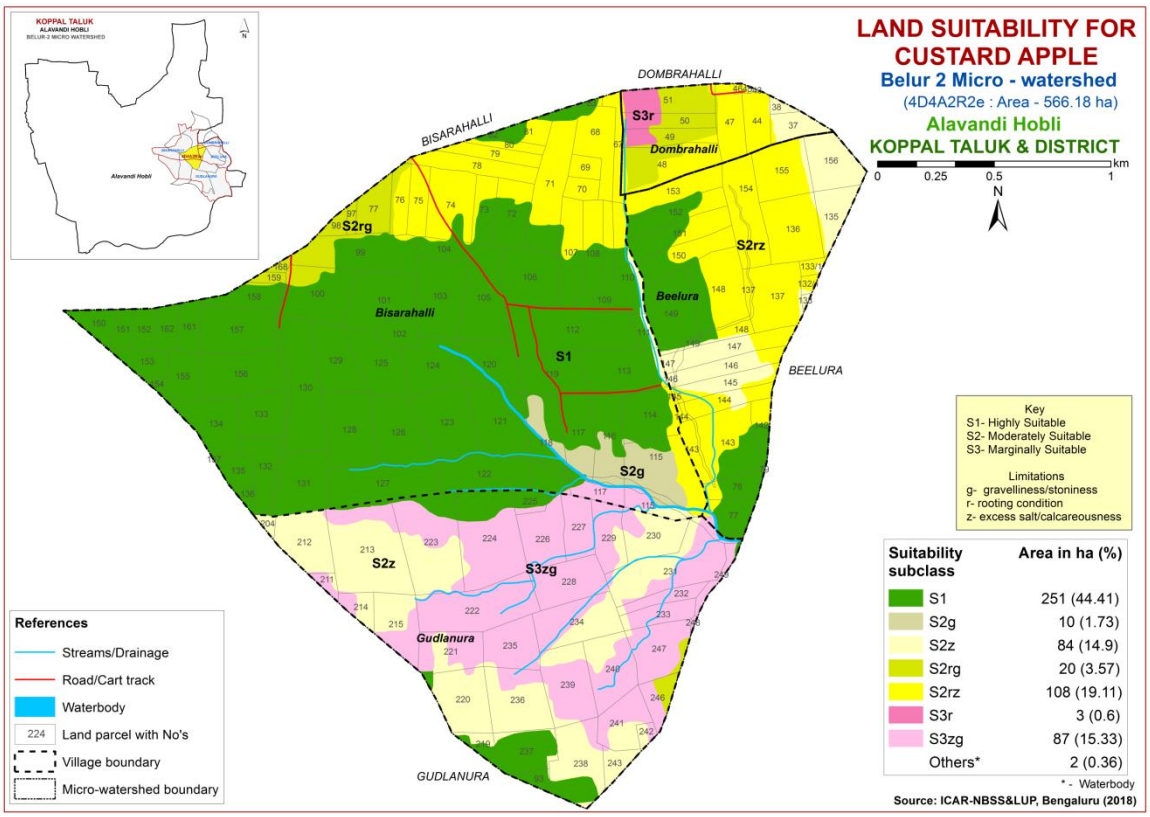


Fig. 7.25 Land Suitability map of Custard Apple

7.26 Land Suitability for Tamarind (*Tamarindus indica*)

Tamarind is one of the most important spice crop grown in 14897 ha in all the districts of the state. The crop requirements (Table 7.27) for growing tamarind were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tamarind was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.26.

No highly suitable (Class S1) lands for growing Tamarind in the microwatershed. An area of about 135 ha (24%) is moderately suitable (Class S2) and distributed in the northern, eastern, western and southern part of the microwatershed with minor limitations of rooting depth, texture and calcareousness. Marginally suitable (Class S3) lands cover a maximum area of about 221 ha (39%) and distributed in all parts of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting depth. An area of about 208 ha (37%) is currently not suitable (Class N1) for growing Tamarind and are distributed in the northern, southern and eastern part of the microwatershed with severe limitations of rooting depth and calcareousness.

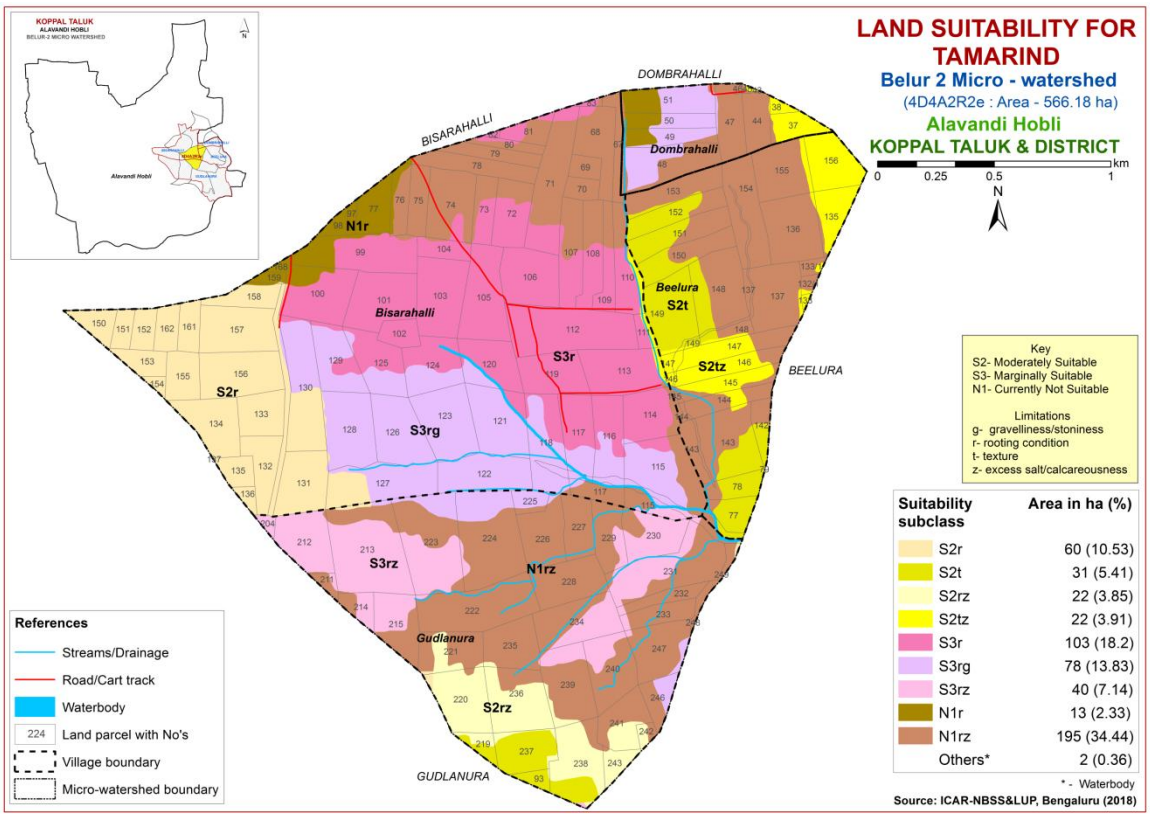


Fig. 7.26 Land Suitability map of Tamarind

7.27 Land Suitability for Mulberry (*Morus nigra*)

Mulberry is the most important leaf crop grown for rearing silkworms in about 1.66 lakh ha in all the districts of the state. The crop requirements for growing mulberry (Table 7.28) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing mulberry was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.27.

No highly suitable (Class S1) lands for growing Mulberry in the microwatershed. Maximum area of about 303 ha (54%) is moderately suitable (Class S2) and distributed in all parts of the microwatershed with minor limitations of texture, rooting depth, calcareousness, drainage and gravelliness. Marginally suitable (Class S3) lands cover an area of about 171 ha (30%) and distributed in the northern and eastern part of the microwatershed. They have moderate limitations of texture, calcareousness and rooting depth. An area of about 90 ha (16%) is currently not suitable (Class N1) for growing Mulberry and are distributed in the northern and southern part of the microwatershed with severe limitations of rooting depth and calcareousness.

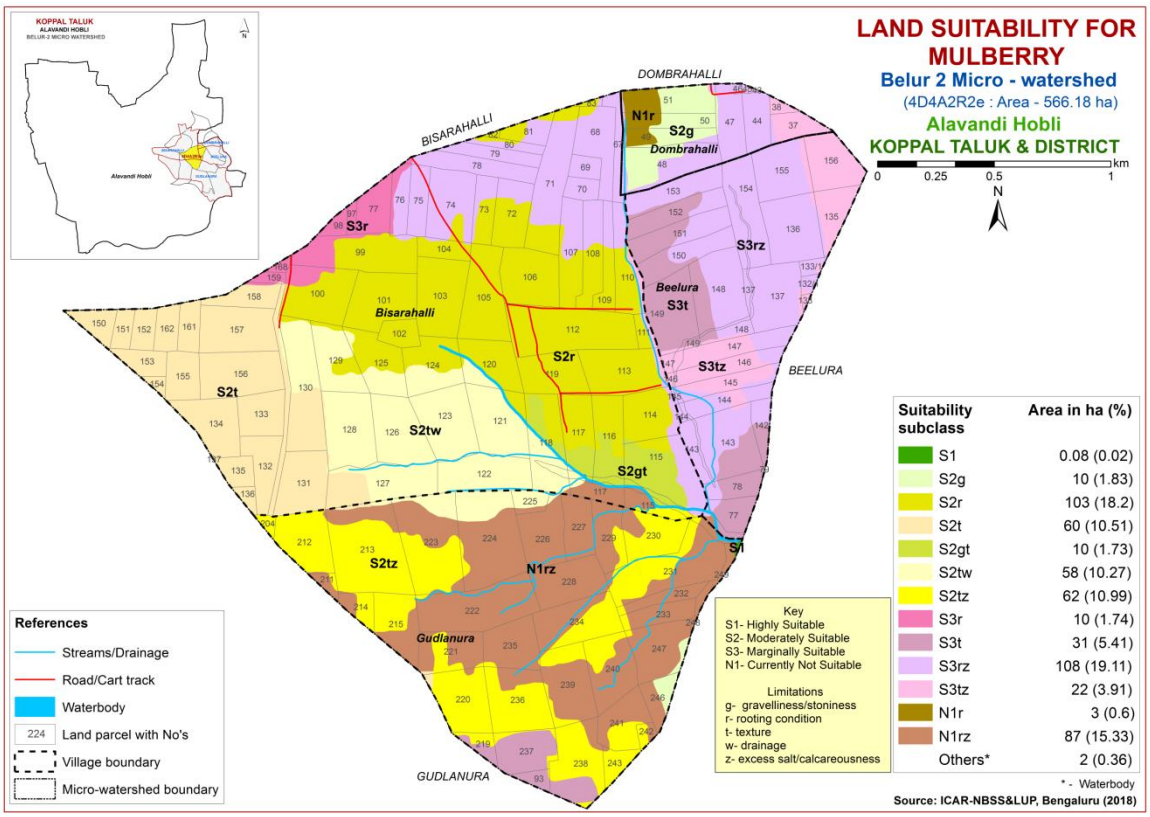


Fig. 7.27 Land Suitability map of Mulberry

7.28 Land Suitability for Marigold (*Tagetes erecta*)

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

An area of about 61 ha (11%) is highly suitable (Class S1) for growing Marigold and distributed in the northwestern and central part of the microwatershed. Maximum area of about 392 ha (69%) is moderately suitable (Class S2) and are distributed in all parts of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture, drainage and calcareousness. Marginally suitable (Class S3) lands occupy an area of about 110 ha (20%) and are distributed in the northern and southern part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness.

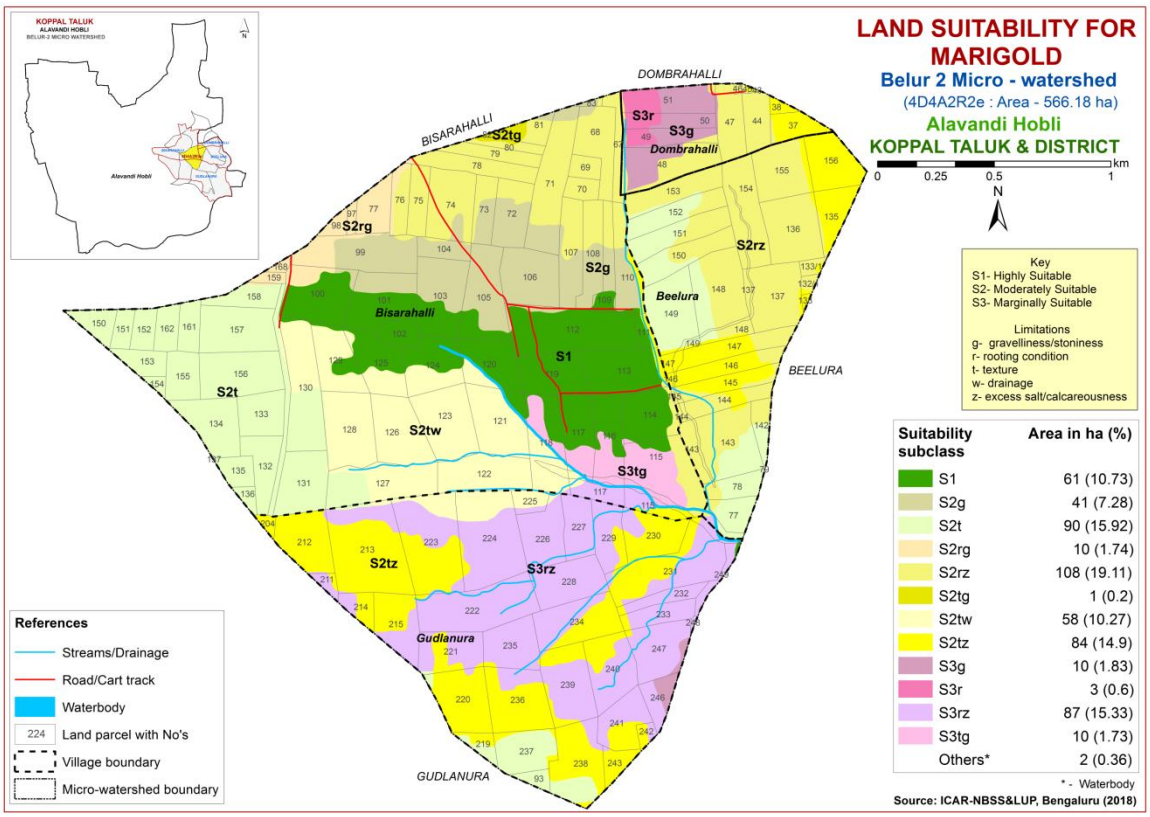


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Chrysanthemum indicum*)

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

An area of about 61 ha (11%) is highly suitable (Class S1) for growing Chrysanthemum and distributed in the northwestern and central part of the microwatershed. Maximum area of about 392 ha (69%) is moderately suitable (Class S2) and are distributed in all parts of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture, drainage and calcareousness. Marginally suitable (Class S3) lands occupy an area of about 110 ha (20%) and are distributed in the northern and southern part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness.

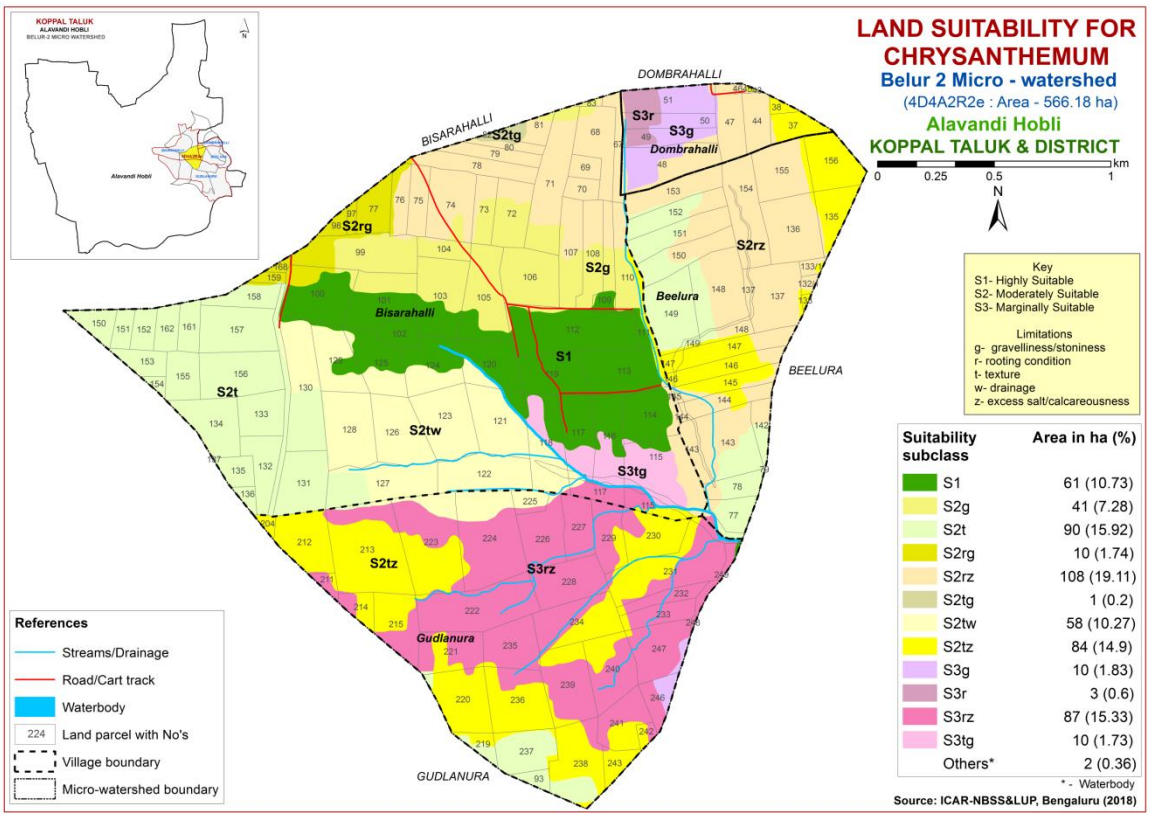


Fig. 7.29 Land Suitability map of Chrysanthemum

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

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

An area of about 61 ha (11%) is highly suitable (Class S1) for growing Jasmine and distributed in the northwestern and central part of the microwatershed. An area of about 160 ha (28%) is moderately suitable (Class S2) and are distributed in the northern and eastern part of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture and calcareousness. Marginally suitable (Class S3) lands occupy a maximum area of about 342 ha (61%) and are distributed in all parts of the microwatershed with moderate limitations of rooting depth, texture, drainage, calcareousness and gravelliness.

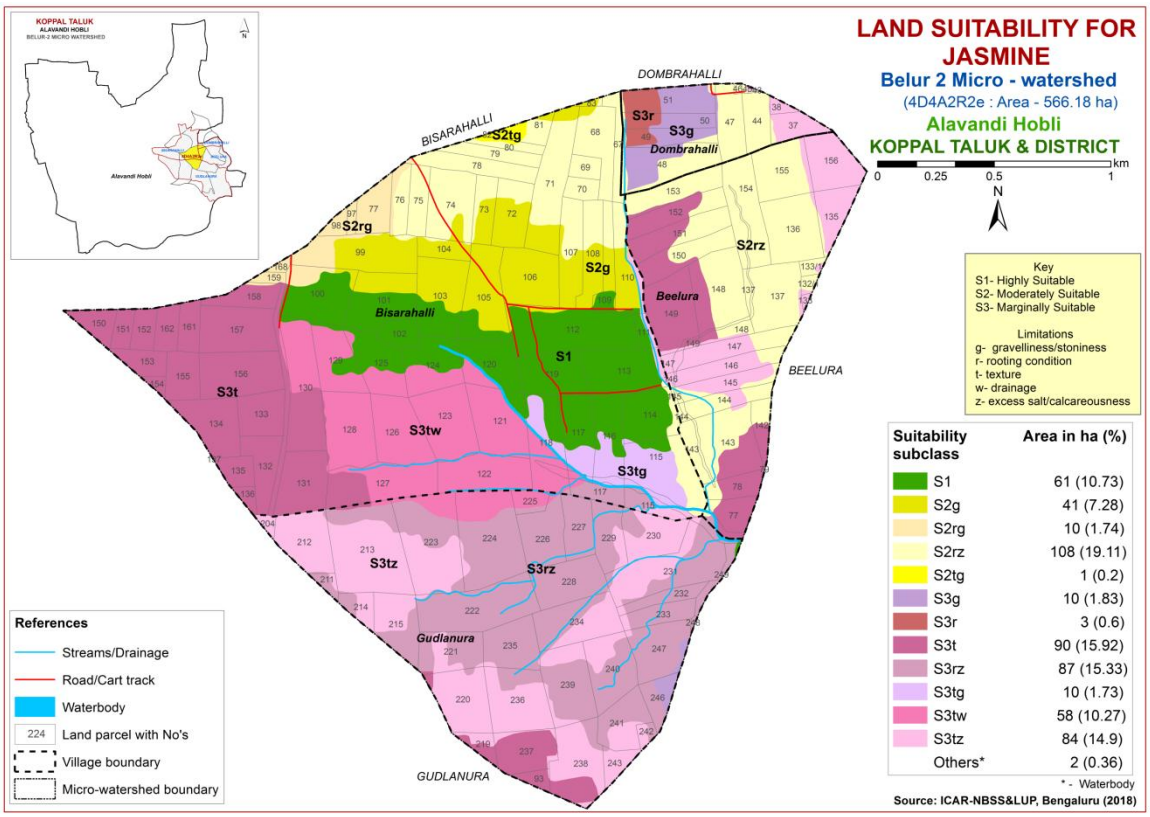


Fig. 7.30 Land Suitability map of Jasmine

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

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

An area of about 61 ha (11%) is highly suitable (Class S1) for growing Crossandra and distributed in the northwestern and central part of the microwatershed. An area of about 99 ha (17%) is moderately suitable (Class S2) and are distributed in the northern and southern part of the microwatershed. They have minor limitations of gravelliness, rooting depth, texture and calcareousness. Marginally suitable (Class S3) lands occupy a maximum area of about 403 ha (72%) and are distributed in all parts of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness.

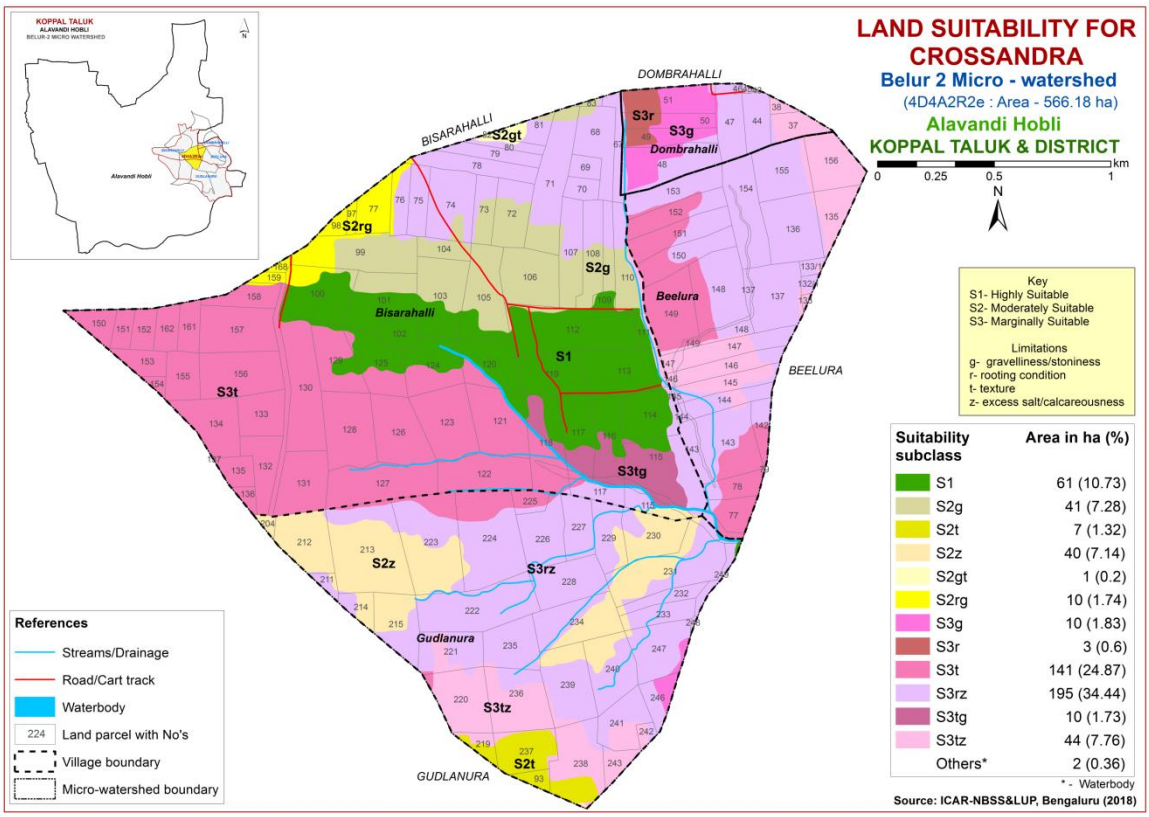


Fig. 7.31 Land Suitability map of Crossandra

Table 7.1 Soil-Site Characteristics of Belur-2 Microwatershed

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m)	Slope (%)	Erosion	pH	EC (dSm^{-1})	ESP	CEC [Cmol $(p^{+})kg^{-1}$]	BS (%)
					Surface	Subsurface	Surface	Subsurface								
CSRiB2	662	<90	WD	25-50	sc	scl	<15	<15	51-100	1-3	moderate	-	-	-	-	-
HTIhB1g1	662	<90	WD	50-75	scl	gsc	15-35	15-35	51-100	1-3	slight	7.11	0.10	0.30	20.19	147
HDHiB2g1	662	<90	WD	75-100	sc	gsc-gc	15-35	>35	51-100	1-3	moderate	6.54	0.07	7.11	5.84	84.00
BSRiB1	662	<90	WD	75-100	sc	gsc	<15	15-35	51-100	1-3	slight	6.59	0.12	6.00	8.80	77.55
BSRiB1g1	662	<90	WD	75-100	sc	gsc	15-35	15-35	51-100	1-3	slight	6.59	0.12	6.00	8.80	77.55
GHThB2g1	662	<90	WD	75-100	scl	gscl	15-35	15-35	101-150	1-3	moderate	5.70	0.06	4.10	3.17	73.00
KMHiB2	662	<90	WD	100-150	sc	sc	<15	<15	151-200	1-3	moderate	7.20	0.19	0.54	15.07	100
MTLmB2	662	<90	WD	25-50	c	gc	<15	15-35	51-100	1-3	moderate	8.27	0.20	0.69	37.00	-
MTLmB2g1	662	<90	WD	25-50	c	gc	15-35	15-35	51-100	1-3	moderate	8.27	0.20	0.69	37.00	-
RNKiA1	662	<90	MWD	50-75	sc	c	<15	<15	51-100	0-1	slight	8.86	0.48	7.00	37.00	-
RNKmB2	662	<90	MWD	50-75	c	c	<15	<15	51-100	1-3	moderate	8.86	0.48	7.00	37.00	-
RNKmB2g1	662	<90	MWD	50-75	c	c	15-35	<15	51-100	1-3	moderate	8.86	0.48	7.00	37.00	-
DRLmB2	662	<90	MWD	75-100	c	c	<15	<15	151-200	1-3	moderate	8.78	0.42	5.62	49.70	100
DRLmB2g1	662	<90	MWD	75-100	c	c	15-35	<15	151-200	1-3	moderate	8.78	0.42	5.62	49.70	100
NSPmB2g1	662	<90	MWD	75-100	c	c	15-35	<15	101-150	1-3	moderate	9.16	0.61	8.60	51.09	-
NSPmB2g2	662	<90	MWD	75-100	c	c	35-60	<15	101-150	1-3	moderate	9.16	0.61	8.60	51.09	-
GRHmA1	662	<90	MWD	100-150	c	c	<15	<15	>200	0-1	slight	9.08	0.23	7.11	63.21	100
GRHmB2	662	<90	MWD	100-150	c	c	<15	<15	>200	1-3	moderate	9.08	0.23	7.11	63.21	100
KVRmB1	662	<90	MWD	100-150	c	c	<15	<15	>200	1-3	slight	8.40	0.26	0.60	43.25	-
LGDmB1	662	<90	WD	100-150	c	c	<15	<15	>200	1-3	slight	8.03	1.93	1.82	32.37	100
LGDmB2g1	662	<90	WD	100-150	c	c	15-35	<15	>200	1-3	moderate	8.03	1.93	1.82	32.37	100
BDRmB2	662	<90	MWD	>150	c	c	<15	<15	>200	1-3	moderate	8.73	0.20	4.37	40.56	-

Table 7.2 Land suitability criteria for Sorghum

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

Table 7.3 Land suitability criteria for Maize

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

Table 7.4 Land suitability criteria for Bajra

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

Table 7.5 Land suitability criteria for Groundnut

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

Table 7.6 Land suitability criteria for Sunflower

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

Table 7.7 Land suitability criteria for Redgram

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

Table 7.8 Land suitability criteria for Bengal gram

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

Table 7.9 Land suitability criteria for Cotton

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

Table 7.10 Land suitability criteria for Chilli

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

Table 7.11 Land suitability criteria for Tomato

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

Table 7.12 Land suitability criteria for Brinjal

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

Table 7.13 Land suitability criteria for Onion

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

Table 7.14 Land suitability criteria for Bhendi

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

Table 7.15 Land suitability criteria for Drumstick

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

Table 7.16 Land suitability criteria for Mango

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

Table 7.17 Land suitability criteria for Guava

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

Table 7.18 Land suitability criteria for Sapota

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

Table 7.19 Land suitability criteria for Pomegranate

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

Table 7.20 Land suitability criteria for Musambi

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

Table 7.21 Land suitability criteria for Lime

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

Table 7.22 Land suitability criteria for Amla

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

Table 7.23 Land suitability criteria for Cashew

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

Table 7.24 Land suitability criteria for Jackfruit

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

Table 7.25 Land suitability criteria for Jamun

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

Table 7.26 Land suitability criteria for Custard apple

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

Table 7.27 Land suitability criteria for Tamarind

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

Table 7.28 Land suitability criteria for Mulberry

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

Table 7.29 Land suitability criteria for Marigold

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

Table 7.30 Land suitability criteria for Chrysanthemum

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

Table 7.31 Land suitability criteria for Jasmine (irrigated)

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

7.32 Land suitability criteria for Crossandra

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

7.32 Land Management Units (LMUs)

The 22 soil map units identified in Belur-2 microwatershed have been grouped into 7 Land Management Units (LMUs) for the purpose of preparing a Proposed Crop Plan. Land Management Units are grouped based on the similarities in respect of the type of soil, the depth of the soil, the surface soil texture, gravel content, AWC, slope, erosion etc. and a Land Management Units map (Fig.7.31) has been generated. These Land Management Units are expected to behave similarly for a given level of management.

The map units that have been grouped into 7 Land Management Units along with brief description of soil and site characteristics are given below.

LMU	Mapping unit	Soil and site characteristics
1	433.BDRmB2 363.NSPmB2g1 364.NSPmB2g2 370.GRHmA1 373.GRHmB2 388.KVRmB1 393.LGDmB1 477.LGDmB2g1 350.DRLmB2 351.DRLmB2g1	Moderately deep to very deep (75 to >150 cm), black calcareous clay soils, slope (0-3%), slight to moderate erosion, gravelly to very gravelly (15-60%)
2	201.KMHiB2 164.BSRiB1 165.BSRiB1g1 142.GHThB2g1	Moderately deep to deep (75-150 cm), red sandy clay loam to sandy clay soils, slope (1-3%), slight to moderate erosion, gravelly (15-35%)
3	128.HDHiB2g1	Moderately deep (75-100 cm), red gravelly sandy clay soils, slope (1-3%), moderate erosion, gravelly (15-35%)
4	329.RNKiA1 336.RNKmB2 337.RNKmB2g1	Moderately shallow (50-75 cm), black calcareous clay soils, slope (0-3%), slight to moderate erosion, gravelly (15-35%)
5	94.HTIhB1g1	Moderately shallow (50-75 cm), red sandy clay loam soils, slope (1-3%), slight erosion, gravelly (15-35%)
6	39.CSRiB2	Shallow (25-50 cm), red sandy clay soils, slope (1-3%), moderate erosion
7	310.MTLmB2 311.MTLmB2g1	Shallow (25-50 cm), black calcareous clay soils, slope (1-3%), moderate erosion, gravelly (15-35%)

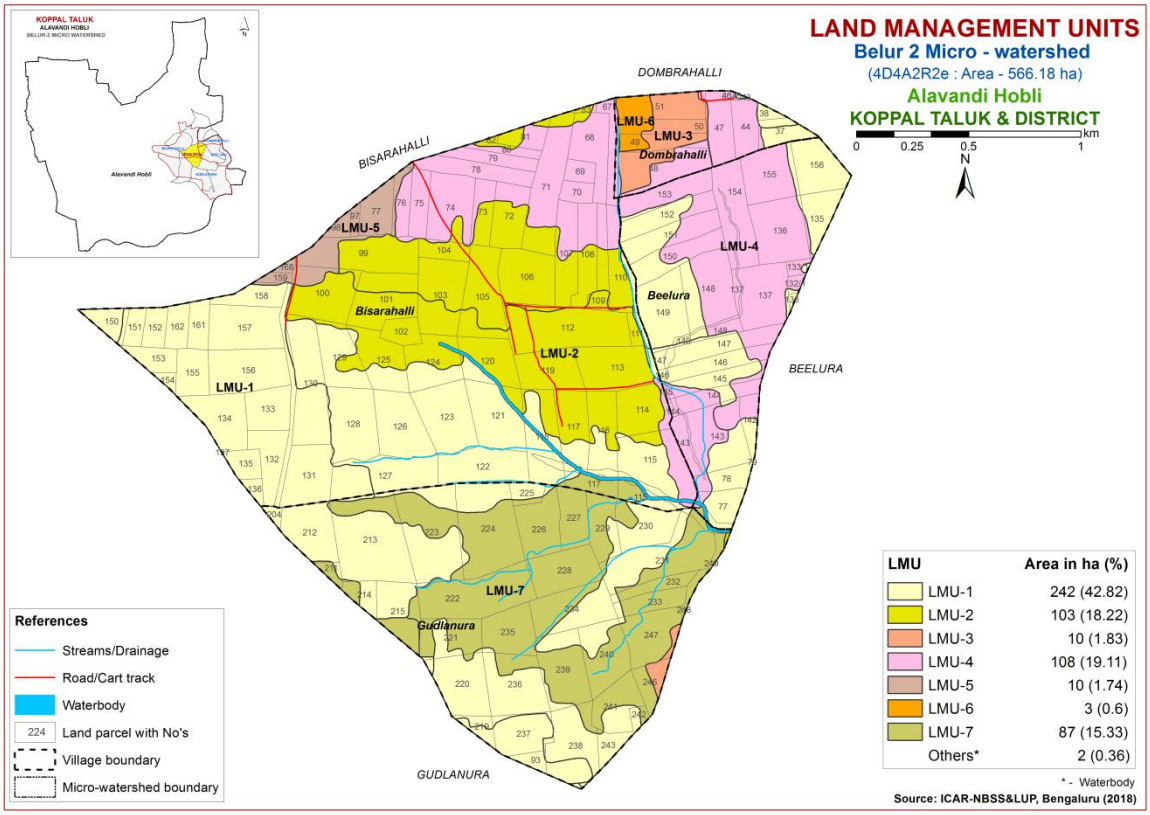


Fig 7.32 Land Management Units map of Belur-2 microwatershed

7.33 Proposed Crop Plan for Belur-2 Microwatershed

After assessing the land suitability for the 31 crops, the proposed crop plan has been prepared for the 7 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 31 crops. The resultant proposed crop plan is presented in Table 7.33.

Table 7.33 Proposed Crop Plan for Belur-2 Microwatershed

LMU	Soil Map Units	Survey Number	Field Crops	Horticulture Crops	Suitable Interventions
1	433.BDRmB2 363.NSPmB2g1 364.NSPmB2g2 370.GRHmA1 373.GRHmB2 388.KVRmB1 393.LGDmB1 477.LGDmB2g1 350.DRLmB2 351.DRLmB2g1	**Beelura**:77,78,79,135,138,145,146,147,149,151,152,156 **Bisarahalli**:115,118,121,122,123,126,127,128,129,130,131,132,133,134,135,136,137,150,151,152,153,154,155,156,157,158,161,162 **Dombrahalli**:37,38,43 **Gudlanur**:93,204,212,213,214,215,219,220,223,225,230,236,237,238,242, 243	Maize, Sorghum, Sunflower, Cotton, Bengal gram, Safflower, Linseed, Bajra , Soybean	**Fruit crops:** Mango, Sapota, Pomegranate, Jamun, Lime, Musambi, Tamarind, Amla, Custard apple **Vegetables:** Drumstick, Chilli, Coriander, Tomato, Bhendi **Flowers:** Marigold, Chrysanthemum, Crossandra, Jasmine	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices
2	201.KMHiB2 164.BSRiB1 165.BSRiB1g1 142.GHThB2g1	**Bisarahalli:**72,73,82,83,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,116,117,119, 120,124,125	Maize, Sorghum, Sunflower, Bajra, Finger millet, Groundnut, Red gram, Cowpea, Field bean, Castor, Mulberry	**Fruit crops:** Mango, Pomegranate, Guava, Sapota, Jackfruit, Jamun, Tamarind, Lime, Musambi, Amla, Custard apple, Cashew **Vegetable crops:** Drumstick, Tomato, Bhendi, Chilli, Brinjal, Onion, Curry leaves **Flower crops:** Marigold, Chrysanthemum, Jasmine, Crossandra	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
3	128.HDHiB2g1	**Dombrahalli**49,50,51	Groundnut, Bajra, Horse gram, Castor, Mulberry	**Fruit crops:** Musambi, Lime, Jamun, Jackfruit Amla, Custard apple,	Drip irrigation, mulching, suitable soil and water

LMU	Soil Map Units	Survey Number	Field Crops	Horticulture Crops	Suitable Interventions
				Tamarind **Vegetable crops:** Drumstick, Curry leaves	conservation practices (Crescent Bunding with Catch Pit etc)
4	329.RNKiA1 336.RNKmB2 337.RNKmB2g1	**Beelura:**132/1,133/1,136,137,142,143, 144,148,150,153,154,155 **Bisarahalli:**67,68,69,70,71,74,75,76,78 ,79,80,81 **Dombrahalli:**44,45,46,47,48	Sorghum, Bajra, Bengal gram, linseed, Safflower, Coriander	**Fruit crops:** Amla, Custard apple **Flower crops:** Marigold, Jasmine Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices
5	94.HTIhB1g1	**Bisarahalli:**77,97,98 ,159,168	Sorghum, Groundnut, Bajra, Green gram, Black gram, Cowpea, Horse gram, Castor,	**Fruit crops:** Lime, Musambi, Amla, Custard apple, Cashew **Flower crops:** Marigold, Chrysanthemum, Crossandra, Jasmine	Drip irrigation, Mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
6	39.CSRiB2	**Dombrahalli:**49,50,51	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
7	310.MTLmB2 311.MTLmB2g1	**Gudlanur:**211,221,222,224,226,227,22 8,229,231,232,233,234,235,239,240,24 1,246,247,248,249	Bengal gram	**Agri-Silvi-Pasture:** Hybrid Napier, *Styloxanthes hamata, Styloxanthes scabra*	Use of short duration varieties, sowing across the slope

Chapter 8

SOIL HEALTH MANAGEMENT

8.1 Soil Health

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

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

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

The most important characteristics of a healthy soil are

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

Characteristics of Belur-2 Microwatershed

- The soil phases with sizeable area identified in the microwatershed belonged to the soil series of RNK 108 ha (19%), MTL 87 ha (15%), NSP 68 ha (12%), BSR 62 ha (11%), GRH 60 ha (11%), LGD 45 ha (8%), GHT 41 ha (7%), DRL 40 ha (7%), KVR 22 ha (4%), HTI 10 ha (2%), HDH 10 ha (2%), BDR 7 ha (1%), CSR 3 ha (1%) and KMH <1 ha (<1%).
- As per land capability classification, entire area in the microwatershed falls under arable land category (Class II and III). The major limitations identified in the arable lands were soil, wetness and erosion.

- On the basis of soil reaction, an area of about 22 ha (4%) is neutral (pH 6.5-7.0), 55 ha (10%) is slightly alkaline (pH 7.3-7.8), 107 ha (19%) is moderately alkaline (pH 7.8-8.4), 213 ha (38%) is strongly alkaline (pH 8.4-9.0) and 167 ha (29%) is very strongly alkaline (pH >9.0) in reaction.

Soil Health Management

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

Neutral soils

About 22 ha (4%) is under neutral soils.

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

Need based micronutrient applications.

Alkaline soils

About 542 ha (96%) is under alkaline soils (moderately to very strongly alkaline soils).

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

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

Soil Degradation

Soil erosion is one of the major factor affecting the soil health in the microwatershed. An area of about 159 ha (28%) is under slight erosion and 405 ha (72%) is under moderate erosion. The areas with moderate erosion need immediate soil and water conservation and other land development and land husbandry practices for restoring soil health.

Dissemination of Information and Communication of Benefits

Any large scale implementation of soil health management requires that supporting information is made available widely, particularly through channels familiar to farmers and extension workers. Given the very high priority attached to soil health especially by the Central Government on issuing Soil-Health Cards to all the farmers, media outlets like Regional, State and National Newspapers, Radio and Dooradarshan programs in local

languages but also modern information and communication technologies such as Cellular phones and the Internet, which can be much more effective in reaching the younger farmers.

Inputs for Net Planning (Saturation Plan) and Interventions needed

Net planning in IWMP is focusing on preparation of

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

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

- **Soil Depth:** The depth of a soil decides the amount of moisture and nutrients it can hold, what crops can be taken up or not, depending on the rooting depth and the length of growing period available for raising any crop. Deeper the soil, better for a wide variety of crops. If sufficient depth is not available for growing deep rooted crops, either choose medium or short duration crops or deeper planting pits need to be opened and additional good quality soil brought from outside has to be filled into the planting pits.
- **Surface Soil Texture:** Lighter soil texture in the top soil means, better rain water infiltration, less run-off and soil moisture conservation, less capillary rise and less evaporation losses. Lighter surface textured soils are amenable to good soil tilth and are highly suitable for crops like groundnut, root vegetables (carrot, raddish, potato etc) but not ideal for crops that need stagnant water like lowland paddy. Heavy textured soils are poor in water infiltration and percolation. They are prone for sheet erosion; such soils can be improved by sand mulching. The technology that is developed by the AICRP-Dryland Agriculture, Vijayapura, Karnataka can be adopted.
- **Gravelliness:** More gravel content is favorable for run-off harvesting but poor in soil moisture storage and nutrient availability. It is a significant parameter that decides the kind of crop to be raised.
- **Land Capability Classification:** The land capability map shows the areas suitable and not suitable for agriculture and the major constraints in each of the plot/survey number. Hence, one can decide what kind of enterprise is possible in each of these units. In general, erosion and soil are the major constraints in Belur-2 Microwatershed.
- **Organic Carbon:** An area of about 91 ha (16%) is low (<0.5%) and 473 ha (83%) is medium (0.5-0.75%) in OC content. The areas that are low and medium in OC needs to be further improved by applying farmyard manure and rotating crops with cereals and legumes or mixed cropping.
- **Promoting green manuring:** Growing of green manuring crops costs Rs. 1250/ha (green manuring seeds) and about Rs. 2000/ha towards cultivation that totals to Rs. 3250/- per ha. On the other hand, application of organic manure @ 10 tons/ha costs Rs. 5000/ha. The practice needs to be continued for 2-3 years or more. Nitrogen fertilizer

needs to be supplemented by 25% in addition to the recommended level in 564 ha area where OC is less than 0.75 per cent. For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg /ha needs to be applied for all the crops grown in these plots.

- **Available Phosphorus**: Available phosphorus is low (<23 kg/ha) in 352 ha (62%) and medium (23-57 kg/ha) in 212 ha (37%) area of the microwatershed. The areas with medium phosphorus content additional 25% phosphorus from the RDF to be applied.
- **Available Potassium:** Available potassium is medium (145-337 kg/ha) in 491 ha (87%) and high (>337 kg/ha) in 73 ha (13%) area of the microwatershed. The areas with high potassium content reduce 25% from the RDF to avoid the excess application of fertilizer and apply additional 25% potassium in areas where it is low and medium.
- **Available Sulphur:** Available sulphur is low (<10 ppm) in 168 ha (30%), medium (10-20 ppm) in 373 ha (66%) and high (>20 ppm) in 24 ha (4%) area of the microwatershed. Areas with low and medium in available sulphur need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertitilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Iron:** Available iron is deficient (<4.5 ppm) in 271 ha (48%) and sufficient (>4.5 ppm) in 294 ha (52%) area of the microwatershed. Application of iron sulphate @ 25 kg/ha for 2-3 years to correct the deficiency.
- **Available Zinc:** Available zinc is deficient (<0.6 ppm) in the entire area of the microwatershed. Application of zinc sulphate @ 25 kg/ha is to be followed in areas that are deficient in available zinc.
- **Available Boron:** Available boron is low in (<0.5ppm) 305 ha (54%) and medium (0.5-1.0 ppm) in 259 ha (46%) area in the microwatershed. The areas with low and medium in boron content need to be applied with sodium borate @ 10 kg/ha as soil application or 0.2% borax as foliar spray to correct the deficiency.
- **Available Manganese**: It is sufficient (>1.0 ppm) in the entire area of the microwatershed.
- **Available Copper:** Available copper is sufficient (>0.2 ppm) in the entire area of the microwatershed.
- **Soil Alkalinity:** An area of 542 ha (96%) in the microwatershed has soils that are slightly to very strongly alkaline. These areas need application of gypsum and wherever calcium is in excess, iron pyrites and element sulphur can be recommended. Management practices like treating repeatedly with good quality water to drain out the excess salts and provision of subsurface drainage and growing of salt tolerant crops like Casuarina, Acasia, Neem, Ber etc, are recommended.

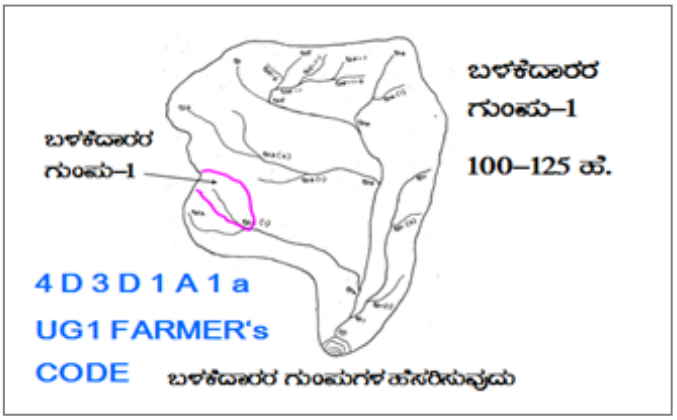
- **Land Suitability for various crops:** Areas that are highly, moderately and marginally suitable and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content,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

Chapter 9

SOIL AND WATER CONSERVATION TREATMENT PLAN

For preparing soil and water conservation treatment plan for Belur-2 microwatershed, the land resource inventory database generated under Sujala-III project has been transformed as information through series of interpretative (thematic) maps using soil phase map as a base. The various thematic maps (1:7920 scale) generated were

- Soil depth
- Surface soil texture
- Available water capacity
- Soil slope
- Soil gravelliness
- Land capability
- Present land use and land cover
- Crop suitability maps
- Rainfall map
- Hydrology
- Water Resources
- Socio-economic data
- Contour plan with existing features- network of waterways, pothissa boundaries, cut up/ minor terraces etc.
- Cadastral map (1:7920 scale)
- Satellite imagery (1:7920 scale)



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

Steps for Survey and Preparation of Treatment Plan

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

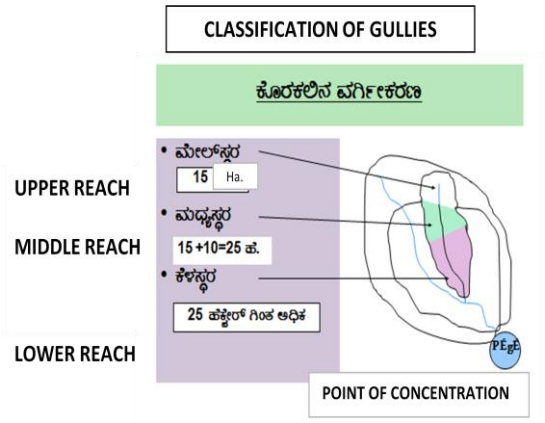
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge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

9.1 Treatment Plan

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

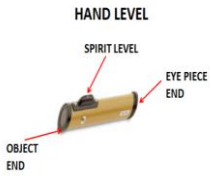
9.1.1 Arable Land Treatment

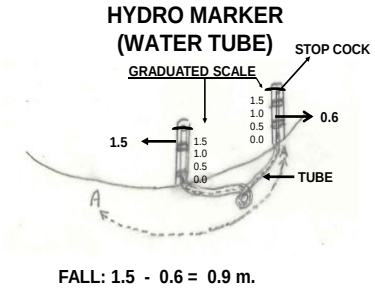
A. BUNDING

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

Measurement of Land Slope

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





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

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

Note: i) The above intervals are maximum.

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

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

Section of the Bund

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

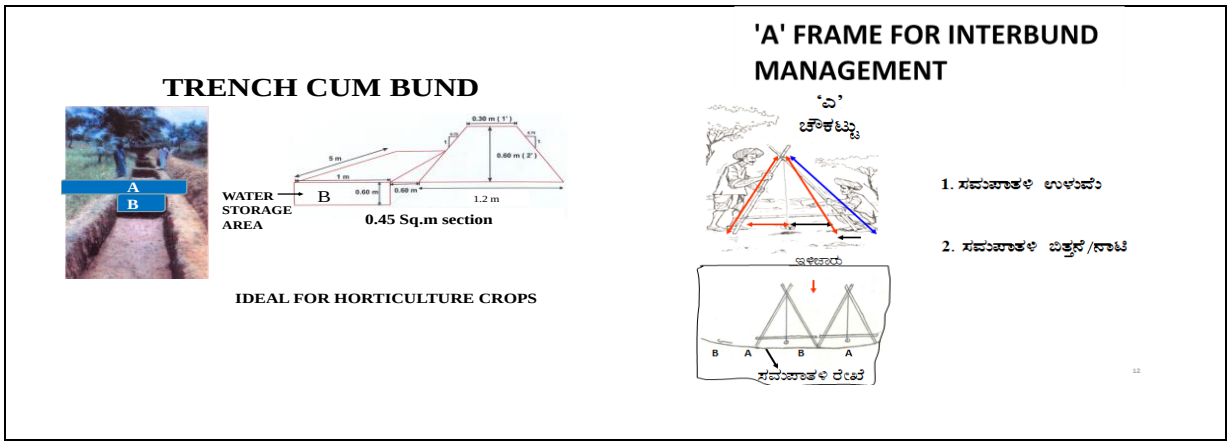
Recommended Bund Section

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

Formation of Trench cum Bund

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

Details of Borrow Pit dimensions are given below



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

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

B. Waterways

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

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

c) The design details are given in the Manual.

C. Farm Ponds

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

D. Diversion Channel

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

9.1.2 Non-Arable Land Treatment

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

9.1.3 Treatment of Natural Water Course/ Drainage Lines

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

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

c) Considering the Catchment, *Nala* bed and bank conditions, suitable structures are decided.
d) Number of storage structures (Check dam/ *Nala* bund/ Percolation tank) will be decided considering the commitments and available runoff in water budgeting and quality of water in the wells and site suitability.
e) Detailed Levelling Survey using Dumpy Level / Total Station has to be carried out to arrive at the site-specific designs as shown in the Manual.
f) The location of ground water recharge structures are decided by examining the lineaments and fracture zones from geological maps.
g) Rainfall intensity data of the nearest Rain Gauge Station is considered for Hydrologic Designs.
h) Silt load to the Storage/Recharge Structures is reduced by providing vegetative, boulder and earthern checks in the natural water course. Location and design details are given in the Manual.

9.2 Recommended Soil and Water Conservation Measures

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

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

A map (Fig. 9.1) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. An area of about 127 ha (22%) needs trench cum bunding. Maximum area of about 394 ha (70%) needs graded bunding. An area of about 43 ha (8%) needs strengthening of existing bunds/bunding. The conservation plan prepared may be presented to all the stakeholders including farmers and after considering their suggestions, the conservation plan for the microwatershed may be finalized in a participatory approach.

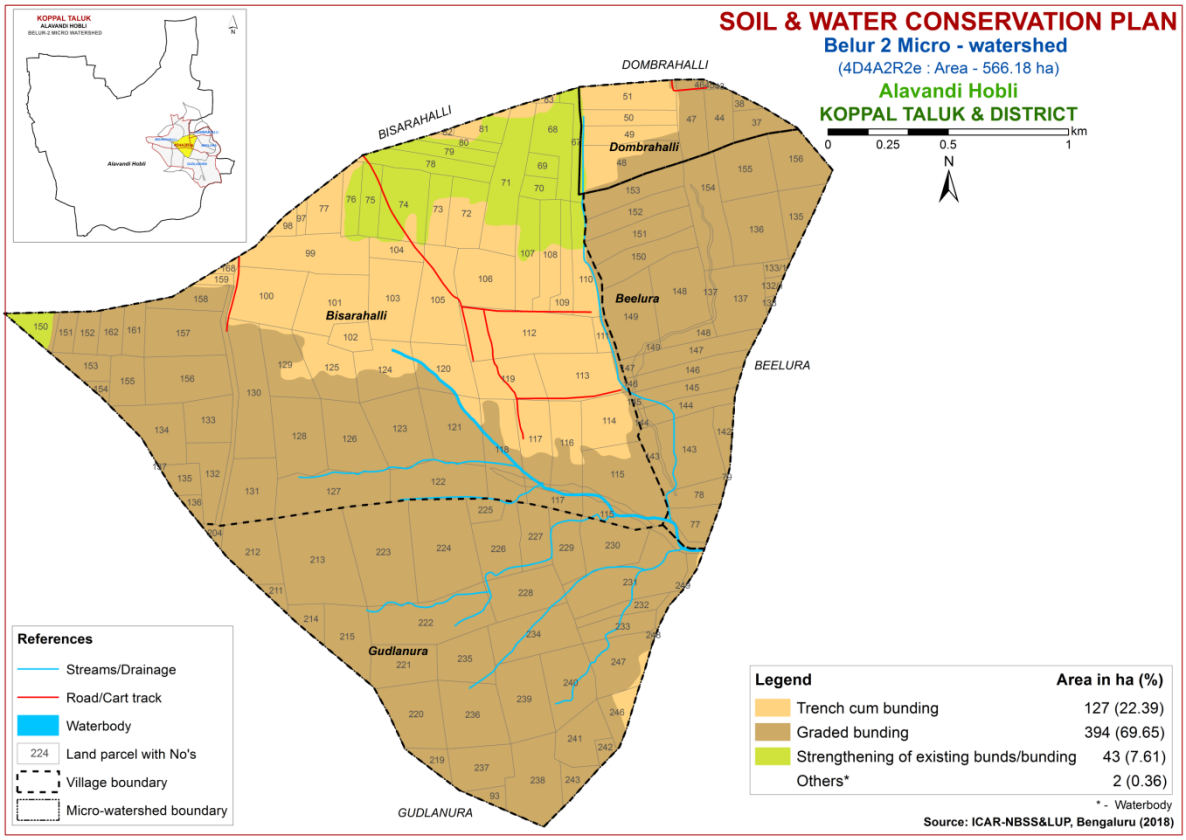


Fig. 9.1 Soil and Water Conservation Plan map of Belur-2 Microwatershed

9.3 Greening of Microwatershed

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

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

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

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

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Appendix I

Belur-2 (2R2e) 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
Bisarahalli	67	1.85	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Bisarahalli	68	4.66	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize+Bajra (Mz+Bj)	Not Available	IIs	Graded bunding
Bisarahalli	69	1.27	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Bisarahalli	70	1.33	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Chilli (Ch)	Borewell	IIs	Graded bunding
Bisarahalli	71	7.9	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize+Bajra (Mz+Bj)	Borewell	IIs	Graded bunding
Bisarahalli	72	4.27	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Bajra (Mz+Bj)	Not Available	IIes	Trench cum bunding
Bisarahalli	73	2.64	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Bisarahalli	74	5.95	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize+Bajra (Mz+Bj)	Not Available	IIs	Graded bunding
Bisarahalli	75	2.5	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Bisarahalli	76	2.29	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Bisarahalli	77	2.99	HTIhB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Groundnut+Bajra (Gn+Bj)	Not Available	IIs	Trench cum bunding
Bisarahalli	78	3.73	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIs	Graded bunding
Bisarahalli	79	2.24	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIs	Graded bunding
Bisarahalli	80	1.26	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Bisarahalli	81	1.98	RNKiA1	LMU-4	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Bajra+Onion (Bj+On)	Not Available	IIs	Graded bunding
Bisarahalli	82	0.14	BSRiB1g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Sugarcane (Mz+Sc)	Not Available	IIs	Trench cum bunding
Bisarahalli	83	0.27	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane+Maize+Groundnut+Bajra (Sc+Mz+Gn+Bj)	Not Available	IIes	Trench cum bunding
Bisarahalli	97	0.54	HTIhB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Cotton (Ct)	Not Available	IIs	Trench cum bunding
Bisarahalli	98	0.88	HTIhB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Chilli (Mz+Ch)	Not Available	IIs	Trench cum bunding
Bisarahalli	99	7.63	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Redgram+Maize (Bj+Rg+Mz)	Not Available	IIes	Trench cum bunding
Bisarahalli	100	6.7	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Groundnut+Seasamum+Redgram+Sugarcane (Gn+Sm+Rg+Sc)	Not Available	IIs	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Bisarahalli	101	6.42	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Chilli+Groundnut (Bj+Ch+Gn)	Borewell	IIs	Trench cum bunding
Bisarahalli	102	1.84	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Groundnut+Current fallow (Gn+Cf)	Not Available	IIs	Trench cum bunding
Bisarahalli	103	6.73	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Bajra (Mz+Bj)	Not Available	IIes	Trench cum bunding
Bisarahalli	104	1.89	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Bisarahalli	105	6.89	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Current fallow (Mz+Cf)	Borewell	IIes	Trench cum bunding
Bisarahalli	106	5.81	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Chilli (Bj+Ch)	Not Available	IIes	Trench cum bunding
Bisarahalli	107	4.51	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram+Groundnut (Mz+Rg+Gn)	Not Available	IIes	Trench cum bunding
Bisarahalli	108	3.92	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Groundnut (Bj+Gn)	Not Available	IIes	Trench cum bunding
Bisarahalli	109	2.6	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Redgram (Bj+Rg)	Not Available	IIes	Trench cum bunding
Bisarahalli	110	4.14	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Greengram (Mz+Gg)	Not Available	IIes	Trench cum bunding
Bisarahalli	111	1.01	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIs	Trench cum bunding
Bisarahalli	112	10.06	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Drumstick+Redgram (Mz+Ds+Rg)	2 Borewell	IIs	Trench cum bunding
Bisarahalli	113	6.49	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Drumstick+Banana (Mz+Ds+Ba)	Not Available	IIs	Trench cum bunding
Bisarahalli	114	4.8	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Trench cum bunding
Bisarahalli	115	9.38	NSPmB2g2	LMU-1	Moderately deep (75-100 cm)	Clay	Very gravelly (35-60%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIes	Graded bunding
Bisarahalli	116	4.5	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Cotton+Maize (Ct+Mz)	Not Available	IIs	Trench cum bunding
Bisarahalli	117	6.3	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Bisarahalli	118	6.06	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Bisarahalli	119	4.83	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Fallow land (Bj+Fl)	Not Available	IIs	Trench cum bunding
Bisarahalli	120	4.93	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Current fallow (Mz+Cf)	Not Available	IIs	Trench cum bunding
Bisarahalli	121	6.63	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Bisarahalli	122	5.89	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Bisarahalli	123	6.7	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIes	Graded bunding
Bisarahalli	124	5.28	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Groundnut+Fallow land (Mz+Gn+Fl)	Not Available	IIs	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Bisarahalli	125	5.01	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Maize (Bj+Mz)	Not Available	IIs	Trench cum bunding
Bisarahalli	126	6.1	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Fallow land (Bj+Fl)	Not Available	IIes	Graded bunding
Bisarahalli	127	7.26	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Fallow land (Mz+Fl)	Not Available	IIes	Graded bunding
Bisarahalli	128	6.76	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Maize (Cf+Mz)	Not Available	IIes	Graded bunding
Bisarahalli	129	4.94	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Bajra (Mz+Bj)	Borewell	IIes	Graded bunding
Bisarahalli	130	8.04	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Bajra+Fallow land (Mz+Bj+Fl)	Not Available	IIes	Graded bunding
Bisarahalli	131	5.41	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Maize (Fl+Mz)	Not Available	IIes	Graded bunding
Bisarahalli	132	3.58	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower (Sf)	Not Available	IIes	Graded bunding
Bisarahalli	133	3.64	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Graded bunding
Bisarahalli	134	5.11	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower+Fallow land+Maize (Sf+Fl+Mz)	Not Available	IIes	Graded bunding
Bisarahalli	135	1.8	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower (Sf)	Not Available	IIes	Graded bunding
Bisarahalli	136	0.72	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower (Sf)	Not Available	IIes	Graded bunding
Bisarahalli	137	0.01	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Sunflower (Sf)	Not Available	IIes	Graded bunding
Bisarahalli	150	2.02	GRHmA1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Bajra+Redgram+Current fallow (Bj+Rg+Cf)	Not Available	IIs	Graded bunding
Bisarahalli	151	1.37	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Bajra (Fl+Bj)	Not Available	IIes	Graded bunding
Bisarahalli	152	1.75	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Bisarahalli	153	2.07	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Bisarahalli	154	0.53	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Bisarahalli	155	2.99	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	Graded bunding
Bisarahalli	156	6.62	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Fallow land (Rg+Mz+Fl)	Not Available	IIes	Graded bunding
Bisarahalli	157	6.26	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Chilli (Mz+Ch)	Not Available	IIes	Graded bunding
Bisarahalli	158	2.59	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Bisarahalli	159	0.64	HTIhB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Trench cum bunding
Bisarahalli	161	1.97	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	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
Bisarahalli	162	1.95	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Bisarahalli	168	0.38	HTIhB1g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Chilli (Mz+Ch)	Not Available	IIs	Trench cum bunding
Dombrahalli	37	2.34	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Banana (Mz+Ba)	Not Available	IIs	Graded bunding
Dombrahalli	38	0.55	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Onion+Maize+Banana (On+Mz+Ba)	Not Available	IIs	Graded bunding
Dombrahalli	43	0.08	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Current fallow+Onion (Mz+Cf+On)	Not Available	IIs	Graded bunding
Dombrahalli	44	2.75	RNKmB2	LMU-4	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Dombrahalli	45	0.1	RNKmB2	LMU-4	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Banana (Ba)	Not Available	IIes	Graded bunding
Dombrahalli	46	0.15	RNKmB2	LMU-4	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Banana (Ba)	Not Available	IIes	Graded bunding
Dombrahalli	47	3.64	RNKmB2	LMU-4	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Current fallow (Mz+Cf)	Not Available	IIes	Graded bunding
Dombrahalli	48	6.43	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Dombrahalli	49	2.91	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)	Not Available	IIes	Trench cum bunding
Dombrahalli	50	2.62	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Maize (Bj+Mz)	Not Available	IIes	Trench cum bunding
Dombrahalli	51	4.49	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+Maize+Onion (Rg+Mz+On)	Not Available	IIes	Trench cum bunding
Gudlanura	93	0.93	BDRmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Sparse Vegetation (Mz+Sv)	Not Available	IIes	Graded bunding
Gudlanura	204	0.51	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation (Sv)	Not Available	IIes	Graded bunding
Gudlanura	211	0.77	MTLmB2	LMU-7	Shallow (25-50 cm)	Clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Graded bunding
Gudlanura	212	5.26	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation+Maize (Sv+Mz)	Not Available	IIes	Graded bunding
Gudlanura	213	11.81	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation+Maize (Sv+Mz)	Not Available	IIes	Graded bunding
Gudlanura	214	1.66	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Graded bunding
Gudlanura	215	4.74	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Farm Pond	IIes	Graded bunding
Gudlanura	219	1.36	BDRmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Graded bunding
Gudlanura	220	5.9	KVRmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow+Maize (Cf+Mz)	Not Available	IIs	Graded bunding
Gudlanura	221	4.62	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	222	8.91	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation (Sv)	Not Available	IIIes	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Gudlanura	223	10.36	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation (Sv)	Not Available	IIes	Graded bunding
Gudlanura	224	10.36	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation+Maize (Sv+Mz)	Not Available	IIIes	Graded bunding
Gudlanura	225	1.4	NSPmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Gudlanura	226	4.78	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	227	3.35	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	228	5.28	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation (Sv)	Not Available	IIIes	Graded bunding
Gudlanura	229	3.65	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	230	4.7	DRLmB2g1	LMU-1	Moderately deep (75-100 cm)	Clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Gudlanura	231	8.88	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	232	1.88	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	233	2.57	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Graded bunding
Gudlanura	234	6.35	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation (Sv)	Not Available	IIIes	Graded bunding
Gudlanura	235	4.58	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Sparse Vegetation (Sv)	Not Available	IIIes	Graded bunding
Gudlanura	236	6.8	KVRmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIs	Graded bunding
Gudlanura	237	4.46	BDRmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Graded bunding
Gudlanura	238	7.06	KVRmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIs	Graded bunding
Gudlanura	239	6.56	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Maize (Cf+Mz)	Not Available	IIIes	Graded bunding
Gudlanura	240	5.6	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Maize (Cf+Mz)	Not Available	IIIes	Graded bunding
Gudlanura	241	4.14	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIIes	Graded bunding
Gudlanura	242	0.68	KVRmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Gudlanura	243	1.51	KVRmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra (Bj)	Not Available	IIs	Graded bunding
Gudlanura	246	2.23	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Chilli (Mz+Ch)	Not Available	IIIes	Graded bunding
Gudlanura	247	5.38	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Graded bunding
Gudlanura	248	0.11	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIIes	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Gudlanura	249	1.13	MTLmB2g1	LMU-7	Shallow (25-50 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Graded bunding
Beelura	77	2.27	LGDmB2g1	LMU-1	Deep (100-150 cm)	Clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Drumstic (Rg+Ds)	Not Available	IIes	Graded bunding
Beelura	78	2.24	LGDmB2g1	LMU-1	Deep (100-150 cm)	Clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Borewell	IIes	Graded bunding
Beelura	79	0.001	LGDmB2g1	LMU-1	Deep (100-150 cm)	Clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Fallow land+Banana (Mz+Fl+Bn)	Not Available	IIes	Graded bunding
Beelura	132/1	0.5	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Chilli (Ch)	Not Available	IIes	Graded bunding
Beelura	133/1	0.67	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Beelura	135	3.15	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Redgram (Bj+Rg)	Not Available	IIs	Graded bunding
Beelura	136	6.38	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Beelura	137	6.23	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Fallow land (Bj+Fl)	Not Available	IIes	Graded bunding
Beelura	138	0.18	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Redgram (Mz+Rg)	Not Available	IIs	Graded bunding
Beelura	142	1.7	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bajra (Rg+Bj)	Borewell	IIes	Graded bunding
Beelura	143	8.2	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Beelura	144	2.86	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land+Current fallow (Rg+Fl+Cf)	Not Available	IIes	Graded bunding
Beelura	145	3.2	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Cotton (Bj+Ct)	Not Available	IIs	Graded bunding
Beelura	146	3.4	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Paddy+Current fallow (Bj+Pd+Cf)	Borewell	IIs	Graded bunding
Beelura	147	4.19	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Bajra+Paddy+Current fallow (Bj+Pd+Cf)	Not Available	IIs	Graded bunding
Beelura	148	8.13	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Paddy (Cf+Pd)	Not Available	IIes	Graded bunding
Beelura	149	6.35	LGDmB2g1	LMU-1	Deep (100-150 cm)	Clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Paddy (Cf+Pd)	Not Available	IIes	Graded bunding
Beelura	150	4.11	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Graded bunding
Beelura	151	4.33	LGDmB2g1	LMU-1	Deep (100-150 cm)	Clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Graded bunding
Beelura	152	3.76	LGDmB2g1	LMU-1	Deep (100-150 cm)	Clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Bajra (Fl+Bj)	Not Available	IIes	Graded bunding
Beelura	153	4.14	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Bajra (Fl+Bj)	Not Available	IIes	Graded bunding
Beelura	154	6.15	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Bajra (Cf+Bj)	Not Available	IIes	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
Beelura	155	5.48	RNKmB2g1	LMU-4	Moderately shallow (50-75 cm)	Clay	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Graded bunding
Beelura	156	4.67	LGDmB1	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow+Fallow land (Cf+Fl)	Not Available	IIs	Graded bunding

Appendix II

Belur-2 (2R2e) 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
Bisarahalli	67	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	68	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	69	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	70	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	71	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	72	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	73	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	74	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	75	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	76	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	77	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	78	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	79	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	80	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	81	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	82	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	83	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	97	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	98	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	99	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	100	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	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
Bisarahalli	101	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	102	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	103	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	104	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	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)
Bisarahalli	105	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	106	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	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)
Bisarahalli	107	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	108	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	109	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	110	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	111	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	112	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	113	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	114	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	115	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	116	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	117	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	118	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	119	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	120	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	121	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	122	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	123	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	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
Bisarahalli	124	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	125	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	126	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	127	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	128	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	129	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	130	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	131	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	132	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	133	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	134	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	135	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	136	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	137	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	150	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	151	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	152	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	153	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	154	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	155	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	156	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	157	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	158	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Bisarahalli	159	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	161	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	162	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Bisarahalli	168	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	37	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	38	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	43	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	44	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	45	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	46	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	47	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	48	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	49	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	50	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Dombrahalli	51	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	93	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	204	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	211	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	212	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	213	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	214	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	215	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	219	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Gudlanura	220	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	221	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	222	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	223	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	224	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	225	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	226	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	227	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	228	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	229	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	230	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	231	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	232	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	233	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	234	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	235	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	236	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	237	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	238	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	239	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	240	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	241	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	242	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Gudlanura	243	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	246	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	247	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	248	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Gudlanura	249	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	77	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	78	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	79	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	132/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	133/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	135	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	136	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	137	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	138	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	142	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	143	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	144	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	145	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	146	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	147	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	148	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	149	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	150	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Beelura	151	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	152	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	153	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	154	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	155	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Beelura	156	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Appendix III

Belur-2 (2R2e) Microwatershed

Soil Suitability Information

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Bisarahalli	67	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	68	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	69	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	70	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	71	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	72	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	73	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	74	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	75	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	76	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	77	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Bisarahalli	78	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	79	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	80	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	81	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Bisarahalli	82	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2rg	S1	S2rg	S1	S2rt	S2rg	S2rg	S2t	S1	S1	S2tg	S2tg	S2rg	S1	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Bisarahalli	83	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	97	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Bisarahalli	98	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Bisarahalli	99	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	100	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	101	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	102	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	103	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Bisarahalli	104	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	105	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	106	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	107	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	108	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	109	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	110	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Bisarahalli	111	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	112	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	113	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	114	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	115	S3rt	S3g	S3rt	S3g	S3tg	S3g	S3rg	S3rg	S3g	S3rg	S2gt	S2gt	S3tg	S2g	N1t	S3rt	S3rg	S3tg	S3tg	S3tg	S3tg	S3tg	S2rt	S3tg	S3tg	S2tz	S2tz	S3tg	S2rt	S2gt	S3tz
Bisarahalli	116	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	117	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	118	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	119	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	120	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	121	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	122	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	123	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	124	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	125	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Bisarahalli	126	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	127	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	128	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Bisarahalli	129	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	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	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Bisarahalli	130	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	131	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	132	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	133	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	134	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	135	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	136	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	137	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	150	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	151	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	152	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	153	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	154	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	155	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	156	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	157	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	158	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	159	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Bisarahalli	161	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	162	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Bisarahalli	168	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S3t	S3r	S3r	S2rg	S3r	S2rg	S3r	S3r	S3r	S2rg	S2rg	S2rg	S2rg	S2rg	S3r	S2rg	S2rg	S2rt	S2r	S2rg	S3r	S3r	S2rt
Dombrahalli	37	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Dombrahalli	38	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Dombrahalli	43	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Dombrahalli	44	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	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	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Dombrahalli	45	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Dombrahalli	46	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Dombrahalli	47	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Dombrahalli	48	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Dombrahalli	49	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Dombrahalli	50	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Dombrahalli	51	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Gudlanura	93	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2t	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S3t
Gudlanura	204	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	211	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	212	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	213	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	214	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	215	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	219	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2t	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S3t
Gudlanura	220	S2rz	S2tz	S3tz	S2z	S3tz	S2z	S2rz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2rz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz
Gudlanura	221	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	222	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	223	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	224	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	225	S3rt	S2tz	S3rt	S1	S3t	S1	S3rg	S2r	S1	S2r	S2t	S2gt	S3t	S1	N1t	S3rt	S2r	S3t	S3t	S3tw	S2tw	S2tw	S2rt	S2t	S3tw	S2tz	S2tz	S3t	S2rt	S2tw	S3tz
Gudlanura	226	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	227	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	228	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Gudlanura	229	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	230	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Gudlanura	231	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	232	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	233	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	234	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	235	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	236	S2rz	S2tz	S3tz	S2z	S3tz	S2z	S2rz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2rz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz
Gudlanura	237	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2t	S1	S3t	S3t	S3t	S2t	S2t	S2t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S3t
Gudlanura	238	S2rz	S2tz	S3tz	S2z	S3tz	S2z	S2rz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2rz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz
Gudlanura	239	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	240	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	241	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	242	S2rz	S2tz	S3tz	S2z	S3tz	S2z	S2rz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2rz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz
Gudlanura	243	S2rz	S2tz	S3tz	S2z	S3tz	S2z	S2rz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2rz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz
Gudlanura	246	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	247	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	248	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Gudlanura	249	N1rt	S3tz	N1rz	S3rz	N1rt	S3rz	N1rz	N1rz	S3rz	N1rz	N1rz	S3tz	N1rt	S3zg	N1rt	N1rt	N1rz	S3tz	S3rz	S3rz	S3rz	S3rz	N1rz	S3rz	S3rz	S3r	S3r	S3rz	N1rz	N1rz	S3rt
Beelura	77	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S3t	S1	S3t	S2t	S3t	S2t	S2t	S2t	S1	S3t	S2t	S2t	S3t	S2t	S3t	S3t
Beelura	78	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S3t	S1	S3t	S2t	S3t	S2t	S2t	S2t	S1	S3t	S2t	S2t	S3t	S2t	S3t	S3t
Beelura	79	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S3t	S1	S3t	S2t	S3t	S2t	S2t	S2t	S1	S3t	S2t	S2t	S3t	S2t	S3t	S3t
Beelura	132/1	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	133/1	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	135	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Beelura	136	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	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	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Beelura	137	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	138	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Beelura	142	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	143	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	144	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	145	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Beelura	146	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Beelura	147	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz
Beelura	148	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	149	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S3t	S1	S3t	S2t	S3t	S2t	S2t	S2t	S1	S3t	S2t	S2t	S3t	S2t	S3t	S3t
Beelura	150	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	151	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S3t	S1	S3t	S2t	S3t	S2t	S2t	S2t	S1	S3t	S2t	S2t	S3t	S2t	S3t	S3t
Beelura	152	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S3t	S1	S3t	S2t	S3t	S2t	S2t	S2t	S1	S3t	S2t	S2t	S3t	S2t	S3t	S3t
Beelura	153	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	154	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	155	N1rz	S2tz	S3rz	S2rz	S3tz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3tz	S2rz	N1tz	S3tz	S3rz	S3tz	S3tz	S3tz	S2rz	S2rz	S3rz	S2tz	S2rz	S2rt	S2rt	S3rz	S3rz	S3rz	S3tz
Beelura	156	S3tz	S2tz	S3tz	S2z	S3tz	S2z	S2tz	S2z	S2z	S2z	S2tz	S2tz	S3tz	S2z	N1tz	S2tz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S3tz	S3tz

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

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Chapter 1

SALIENT FINDINGS OF THE STUDY

- *Results indicated that, 35 farmers were sampled in Belur-2 microwatershed among them 6 (13.95%) were marginal farmers, 12 (30.23 %) were small farmers, 11 (25.58 %) were semi medium farmers, 1 (2.33%) were medium farmers and 6 (13.95 %) landless farmers were also interviewed for the survey.*
- *The data indicated that there were 188 population households were there in the studied micro watershed. Among them 100 (53.19%) men and 88 (46.81 %) were women. The average family size of landless was 4.67, marginal farmer was 3.85, small farmer was 4.6, semi medium farmers were 4.45 and medium and large farmers were 5.*
- *The data indicated that 26 (13.83%) people were in 0-15 years of age, 85 (45.21 %) were in 16-35 years of age, 58 (30.85 %) were in 36-60 years of age and 19 (10.11%) were above 61 years of age.*
- *The results indicated that the Belur-2 had 27.66 per cent illiterates, 32.98 per cent of them had primary school education, 6.91 per cent of them had middle school, 15.43 per cent them had high school education, 8.51 per cent of them had PUC education, 0.53 per cent of them had ITI education and 3.19 per cent of them had degree education.*
- *The results indicated that, 83.72 per cent of households practicing agriculture, 13.95 per cent of the household heads were agricultural labour and 2.33 per cent of the household heads were others.*
- *The results indicated that agriculture was the major occupation for 29.26 per cent of the household members, 44.15 per cent were agricultural labourers, 2.13 per cent were general labours and 1.06 per cent were in private sector, 0.53 per cent were in government service, 2.66 per cent were housewives and children's and 15.43 per cent of them were students. In case of landless farmers 57.14 per cent of them were agriculture labours, 14.29 per cent were general labours and 10.71 per cent of them were students.*
- *In case of marginal farmers 32 per cent of them were doing agriculture, 48 per cent of them were agriculture and 16 per cent of them were students. In small farmers 32 per cent of them were doing agriculture, 30.36 per cent of them were agriculture labour, 8.93 per cent were children and 17.86 per cent of them were students. In case of semi medium farmers 28.57 per cent of them were agriculturist, 53.06 per cent of them were agriculture labour, 2.04 per cent of them were in private service. and 16.33 per cent of them were students. In medium farmers 60 per cent of them were agriculturist, 20 per cent of them were government service and 20 per cent of them were doing other work.*
- *The results showed that 1.06 per cent of them participated in Sthree Shakthi Sangha and 98.94 per cent of them have not participated in any local institutions. Landless,*

marginal, semi medium and medium farmers were found to have no participation in any local institutions. Small farmers were found to participate in one or the other local institutions.

- *The results indicated that 6.98 per cent of the households possess thatched house, 83.72 per cent of the households possess Katcha house and 9.30 per cent of the households possess Pacca house.*
- *The results showed that, 88.37 per cent of the households possess TV, 79.07 per cent of the households possess mixer/grinder, 55.81 per cent of the households possess bicycle, 44.19 per cent of the households possess motor cycle, 2.33 per cent of them possess tempo and 86.05 per cent of the households possess mobile phones.*
- *The results showed that the average value of television was Rs. 3526, mixer/grinder was Rs. 1188, bicycle was Rs.1041, motor cycle was Rs.48684, Tempo was Rs.2000, Edge shear was Rs.3000 and mobile phone was Rs.1093.*
- *Results showed that, about 16.28 per cent of the households possess bullock cart, 25.58 per cent of them possess plough, 2.33 per cent of the households possess tractor, 11.63 per cent of the households possess sprayer, 79.07 per cent of the households possess weeder and 9.30 per cent of the households possess chaff cutter.*
- *The results showed that the average value of bullock cart was Rs.17428; the average value of plough was Rs. 911, the average value of tractor was Rs. 300000, the average value of sprayer was Rs. 20200, the average value of weeder was Rs. 36 and the average value of chaff cutter was Rs. 2175.*
- *The results indicated that, 23.26 per cent of the households possess bullocks, 6.98 per cent of the households possess local cow, 2.33 per cent of the households possess crossbreed cow, 4.65 per cent of the households possess sheep and 9.30 per cent of the households possess buffalo and goat respectively. 16.67 per cent of the landless farmers possess sheep and goat respectively. In case of marginal farmers, 15.38 per cent of the households possess local cow and 7.69 per cent of the households possess local cow, crossbreed cow and goat respectively. In case of small farmers, 25 per cent of households possess bullock and 8.33 per cent possess local cow, buffalo, sheep and goat correspondingly. In case of semi medium farmers, 45.45 per cent of the households possess bullock and 9.09 per cent of the households possess local cow and buffalo respectively. 100 per cent of the medium farmers possess goat.*
- *The results indicated that, average own labour men available in the micro watershed was 1.59, average own labour (women) available was 1.39, average hired labour (men) available was 7.70 and average hired labour (women) available was 8.11.*
- *In case of marginal farmers, average own labour men available was 1.69, average own labour (women) was also 1.38, average hired labour (men) was 6.08 and average hired labour (women) available was 6.08. In case of small farmers, average*

own labour men available was 1.54, average own labour (women) was 1.50, average hired labour (men) was 7.08 and average hired labour (women) available was 7.25. In case of semi medium farmers, average own labour men available was 1.55, average own labour (women) was 1.27, average hired labour (men) was 10.55 and average hired labour (women) available was 11.73. In medium farmers average own labour men available was 2, average own labour (women) was 1.

- *The results indicated that, 9.30 per cent of the household opined that the hired labour was adequate and 76.74 per cent of them opined that hired labour was inadequate.*
- *The results indicated that, households of the Belur-2 microwatershed possess 28.99 ha (62.56%) of dry land and 17.35 ha (37.44 %) of irrigated land. Marginal farmers possess 7.55 ha (89.66%) of dry land 0.87 ha (10.34%) of irrigated land. Small farmers possess 15.78 ha (94.73%) of dry land and 0.88 ha (5.27%) of irrigated land. Semi medium farmers possess 5.67 ha (32.15%) of dry land and 11.95 ha (67.85%) of irrigated land. Medium farmers possess 3.64 ha (100%) of the irrigated land.*
- *The results indicated that, the average value of dry land was Rs. 298,275.86 and average value of irrigated was Rs. 403,406.44. In case of marginal famers, the average land value was Rs. 423,806.96 for dry land and Rs. 1,033,953.50 for irrigated land. In case of small famers, the average land value was Rs. 256,631.61 for dry land Rs. 569,124.40 for irrigated land. In case of semi medium famers, the average land value was Rs. 247,000 for dry land and Rs. 392,992.56 for irrigated land. In case of medium famers, the average land value was Rs. 247,000 for irrigated land.*
- *The results indicated that, there were 14 defunctioning and 15 functioning bore wells in the micro watershed.*
- *The results indicated that, bore well was the major irrigation source for 34.88 per cent of the farmers.*
- *The results indicated that on an average the depth of the bore well was 23.09 meters.*
- *The results indicated that, in case of marginal farmers there was 0.87 per cent of irrigated land, in case of small farmers there was 1.28 ha of irrigated land, in case of semi medium farmers there was 12.10 ha of irrigated land and medium farmers were having 3.64 ha of irrigated land. On an average there were 17.90 ha of irrigated land.*
- *The results indicated that, farmers have grown maize (19.93ha), onion (8.51 ha), groundnut (5.81 ha), sunflower (2.43 ha), cotton 1.88 ha), Red gram (1.83 ha), sorghum (1.62 ha), bajra (0.97 ha), banana (0.4 ha) and green gram (0.4 ha) in kharif season. Marginal farmers have grown maize, groundnut, sunflower, cotton, red gram and bajra. Small farmers have grown maize, onion, groundnut, sunflower*

and green gram. Small farmers have grown maize, onion, cotton, red gram, sorghum and banana. Medium farmers have grown only maize.

- *The results indicated that, the cropping intensity in Belur-2 microwatershed was found to be 82.12 per cent. In case of marginal farmers it was 95.19 per cent, in small farmers it was 89.92, in semi medium farmers it was 69.54 and in medium farmers it was 100 per cent.*
- *The results indicated that, 69.77 per cent of the households have both bank account and savings respectively. 92.31 percent of marginal, small and large farmers possess both bank account savings respectively. In small farmers 66.67 per cent of the households have both bank account and savings respectively. In case of semi medium farmers, 90.91 per cent of possess bank account and savings respectively.*
- *The results indicated that, 92.31 per cent of marginal, 66.67 per cent of small and 90.91 per cent of semi medium farmers have borrowed credit from different sources.*
- *The results indicated that, the total cost of cultivation for maize was Rs. 32679.41. The gross income realized by the farmers was Rs. 35141.18. The net income from maize cultivation was Rs. 2461.78. Thus the benefit cost ratio was found to be 1:1.08.*
- *The results indicated that, the total cost of cultivation for groundnut was Rs. 32679.41. The gross income realized by the farmers was Rs. 35141.18. The net income from groundnut cultivation was Rs. 2461.78. Thus the benefit cost ratio was found to be 1:1.08.*
- *The results indicated that, the total cost of cultivation for redgram was Rs. 92106.94. The gross income realized by the farmers was Rs. 37235.25. The net income from redgram cultivation was Rs. -54871.69. Thus the benefit cost ratio was found to be 1:0.4.*
- *The results indicated that, the total cost of cultivation for bajra was Rs. 49544.52. The gross income realized by the farmers was Rs. 37461.67. The net income from bajra cultivation was Rs. -12082.86. Thus the benefit cost ratio was found to be 1:0.76.*
- *The results indicated that, the total cost of cultivation for sorghum was Rs. 6593.64. The gross income realized by the farmers was Rs. 18278. The net income from sorghum cultivation was Rs. 11684.36. Thus the benefit cost ratio was found to be 1:2.77.*
- *The results indicated that, the total cost of cultivation for green gram was Rs. 43774.34. The gross income realized by the farmers was Rs. 41990. The net income from green gram cultivation was Rs. -1784.34. Thus the benefit cost ratio was found to be 1:0.96.*
- *The results indicated that, the total cost of cultivation for onion was Rs. 31943.56. The gross income realized by the farmers was Rs. 132285.50. The net income from*

onion cultivation was Rs. 100341.94. Thus the benefit cost ratio was found to be 1:4.14.

- *The results indicated that, the total cost of cultivation for Sunflower was Rs. 26042.92. The gross income realized by the farmers was Rs. 42306.47. The net income from Sunflower cultivation was Rs. 16263.55. Thus the benefit cost ratio was found to be 1:1.62.*
- *The results indicated that, the total cost of cultivation for Cotton was Rs. 38511.39. The gross income realized by the farmers was Rs. 79607.03. The net income from Cotton cultivation was Rs. 41095.63. Thus the benefit cost ratio was found to be 1:2.07.*
- *The results indicated that, the total cost of cultivation for Banana was Rs. 89684.87. The gross income realized by the farmers was Rs. 247000. The net income from Banana cultivation was Rs. 157315.13. Thus the benefit cost ratio was found to be 1:2.75.*
- *The results indicated that, 18.60 per cent of the households opined that dry fodder was adequate, 11.63 per cent of the households opined that dry fodder was inadequate and 18.60 per cent of the households opined that green fodder was adequate.*
- *The results indicated that, in landless farmers, the average income from wage was Rs. 27000. In marginal farmers the average income from service/salary was Rs.7384.62, wage was Rs. 30384.62, agriculture was Rs. 32015.38 and dairy farm was Rs. 5230.77. In small farmers the average income from business was Rs. 1000, wage was Rs. 21166.67, agriculture was Rs. 43470.83 and dairy farm was Rs. 1166.67. In semi medium farmers the average income from service/salary was Rs. 16272.73, wage was Rs. 22454.55, agriculture was Rs. 187236.36 and dairy farm was Rs.363.64. In medium farmers the average income from business was Rs. 6000 and agriculture was Rs. 375000.*
- *The results indicated that, in landless farmers, the average expenditure from wage was Rs. 25000, farm income was Rs.500 and goat farming was Rs.5000. In marginal farmers the average expenditure from wage was Rs.9090.91, agriculture was Rs.16307.69 and dairy farm was Rs.9333.33. In case of small farmers the average expenditure from business was Rs. 4000, wage was Rs. 11500, agriculture was Rs. 28727.27 and dairy farm was Rs. 2000. In case of semi medium farmers the average expenditure from service/salary was Rs.40500, wage was Rs. 8375, dairy farm was Rs.2000 and agriculture was Rs. 60090.91. In case of medium farmers the average expenditure from business was Rs.4000, agriculture was Rs. 50000 and goat farming was Rs. 2000.*
- *The results indicated that, sampled households have grown 34 coconut trees in their field and also planted 1 coconut tree in their back yard.*

- *The results indicated that, households have planted 1 eucalyptus, 5 teak, 58 neem, 1 tarmind tree, 3 pongamia trees and 1 banyan tree in their field and also planted 2 neem tree in their back yard.*
- *The results indicate that, households have an average investment capacity of Rs. 4744.19 for land development, Rs. 441.86 in irrigation facility and 302.33 Rs.2714.29 for improved crop production.*
- *Marginal households have an average investment capacity of Rs. 6846.15 for land development, Rs. 769.23 for irrigation facility and Rs.384.62 for improved crop production. Small farmers have an average investment capacity of Rs. 3666.67 for land development, Rs. 83.33 in irrigation facility and Rs.666.67 for improved crop production. Semi medium farmers have an average investment capacity of Rs. 6454.55 for land development and Rs. 727.27 in irrigation facility.*
- *The results indicated that, for land development, 31.11 per cent of the farmers were depend on government subsidy, 22.22 per cent were depend on loan from the bank. 4.44 per cent of the households were dependent on government subsidy and 8.89 per cent of the households were dependent on loan from the bank for irrigation facility. Similarly for improved crop production, 4.44 per cent of the households were dependent on government subsidy.*
- *The results indicated that, cotton, onion and sunflower crops were sold to the extent of 100 per cent. Bajra, banana, groundnut, maize and red gram were sold to an extent 13.04 per cent, 90 per cent, 68.75 per cent, 99.77 per cent and 88.89 per cent respectively.*
- *The results indicated that, 2.33 percent of the households have sold their produce to agents/ traders, 16.28 per cent of the households have sold their produce to local/village merchant, 74.42 percent of the households sold their produce in regulated markets and 2.33 percent of the households sold their produce in cooperative marketing society.*
- *The results indicated that 18.60 per cent of the households have used cart as a mode of transport, 72.09 per cent of them have used tractor and 2.33 per cent have used bus as a mode of transport.*
- *The results indicated that, 34.88 per cent of the households have experienced the soil and water erosion problems i.e. 46.15 percent of marginal farmers, 33.33 per cent of small farmers and 45.45 per cent of semi medium farmers.*
- *The results indicated that, 65.12 per cent of the households have shown interest in soil testing including 92.31 per cent of marginal farmers, 58.33 per cent of the small farmers and 81.82 semi medium farmers.*
- *The results indicated that, 100 percent used fire wood as a source of fuel.*
- *The results indicated that, piped supply was the source of drinking water for 90.70 per cent and 11.63 per cent of them were using bore well for drinking water.*

- *The results indicated that, electricity was the major source of light for 100 per cent of the households.*
- *The results indicated that, 46.51 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, semi medium and medium farmers, 7.69 per cent of marginal and 8.33 per cent of small farmers had sanitary toilet facility.*
- *The results indicated that, 93.02 per cent of the sampled households possessed BPL card and 6.98 per cent of the sampled households does not possessed BPL card.*
- *The results indicated that, 60.47 per cent of the households participated in NREGA programme which included 50 per cent of the landless, 69.23 percent of the marginal, 50 per cent of the small, 63.64 per cent of the semi medium and 100 percent of the medium farmers.*
- *The results indicated that, cereals, pulses, oilseeds, vegetables, fruits , milk, egg and meat were adequate for 100 per cent, 53.49 per cent, 51.16 per cent, 39.53 per cent, 58.14 per cent, 51.16 per cent, 48.84 per cent and 9.30 per cent respectively.*
- *The results indicated that, pulses, oilseed; vegetables, fruits, milk, egg and meat were inadequate for 46.51 per cent, 48.84 per cent, 60.47 per cent, 27.91 per cent, 23.26 per cent, 27.91 per cent and 6.98 per cent of the households respectively.*
- *The results indicated that, Lower fertility status of the soil problem was experienced by 72.09 per cent of the households, and wild animal menace on farm field was experienced by 62.79 per cent of the households, frequent incidence of pest and diseases was experienced by 27.91 per cent of the farmers, inadequacy of irrigation water was experienced by 13.95 per cent of the households, high cost of Fertilizers and plant protection chemicals was experienced 44.19 per cent and high rate of interest on credit was experienced by 13.95 per cent of the farmers, low price for the agricultural commodities was experienced by 18.60 per cent of the farmers, lack of marketing facilities in the area was experienced 16.28 per cent of the households, inadequate of extension services experienced by 11.63 per cent of the households, lack of transport for safe transport of the agricultural produce to the market was experienced by 34.88 per cent of the households, less rainfall was experienced by 51.16 per cent and of the farmers and Source of Agri-technology information(Newspaper/TV/Mobile) 11.63 per cent of the households.*

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 Jains. 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. It consists of four taluks namely Koppal, Gangavathi, Kushtagi and Yelburga.

The undulating topography with black cotton soil shrips, cut across by numerous nalas or streams is the major characteristic feature of the study region. The Koppal district is having partly red sandy and black soil suitable for agriculture and horticulture crops. Majority of Gangavathi taluk is having black soil. The taluk is also having very few hills with xerophilous vegetation. The partly red sandy soil and black soil of mixed geographical origin are found in the Yelburga taluk.Three physiographic divisions have made considering the local conditions of landforms and crops grown in the district. On the basis of physiographic, Koppal district can be divided into three major divisions. They are (a) Koppal & Yelburga plateau, (b) Maidan division, (c) Tungabhadra valley. The district is part of Krishna basin the main streams draining the area are Maskinala, Ilkal-nadi and Hirenala. These are Ephemeral in nature, these come under Tungabhadra sub-basin. The drainage exhibit dendritic to subdendritic 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

Belur-2 micro-watershed (Katarki sub-watershed, Koppal Taluk and District) is located at North latitude $15^0$15’28.261’’ to 15^0 13’48.319’’ and East longitude 76^0 7’19.99’’ to $76^0$5’22.598’’ covering an area of 566.43 ha and spread across Domnrahalli, Beelura, Bisarahalli and Gudlanura 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 43 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 Belur-2 micro watershed is presented in Table 1 and it indicated that 35 farmers were sampled in Belur-2 micro watershed among them 6 (13.95%) were marginal farmers, 12 (30.23 %) were small farmers, 11 (25.58 %) were semi medium farmers, 1 (2.33%) were medium farmers and 6 (13.95 %) landless farmers were also interviewed for the survey.

Table 1: Households sampled for socio economic survey in Belur-2 microwatershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	6	13.95	13	30.23	12	27.91	11	25.58	1	2.33	43	100.00

Population characteristics: The population characteristics of households sampled for socio-economic survey in Belur-2 micro watershed is presented in Table 2. The data indicated that there were 188 population households were there in the studied micro watershed. Among them 100 (53.19%) men and 88 (46.81 %) were women. The average family size of landless was 4.67, marginal farmer was 3.85, small farmer was 4.6, semi medium farmers were 4.45 and medium and large farmers were 5.

Table 2: Population characteristics of Belur-2 micro-watershed Age wise classification of population

Sl. No.	Particulars	LL (28)		MF (50)		SF (56)		SMF (49)		MDF (5)		All (188)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Male	16	57.14	25	50.00	29	51.79	26	53.06	4	80.00	100	53.19
2	Female	12	42.86	25	50.00	27	48.21	23	46.94	1	20.00	88	46.81
Total		28	100.00	50	100.00	56	100.00	49	100.00	5	100.00	188	100.00
Average		4.67		3.85		4.67		4.45		5.00		4.37	

Age wise classification of household members: The age wise classification of household members in Belur-2 micro-watershed is presented in Table 3. The data indicated that 26 (13.83%) people were in 0-15 years of age, 85 (45.21 %) were in 16-35 years of age, 58 (30.85 %) were in 36-60 years of age and 19 (10.11%) were above 61 years of age.

Table 3: Age wise classification of household members in Belur-2 micro-watershed Education level of household members

Sl. No.	Particulars	LL (28)		MF (50)		SF (56)		SMF (49)		MDF (5)		All (188)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years of age	2	7.14	6	12.00	11	19.64	7	14.29	0	0.00	26	13.83
2	16-35 years of age	16	57.14	22	44.00	24	42.86	20	40.82	3	60.00	85	45.21
3	36-60 years of age	8	28.57	18	36.00	16	28.57	15	30.61	1	20.00	58	30.85
4	> 61 years	2	7.14	4	8.00	5	8.93	7	14.29	1	20.00	19	10.11
Total		28	100.00	50	100.00	56	100.00	49	100.00	5	100.00	188	100.00

Education level of household: Education level of household members in Belur-2 micro watershed is presented in Table 4. The results indicated that the Belur-2 had 27.66 per

cent illiterates, 32.98 per cent of them had primary school education, 6.91 per cent of them had middle school, 15.43 per cent them had high school education, 8.51 per cent of them had PUC education, 0.53 per cent of them had ITI education and 3.19 per cent of them had degree education.

Table 4: Education level of household members in Belur-2 micro-watershed

Sl.No.	Particulars	LL (28)		MF (50)		SF (56)		SMF (49)		MDF (5)		All (188)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	8	28.57	13	26.00	14	25.00	13	26.53	4	80.00	52	27.66
2	Primary School	7	25.00	20	40.00	18	32.14	17	34.69	0	0.00	62	32.98
3	Middle School	0	0.00	4	8.00	4	7.14	5	10.20	0	0.00	13	6.91
4	High School	9	32.14	7	14.00	4	7.14	9	18.37	0	0.00	29	15.43
5	PUC	2	7.14	5	10.00	6	10.71	3	6.12	0	0.00	16	8.51
6	ITI	0	0.00	1	2.00	0	0.00	0	0.00	0	0.00	1	0.53
7	Degree	2	7.14	0	0.00	2	3.57	2	4.08	0	0.00	6	3.19
8	Masters	0	0.00	0	0.00	1	1.79	0	0.00	1	20.00	2	1.06
9	Ph.D	0	0.00	0	0.00	1	1.79	0	0.00	0	0.00	1	0.53
10	Others	0	0.00	0	0.00	6	10.71	0	0.00	0	0.00	6	3.19
Total		28	100.00	50	100.00	56	100.00	49	100.00	5	100.00	188	100.00

Occupation of household heads: The data regarding the occupation of the household heads in Belur-2 micro-watershed is presented in Table 5. The results indicated that, 83.72 per cent of households practicing agriculture, 13.95 per cent of the household heads were agricultural labour and 2.33 per cent of the household heads were others.

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

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0.00	13	100.00	11	91.67	11	100.00	1	100.00	36	83.72
2	Agricultural Labour	5	83.33	0	0.00	1	8.33	0	0.00	0	0.00	6	13.95
3	Others	1	16.67	0	0.00	0	0.00	0	0.00	0	0.00	1	2.33
Total		6	100.00	13	100.00	12	100.00	11	100.00	1	100.00	43	100.00

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

Sl. No.	Particulars	LL (28)		MF (50)		SF (56)		SMF (49)		MDF (5)		All (188)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0.00	16	32.00	22	39.29	14	28.57	3	60.00	55	29.26
2	Agricultural Labour	16	57.14	24	48.00	17	30.36	26	53.06	0	0.00	83	44.15
3	General Labour	4	14.29	0	0.00	0	0.00	0	0.00	0	0.00	4	2.13
4	Government Service	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00	1	0.53
5	Private Service	1	3.57	0	0.00	0	0.00	1	2.04	0	0.00	2	1.06
6	Student	3	10.71	8	16.00	10	17.86	8	16.33	0	0.00	29	15.43
7	Others	2	7.14	0	0.00	1	1.79	0	0.00	1	20.00	4	2.13
8	Housewife	2	7.14	2	4.00	1	1.79	0	0.00	0	0.00	5	2.66
9	Children	0	0.00	0	0.00	5	8.93	0	0.00	0	0.00	5	2.66
Total		28	100.00	50	100.00	56	100.00	49	100.00	5	100.00	188	100.00

Occupation of the household members: The data regarding the occupation of the household members in Belur-2 micro-watershed is presented in Table 6. The results

indicated that agriculture was the major occupation for 29.26 per cent of the household members, 44.15 per cent were agricultural labourers, 2.13 per cent were general labours and 1.06 per cent were in private sector, 0.53 per cent were in government service, 2.66 per cent were housewives and children's and 15.43 per cent of them were students. In case of landless farmers 57.14 per cent of them were agriculture labours, 14.29 per cent were general labors and 10.71 per cent of them were students.

Institutional participation of the household members: The data regarding the institutional participation of the household members in Belur-2 micro-watershed is presented in Table 7. The results showed that 1.06 per cent of them participated in Sthree Shakthi Sangha and 98.94 per cent of them have not participated in any local institutions. Landless, marginal, semi medium and medium farmers were found to have no participation in any local institutions. Small farmers were found to participate in one or the other local institutions.

Table 7: Institutional Participation of household members in Belur-2 micro-watershed

Sl. No.	Particulars	LL (28)		MF (50)		SF (56)		SMF (49)		MDF (5)		All (188)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sthree Shakthi Sangha	0	0.00	0	0.00	2	3.57	0	0.00	0	0.00	2	1.06
2	No Participation	28	100.00	50	100.00	54	96.43	49	100.00	5	100.00	186	98.94
Total		28	100.00	50	100.00	56	100.00	49	100.00	5	100.00	188	100.00

Type of house owned: The data regarding the type of house owned by the households in Belur-2 micro-watershed is presented in Table 8. The results indicated that 6.98 per cent of the households possess thatched house, 83.72 per cent of the households possess Katcha house and 9.30 per cent of the households possess Pacca house.

Table 8: Type of house owned by households in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	0	0.00	1	7.69	1	8.33	1	9.09	0	0.00	3	6.98
2	Katcha	6	100.00	11	84.62	11	91.67	7	63.64	1	100.00	36	83.72
3	Pucca/RCC	0	0.00	1	7.69	0	0.00	3	27.27	0	0.00	4	9.30
Total		6	100.00	13	100.00	12	100.00	11	100.00	1	100.00	43	100.00

Table 9: Durable Assets owned by households in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	5	83.33	12	92.31	9	75.00	11	100.00	1	100.00	38	88.37
2	Mixer/Grinder	2	33.33	13	100.00	8	66.67	11	100.00	0	0.00	34	79.07
3	Bicycle	2	33.33	11	84.62	5	41.67	5	45.45	1	100.00	24	55.81
4	Motor Cycle	2	33.33	4	30.77	6	50.00	6	54.55	1	100.00	19	44.19
5	Tempo	0	0.00	1	7.69	0	0.00	0	0.00	0	0.00	1	2.33
6	Mobile Phone	5	83.33	11	84.62	10	83.33	11	100.00	0	0.00	37	86.05
7	Blank	0	0.00	0	0.00	2	16.67	0	0.00	0	0.00	2	4.65
8	Edge shear	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00	1	2.33

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Belur-2 micro-watershed is presented in Table 9. The results showed that, 88.37 per cent of the households possess TV, 79.07 per cent of the households possess mixer/grinder, 55.81 per cent of the households possess bicycle, 44.19 per cent of the households possess motor cycle, 2.33 per cent of them possess tempo and 86.05 per cent of the households possess mobile phones.

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Belur-2 micro-watershed is presented in Table 10. The results showed that the average value of television was Rs. 3526, mixer/grinder was Rs. 1188, bicycle was Rs.1041, motor cycle was Rs.48684, Tempo was Rs.2000, Edge shear was Rs.3000 and mobile phone was Rs.1093.

Table 10: Average value (Rs) of durable assets owned by households in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
1	Television	3,000.00	3,250.00	3,777.00	3,727.00	5,000.00	3,526.00
2	Mixer/Grinder	1,000.00	1,169.00	1,087.00	1,318.00	0.00	1,188.00
3	Bicycle	1,000.00	1,090.00	960.00	1,000.00	1,200.00	1,041.00
4	Motor Cycle	35,000.00	32,500.00	81,666.00	33,333.00	35,000.00	48,684.00
5	Tempo	0.00	2,000.00	0.00	0.00	0.00	2,000.00
6	Mobile Phone	1,125.00	1,206.00	1,194.00	941.00	0.00	1,093.00
7	Edge shear	0.00	0.00	0.00	0.00	3,000.00	3,000.00

Farm Implements owned: The data regarding the farm implements owned by the households in Belur-2 micro-watershed is presented in Table 11. About 16.28 per cent of the households possess bullock cart, 25.58 per cent of them possess plough, 2.33 per cent of the households possess tractor, 11.63 per cent of the households possess sprayer, 79.07 per cent of the households possess weeder and 9.30 per cent of the households possess chaff cutter.

Table 11: Farm Implements owned by households in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	0	0.00	1	7.69	3	25.00	3	27.27	7	16.28
2	Plough	0	0.00	2	15.38	4	33.33	5	45.45	11	25.58
3	Tractor	0	0.00	0	0.00	1	8.33	0	0.00	1	2.33
4	Sprayer	0	0.00	0	0.00	3	25.00	2	18.18	5	11.63
5	Weeder	3	50.00	13	100.00	8	66.67	10	90.91	34	79.07
6	Chaff Cutter	0	0.00	1	7.69	0	0.00	3	27.27	4	9.30
7	Blank	3	50.00	1	7.69	3	25.00	0	0.00	8	18.60

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Belur-2 micro-watershed is presented in Table 12. The results showed that the average value of bullock cart was Rs.17428; the average value of plough was Rs. 911, the average value of tractor was Rs. 300000, the average

value of sprayer was Rs. 20200, the average value of weeder was Rs. 36 and the average value of chaff cutter was Rs. 2175.

Table 12: Average value (Rs) of farm implements owned by households in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)	MF (13)	SF (12)	SMF (11)	All (43)
1	Bullock Cart	0.00	2,000.00	18,333.00	21,666.00	17,428.00
2	Plough	0.00	1,000.00	937.00	861.00	911.00
3	Tractor	0.00	0.00	300,000.00	0.00	300,000.00
4	Sprayer	0.00	0.00	19,000.00	22,000.00	20,200.00
5	Weeder	19.00	35.00	33.00	46.00	36.00
6	Chaff Cutter	0.00	3,000.00	0.00	1,900.00	2,175.00

Livestock possession by the households: The data regarding the Livestock possession by the households in Belur-2 micro-watershed is presented in Table 13. The results indicated that, 23.26 per cent of the households possess bullocks, 6.98 per cent of the households possess local cow, 2.33 per cent of the households possess crossbreed cow, 4.65 per cent of the households possess sheep and 9.30 per cent of the households possess buffalo and goat respectively. 16.67 per cent of the landless farmers possess sheep and goat respectively. In case of marginal farmers, 15.38 per cent of the households possess local cow and 7.69 per cent of the households possess local cow, crossbreed cow and goat respectively. In case of small farmers, 25 per cent of households possess bullock and 8.33 per cent possess local cow, buffalo, sheep and goat correspondingly. In case of semi medium farmers, 45.45 per cent of the households possess bullock and 9.09 per cent of the households possess local cow and buffalo respectively. 100 per cent of the medium farmers possess goat.

Table 13: Livestock possession by households in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock	0	0.00	2	15.38	3	25.00	5	45.45	0	0.00	10	23.26
2	Local cow	0	0.00	1	7.69	1	8.33	1	9.09	0	0.00	3	6.98
3	Crossbred cow	0	0.00	1	7.69	0	0.00	0	0.00	0	0.00	1	2.33
4	Buffalo	0	0.00	2	15.38	1	8.33	1	9.09	0	0.00	4	9.30
5	Sheep	1	16.67	0	0.00	1	8.33	0	0.00	0	0.00	2	4.65
6	Goat	1	16.67	1	7.69	1	8.33	0	0.00	1	100.00	4	9.30
7	Poultry birds	2	33.33	0	0.00	0	0.00	0	0.00	0	0.00	2	4.65

Table 14: Average Labour availability in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
		N	N	N	N	N
1	Own labour Male	1.69	1.54	1.55	2.00	1.59
2	Own Labour Female	1.38	1.50	1.27	1.00	1.39
3	Hired labour Male	6.08	7.08	10.55	0.00	7.70
4	Hired labour Female	6.08	7.25	11.73	0.00	8.11

Average Labour availability: The data regarding the average labour availability in Belur-2 micro-watershed is presented in Table 14. The results indicated that, average own

labour men available in the micro watershed was 1.59, average own labour (women) available was 1.39, average hired labour (men) available was 7.70 and average hired labour (women) available was 8.11.

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Belur-2 micro-watershed is presented in Table 15. The results indicated that, 9.30 per cent of the household opined that the hired labour was adequate and 76.74 per cent of them opined that hired labour was inadequate.

Table 15: Adequacy of Hired Labour in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate	1	7.69	2	16.67	1	9.09	0	0.00	4	9.30
2	Inadequate	12	92.31	10	83.33	10	90.91	0	0.00	33	76.74

Distribution of land (ha): The data regarding the distribution of land (ha) in Belur-2 micro-watershed is presented in Table 16. The results indicated that, households of the Belur-2 micro-watershed possess 28.99 ha (62.56%) of dry land and 17.35 ha (37.44 %) of irrigated land. Marginal farmers possess 7.55 ha (89.66%) of dry land 0.87 ha (10.34%) of irrigated land. Small farmers possess 15.78 ha (94.73%) of dry land and 0.88 ha (5.27%) of irrigated land. Semi medium farmers possess 5.67 ha (32.15%) of dry land and 11.95 ha (67.85%) of irrigated land. Medium farmers possess 3.64 ha (100%) of the irrigated land.

Table 16: Distribution of land (Ha) in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	7.55	89.66	15.78	94.73	5.67	32.15	0.00	0.00	28.99	62.56
2	Irrigated	0.87	10.34	0.88	5.27	11.95	67.85	3.64	100.00	17.35	37.44
Total		8.42	100.00	16.65	100.00	17.62	100.00	3.64	100.00	46.33	100.00

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Belur-2 micro-watershed is presented in Table 17. The results indicated that, the average value of dry land was Rs. 298,275.86 and average value of irrigated was Rs. 403,406.44. In case of marginal famers, the average land value was Rs. 423,806.96 for dry land and Rs. 1,033,953.50 for irrigated land. In case of small famers, the average land value was Rs. 256,631.61 for dry land Rs. 569,124.40 for irrigated land. In case of semi medium famers, the average land value was Rs. 247,000 for dry land and Rs. 392,992.56 for irrigated land. In case of medium famers, the average land value was Rs. 247,000 for irrigated land.

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

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
		N	N	N	N	N
1	Dry	423,806.96	256,631.61	247,000.00	0.00	298,275.86
2	Irrigated	1,033,953.50	569,124.40	392,992.56	247,000.00	403,406.44

Status of bore wells: The data regarding the status of bore wells in Belur-2 micro-watershed is presented in Table 18. The results indicated that, there were 14 defunctioning and 15 functioning bore wells in the micro watershed.

Table 18: Status of bore wells in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
		N	N	N	N	N	N
1	De-functioning	0	2	2	10	0	14
2	Functioning	0	2	2	9	2	15

Source of irrigation: The data regarding the source of irrigation in Belur-2 micro-watershed is presented in Table 19. The results indicated that, bore well was the major irrigation source for 34.88 per cent of the farmers.

Table 19: Source of irrigation in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bore Well	0	0.00	2	15.38	2	16.67	9	81.82	1	100	15	34.88

Depth of water: The data regarding the depth of water in Belur-2 micro-watershed is presented in Table 20.The results indicated that on an average the depth of the bore well was 23.09 meters.

Table 20: Depth of water in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
		N	N	N	N	N
1	Bore Well	12.66	5.08	57.08	139.60	23.09

Irrigated Area (ha): The data regarding the irrigated area in Belur-2 micro-watershed is presented in Table 21. The results indicated that, in case of marginal farmers there was 0.87 per cent of irrigated land, in case of small farmers there was 1.28 ha of irrigated land, in case of semi medium farmers there was 12.10 ha of irrigated land and medium farmers were having 3.64 ha of irrigated land. On an average there were 17.90 ha of irrigated land.

Table 21: Irrigated Area (ha) in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
		Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
1	Kharif	0.87	1.28	12.10	3.64	17.90
Total		0.87	1.28	12.10	3.64	17.90

Cropping pattern: The data regarding the cropping pattern in Belur-2 micro-watershed is presented in Table 22. The results indicated that, farmers have grown maize (19.93ha), onion (8.51 ha), groundnut (5.81 ha), sunflower (2.43 ha), cotton 1.88 ha), Red gram (1.83 ha), sorghum (1.62 ha), bajra (0.97 ha), banana (0.4 ha) and green gram (0.4 ha) in kharif season. Marginal farmers have grown maize, groundnut, sunflower, cotton, red gram and bajra. Small farmers have grown maize, onion, groundnut, sunflower and green gram. Small farmers have grown maize, onion, cotton, red gram, sorghum and banana. Medium farmers have grown only maize.

Table 22: Cropping pattern in Belur-2 micro-watershed Area (ha)

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
1	Kharif - Maize	0.81	9.99	5.49	3.64	19.93
2	Kharif - Onion	0	0.47	8.03	0	8.51
3	Kharif - Groundnut	3.13	2.67	0	0	5.81
4	Kharif - Sunflower	0.81	1.62	0	0	2.43
5	Kharif - Cotton	0.87	0	1.01	0	1.88
6	Kharif - Red gram (togari)	1.42	0	0.4	0	1.83
7	Kharif - Sorghum	0	0	1.62	0	1.62
8	Kharif - Bajra	0.97	0	0	0	0.97
9	Kharif - Banana	0	0	0.4	0	0.4
10	Kharif - Greengram	0	0.4	0	0	0.4
Total		8.02	15.16	16.96	3.64	43.78

Cropping intensity: The data regarding the cropping intensity in Belur-2 micro-watershed is presented in Table 23. The results indicated that, the cropping intensity in Belur-2 micro-watershed was found to be 82.12 per cent. In case of marginal farmers it was 95.19 per cent, in small farmers it was 89.92, in semi medium farmers it was 69.54 and in medium farmers it was 100 per cent.

Table 23: Cropping intensity (%) in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
1	Cropping Intensity	95.19	89.92	69.54	100.00	82.12

Possession of Bank account: The data regarding the possession of Bank account and savings in Belur-2 micro-watershed is presented in Table 25. The results indicated that, 69.77 per cent of the households have both bank account and savings respectively. 92.31 percent of marginal, small and large farmers possess both bank account savings respectively. In small farmers 66.67 per cent of the households have both bank account and savings respectively. In case of semi medium farmers, 90.91 per cent of possess bank account and savings respectively.

Table 24: Possession of Bank account and savings in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Account	12	92.31	8	66.67	10	90.91	0	0.00	30	69.77
2	Savings	12	92.31	8	66.67	10	90.91	0	0.00	30	69.77

Borrowing status: The data regarding the possession of borrowing status in Belur-2 micro-watershed is presented in Table 25. The results indicated that, 92.31 per cent of marginal, 66.67 per cent of small and 90.91 per cent of semi medium farmers have borrowed credit from different sources.

Table 25: Borrowing status in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Credit Availed	12	92.31	8	66.67	10	90.91	0	0.00	30	69.77

Cost of Cultivation of Maize: The data regarding the cost of cultivation of maize in Belur-2 micro-watershed is presented in Table 26. The results indicated that, the total cost of cultivation for maize was Rs. 32679.41. The gross income realized by the farmers was Rs. 35141.18. The net income from maize cultivation was Rs. 2461.78. Thus the benefit cost ratio was found to be 1:1.08.

Table 26: Cost of Cultivation of Maize in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	39.68	7300.23	22.34
2	Bullock		Pairs/day	1.69	853.26	2.61
3	Tractor		Hours	2.27	1672.45	5.12
4	Machinery		Hours	2.59	1884.65	5.77
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	18.53	2665.44	8.16
6	Seed Inter Crop		Kgs.	0.08	0.00	0.00
7	FYM		Quintal	17.86	2834.19	8.67
8	Fertilizer + micronutrients		Quintal	2.08	1963.27	6.01
9	Pesticides (PPC)		Kgs / liters	1.31	4688.03	14.35
10	Irrigation		Number	1.21	0.00	0.00
11	Depreciation charges			0.00	131.86	0.40
12	Land revenue and Taxes			0.00	2.20	0.01
II	**Cost B1**					
13	Interest on working capital				1458.72	4.46
14	**Cost B1 = (Cost A1 + sum of 15 and 16)**				25454.30	77.89
III	**Cost B2**					
15	Rental Value of Land				339.58	1.04
16	**Cost B2 = (Cost B1 + Rental value)**				25793.88	78.93
IV	**Cost C1**					
17	Family Human Labour			16.84	3909.61	11.96
18	**Cost C1 = (Cost B2 + Family Labour)**				29703.49	90.89
V	**Cost C2**					
19	Risk Premium				5.06	0.02
20	**Cost C2 = (Cost C1 + Risk Premium)**				29708.55	90.91
VI	**Cost C3**					
21	Managerial Cost				2970.86	9.09
22	**Cost C3 = (Cost C2 + Managerial Cost)**				32679.41	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		22.87	33193.99	
		b) Main Crop Sales Price (Rs.)			1451.33	
	By Product	e) Main Product (q)		12.07	1947.20	
		f) Main Crop Sales Price (Rs.)			161.33	
b.	Gross Income (Rs.)				35141.18	
c.	Net Income (Rs.)				2461.78	
d.	Cost per Quintal (Rs./q.)				1428.83	
e.	Benefit Cost Ratio (BC Ratio)				1:1.08	

Cost of Cultivation of Groundnut: The data regarding the cost of cultivation of groundnut in Belur-2 micro-watershed is presented in Table 27. The results indicated that, the total cost of cultivation for groundnut was Rs. 43553.04. The gross income realized by the farmers was Rs. 52499.24. The net income from groundnut cultivation was Rs. 8946.20. Thus the benefit cost ratio was found to be 1:1.21.

Table 27: Cost of Cultivation of Groundnut in Belur-2 micro-watershed

Sl. No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	33.54	7509.08	17.24
2	Bullock		Pairs/day	0.71	388.22	0.89
3	Tractor		Hours	2.71	2035.42	4.67
4	Machinery		Hours	0.76	300.10	0.69
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	90.33	9032.54	20.74
6	FYM		Quintal	20.84	4168.23	9.57
7	Fertilizer + micronutrients		Quintal	2.72	3912.82	8.98
8	Pesticides (PPC)		Kgs / liters	1.75	2625.54	6.03
9	Irrigation		Number	0.00	0.00	0.00
10	Depreciation charges			0.00	13.17	0.03
11	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
12	Interest on working capital				2369.90	5.44
13	**Cost B1 = (Cost A1 + sum of 15 and 16)**				32355.02	74.29
III	**Cost B2**					
14	Rental Value of Land				166.67	0.38
15	**Cost B2 = (Cost B1 + Rental value)**				32521.68	74.67
IV	**Cost C1**					
16	Family Human Labour			27.43	7061.99	16.21
17	**Cost C1 = (Cost B2 + Family Labour)**				39583.67	90.89
V	**Cost C2**					
18	Risk Premium				10.00	0.02
19	**Cost C2 = (Cost C1 + Risk Premium)**				39593.67	90.91
VI	**Cost C3**					
20	Managerial Cost				3959.37	9.09
21	**Cost C3 = (Cost C2 + Managerial Cost)**				43553.04	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		10.51	52317.04	
		b) Main Crop Sales Price (Rs.)			4978.57	
	By Product	e) Main Product (q)		4.25	182.19	
		f) Main Crop Sales Price (Rs.)			42.86	
b.	Gross Income (Rs.)				52499.24	
c.	Net Income (Rs.)				8946.20	
d.	Cost per Quintal (Rs./q.)				4144.57	
e.	Benefit Cost Ratio (BC Ratio)				1:1.21	

Cost of Cultivation of Redgram: The data regarding the cost of cultivation of redgram in Belur-2 micro-watershed is presented in Table 28. The results indicated that, the total cost of cultivation for redgram was Rs. 92106.94. The gross income realized by the farmers was Rs. 37235.25. The net income from redgram cultivation was Rs. -54871.69. Thus the benefit cost ratio was found to be 1:0.4.

Table 28: Cost of Cultivation of Redgram in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	113.03	20869.21	22.66
2	Bullock		Pairs/day	8.32	4208.15	4.57
3	Tractor		Hours	1.83	1372.22	1.49
4	Machinery		Hours	1.24	926.25	1.01
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	70.20	7349.01	7.98
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	74.10	7410.00	8.04
8	Fertilizer + micronutrients		Quintal	4.30	4228.73	4.59
9	Pesticides (PPC)		Kgs / liters	3.38	13685.63	14.86
10	Irrigation		Number	0.00	0.00	0.00
11	Repairs			0.00	0.00	0.00
12	Msc. Charges (Marketing costs etc)			0.00	0.00	0.00
13	Depreciation charges			0.00	889.99	0.97
14	Land revenue and Taxes			0.00	2.47	0.00
II	**Cost B1**					
16	Interest on working capital				3921.40	4.26
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				64863.07	70.42
III	**Cost B2**					
18	Rental Value of Land				283.33	0.31
19	**Cost B2 = (Cost B1 + Rental value)**				65146.41	70.73
IV	**Cost C1**					
20	Family Human Labour			78.90	18582.18	20.17
21	**Cost C1 = (Cost B2 + Family Labour)**				83728.58	90.90
V	**Cost C2**					
22	Risk Premium				5.00	0.01
23	**Cost C2 = (Cost C1 + Risk Premium)**				83733.58	90.91
VI	**Cost C3**					
24	Managerial Cost				8373.36	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				92106.94	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		9.19	37235.25	
		b) Main Crop Sales Price (Rs.)			4050.00	
b.	Gross Income (Rs.)				37235.25	
c.	Net Income (Rs.)				-54871.69	
d.	Cost per Quintal (Rs./q.)				10018.28	
e.	Benefit Cost Ratio (BC Ratio)				1:0.4	

Cost of Cultivation of Bajra: The data regarding the cost of cultivation of bajra in Belur-2 micro-watershed is presented in Table 29. The results indicated that, the total cost of cultivation for bajra was Rs. 49544.52. The gross income realized by the farmers was Rs. 37461.67. The net income from bajra cultivation was Rs. -12082.86. Thus the benefit cost ratio was found to be 1:0.76.

Table 29: Cost of Cultivation of Bajra in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	52.49	11526.67	23.27
2	Bullock		Pairs/day	3.09	1698.12	3.43
3	Tractor		Hours	5.15	3859.37	7.79
4	Machinery		Hours	3.09	1852.50	3.74
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	8.23	885.08	1.79
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	30.87	6175.00	12.46
8	Fertilizer + micronutrients		Quintal	3.09	4940.00	9.97
9	Pesticides (PPC)		Kgs / liters	2.06	3087.50	6.23
10	Irrigation		Number	0.00	0.00	0.00
11	Repairs			0.00	0.00	0.00
12	Msc. Charges (Marketing costs etc)			0.00	0.00	0.00
13	Depreciation charges			0.00	177.02	0.36
14	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
16	Interest on working capital				1811.71	3.66
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				36012.98	72.69
III	**Cost B2**					
18	Rental Value of Land				166.67	0.34
19	**Cost B2 = (Cost B1 + Rental value)**				36179.64	73.02
IV	**Cost C1**					
20	Family Human Labour			32.93	8850.83	17.86
21	**Cost C1 = (Cost B2 + Family Labour)**				45030.47	90.89
V	**Cost C2**					
22	Risk Premium				10.00	0.02
23	**Cost C2 = (Cost C1 + Risk Premium)**				45040.47	90.91
VI	**Cost C3**					
24	Managerial Cost				4504.05	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				49544.52	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		23.67	36689.79	
		b) Main Crop Sales Price (Rs.)			1550.00	
	By Product	e) Main Product (q)		3.09	771.87	
		f) Main Crop Sales Price (Rs.)			250.00	
b.	Gross Income (Rs.)				37461.67	
c.	Net Income (Rs.)				-12082.86	
d.	Cost per Quintal (Rs./q.)				2093.06	
e.	Benefit Cost Ratio (BC Ratio)				1:0.76	

Cost of Cultivation of sorghum: The data regarding the cost of cultivation of sorghum in Belur-2 micro-watershed is presented in Table 30. The results indicated that, the total cost of cultivation for sorghum was Rs. 6593.64. The gross income realized by the farmers was Rs. 18278. The net income from sorghum cultivation was Rs. 11684.36. Thus the benefit cost ratio was found to be 1:2.77.

Table 30: Cost of Cultivation of Sorghum in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	25.32	0.00	0.00
2	Bullock		Pairs/day	3.71	0.00	0.00
3	Tractor		Hours	0.00	0.00	0.00
4	Machinery		Hours	1.24	0.00	0.00
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	17.29	2074.80	31.47
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	14.82	1778.40	26.97
8	Fertilizer + micronutrients		Quintal	1.24	833.63	12.64
9	Pesticides (PPC)		Kgs / liters	0.00	0.00	0.00
10	Irrigation		Number	0.00	0.00	0.00
11	Repairs			0.00	0.00	0.00
12	Msc. Charges (Marketing costs etc)			0.00	0.00	0.00
13	Depreciation charges			0.00	333.45	5.06
14	Land revenue and Taxes			0.00	11.53	0.17
II	**Cost B1**					
16	Interest on working capital				562.42	8.53
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				5594.22	84.84
III	**Cost B2**					
18	Rental Value of Land				400.00	6.07
19	**Cost B2 = (Cost B1 + Rental value)**				5994.22	90.91
IV	**Cost C1**					
20	Family Human Labour			9.26	0.00	0.00
21	**Cost C1 = (Cost B2 + Family Labour)**				5994.22	90.91
V	**Cost C2**					
22	Risk Premium				0.00	0.00
23	**Cost C2 = (Cost C1 + Risk Premium)**				5994.22	90.91
VI	**Cost C3**					
24	Managerial Cost				599.42	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				6593.64	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		2.47	12350.00	
		b) Main Crop Sales Price (Rs.)			5000.00	
	By Product	e) Main Product (q)		14.82	5928.00	
		f) Main Crop Sales Price (Rs.)			400.00	
b.	Gross Income (Rs.)				18278.00	
c.	Net Income (Rs.)				11684.36	
d.	Cost per Quintal (Rs./q.)				2669.49	
e.	Benefit Cost Ratio (BC Ratio)				1:2.77	

Cost of Cultivation of green gram: The data regarding the cost of cultivation of green gram in Belur-2 micro-watershed is presented in Table 31. The results indicated that, the total cost of cultivation for green gram was Rs. 43774.34. The gross income realized by the farmers was Rs. 41990. The net income from green gram cultivation was Rs. -1784.34. Thus the benefit cost ratio was found to be 1:0.96.

Table 31: Cost of Cultivation of green gram in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	51.87	8768.50	20.03
2	Bullock		Pairs/day	9.88	4940.00	11.29
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.)	12.35	1976.00	4.51
6	FYM		Quintal	49.40	4940.00	11.29
7	Fertilizer + micronutrients		Quintal	9.88	7657.00	17.49
8	Pesticides (PPC)		Kgs / liters	0.00	0.00	0.00
9	Irrigation		Number	0.00	0.00	0.00
10	Repairs			0.00	0.00	0.00
11	Msc. Charges (Marketing costs etc)			0.00	0.00	0.00
12	Depreciation charges			0.00	1086.80	2.48
13	Land revenue and Taxes			0.00	3.29	0.01
II	**Cost B1**					
14	Interest on working capital				1748.76	3.99
15	**Cost B1 = (Cost A1 + sum of 15 and 16)**				31120.35	71.09
III	**Cost B2**					
16	Rental Value of Land				400.00	0.91
17	**Cost B2 = (Cost B1 + Rental value)**				31520.35	72.01
IV	**Cost C1**					
18	Family Human Labour			41.99	8274.50	18.90
19	**Cost C1 = (Cost B2 + Family Labour)**				39794.85	90.91
V	**Cost C2**					
20	Risk Premium				0.00	0.00
21	**Cost C2 = (Cost C1 + Risk Premium)**				39794.85	90.91
VI	**Cost C3**					
22	Managerial Cost				3979.49	9.09
23	**Cost C3 = (Cost C2 + Managerial Cost)**				43774.34	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		7.41	37050.00	
		b) Main Crop Sales Price (Rs.)			5000.00	
	By Product	e) Main Product (q)		24.70	4940.00	
		f) Main Crop Sales Price (Rs.)			200.00	
b.	Gross Income (Rs.)				41990.00	
c.	Net Income (Rs.)				-1784.34	
d.	Cost per Quintal (Rs./q.)				5907.47	
e.	Benefit Cost Ratio (BC Ratio)				1:0.96	

Cost of cultivation of onion: The data regarding the cost of cultivation of onion in Belur-2 micro-watershed is presented in Table 32. The results indicated that, the total cost of cultivation for onion was Rs. 31943.56. The gross income realized by the farmers was Rs. 132285.50. The net income from onion cultivation was Rs. 100341.94. Thus the benefit cost ratio was found to be 1:4.14.

Table 32: Cost of Cultivation of onion in Belur-2 micro-watershed

Sl.No	Particulars	Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**				
1	Hired Human Labour	Man days	39.51	8855.48	27.72
2	Bullock	Pairs/day	1.49	819.03	2.56
3	Tractor	Hours	3.20	2403.56	7.52
4	Machinery	Hours	1.14	684.74	2.14
5	Seed Main Crop (Establishment and Maintenance)	Kgs (Rs.)	5.66	1330.21	4.16
6	FYM	Quintal	13.72	2744.52	8.59
7	Fertilizer + micronutrients	Quintal	1.88	2871.06	8.99
8	Pesticides (PPC)	Kgs / liters	1.44	2145.41	6.72
9	Irrigation	Number	6.08	0.00	0.00
10	Repairs		0.00	0.00	0.00
11	Msc. Charges (Marketing costs etc)		0.00	0.00	0.00
12	Depreciation charges		0.00	1068.85	3.35
13	Land revenue and Taxes		0.00	0.00	0.00
II	**Cost B1**				
14	Interest on working capital			1092.14	3.42
15	**Cost B1 = (Cost A1 + sum of 15 and 16)**			24015.00	75.18
III	**Cost B2**				
16	Rental Value of Land			291.67	0.91
17	**Cost B2 = (Cost B1 + Rental value)**			24306.67	76.09
IV	**Cost C1**				
18	Family Human Labour		17.71	4722.93	14.79
19	**Cost C1 = (Cost B2 + Family Labour)**			29029.60	90.88
V	**Cost C2**				
20	Risk Premium			10.00	0.03
21	**Cost C2 = (Cost C1 + Risk Premium)**			29039.60	90.91
VI	**Cost C3**				
22	Managerial Cost			2903.96	9.09
23	**Cost C3 = (Cost C2 + Managerial Cost)**			31943.56	100.00
VII	**Economics of the Crop**				
a.	Main Product	a) Main Product (q)	126.74	132285.50	
		b) Main Crop Sales Price (Rs.)		1043.75	
b.	Gross Income (Rs.)			132285.50	
c.	Net Income (Rs.)			100341.94	
d.	Cost per Quintal (Rs./q.)			252.04	
e.	Benefit Cost Ratio (BC Ratio)			1:4.14	

Cost of cultivation of Sunflower: The data regarding the cost of cultivation of Sunflower in Belur-2 micro-watershed is presented in Table 33. The results indicated that, the total cost of cultivation for Sunflower was Rs. 26042.92. The gross income realized by the farmers was Rs. 42306.47. The net income from Sunflower cultivation was Rs. 16263.55. Thus the benefit cost ratio was found to be 1:1.62.

Table 33: Cost of Cultivation of Sunflower in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	25.01	5588.38	21.46
2	Bullock		Pairs/day	0.62	339.63	1.30
3	Tractor		Hours	3.09	2315.63	8.89
4	Machinery		Hours	0.31	185.25	0.71
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	3.71	741.00	2.85
6	FYM		Quintal	12.35	2470.00	9.48
7	Fertilizer + micronutrients		Quintal	1.54	2346.50	9.01
8	Pesticides (PPC)		Kgs / liters	1.54	3087.50	11.86
9	Irrigation		Number	0.00	0.00	0.00
10	Repairs			0.00	0.00	0.00
11	Msc. Charges (Marketing costs etc)			0.00	0.00	0.00
12	Depreciation charges			0.00	137.49	0.53
13	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
14	Interest on working capital				1038.60	3.99
15	**Cost B1 = (Cost A1 + sum of 15 and 16)**				18249.96	70.08
III	**Cost B2**					
16	Rental Value of Land				166.67	0.64
17	**Cost B2 = (Cost B1 + Rental value)**				18416.63	70.72
IV	**Cost C1**					
18	Family Human Labour			19.14	5248.75	20.15
19	**Cost C1 = (Cost B2 + Family Labour)**				23665.38	90.87
V	**Cost C2**					
20	Risk Premium				10.00	0.04
21	**Cost C2 = (Cost C1 + Risk Premium)**				23675.38	90.91
VI	**Cost C3**					
22	Managerial Cost				2367.54	9.09
23	**Cost C3 = (Cost C2 + Managerial Cost)**				26042.92	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		8.95	42306.47	
		b) Main Crop Sales Price (Rs.)			4725.00	
b.	Gross Income (Rs.)				42306.47	
c.	Net Income (Rs.)				16263.55	
d.	Cost per Quintal (Rs./q.)				2908.60	
e.	Benefit Cost Ratio (BC Ratio)				1:1.62	

Cost of cultivation of Cotton: The data regarding the cost of cultivation of Cotton in Belur-2 micro-watershed is presented in Table 34. The results indicated that, the total cost of cultivation for Cotton was Rs. 38511.39. The gross income realized by the farmers was Rs. 79607.03. The net income from Cotton cultivation was Rs. 41095.63. Thus the benefit cost ratio was found to be 1:2.07.

Table 34: Cost of Cultivation of Cotton in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	50.61	11231.70	29.16
2	Bullock		Pairs/day	0.82	452.83	1.18
3	Tractor		Hours	2.91	2185.41	5.67
4	Machinery		Hours	0.82	494.00	1.28
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	4.07	884.90	2.30
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	24.70	4940.00	12.83
8	Fertilizer + micronutrients		Quintal	2.91	4573.44	11.88
9	Pesticides (PPC)		Kgs / liters	1.87	2584.55	6.71
10	Irrigation		Number	0.00	0.00	0.00
11	Repairs			0.00	0.00	0.00
12	Msc. Charges (Marketing costs etc)			0.00	0.00	0.00
13	Depreciation charges			0.00	2.43	0.01
14	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
16	Interest on working capital				1559.15	4.05
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				28908.41	75.06
III	**Cost B2**					
18	Rental Value of Land				277.78	0.72
19	**Cost B2 = (Cost B1 + Rental value)**				29186.19	75.79
IV	**Cost C1**					
20	Family Human Labour			21.71	5814.17	15.10
21	**Cost C1 = (Cost B2 + Family Labour)**				35000.36	90.88
V	**Cost C2**					
22	Risk Premium				10.00	0.03
23	**Cost C2 = (Cost C1 + Risk Premium)**				35010.36	90.91
VI	**Cost C3**					
24	Managerial Cost				3501.04	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				38511.39	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.56	79607.03	
		b) Main Crop Sales Price (Rs.)			5466.67	
b.	Gross Income (Rs.)				79607.03	
c.	Net Income (Rs.)				41095.63	
d.	Cost per Quintal (Rs./q.)				2644.60	
e.	Benefit Cost Ratio (BC Ratio)				1:2.07	

Cost of cultivation of Banana: The data regarding the cost of cultivation of Banana in Belur-2 micro-watershed is presented in Table 35. The results indicated that, the total cost of cultivation for Banana was Rs. 89684.87. The gross income realized by the farmers was Rs. 247000. The net income from Banana cultivation was Rs. 157315.13. Thus the benefit cost ratio was found to be 1:2.75.

Table 35: Cost of Cultivation of Banana in Belur-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	88.92	11485.50	12.81
2	Bullock		Pairs/day	0.00	0.00	0.00
3	Tractor		Hours	7.41	5557.50	6.20
4	Machinery		Hours	2.47	1482.00	1.65
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	3211.00	41743.00	46.54
6	Seed Inter Crop		Kgs.	0.00	0.00	0.00
7	FYM		Quintal	24.70	4940.00	5.51
8	Fertilizer + micronutrients		Quintal	2.47	4940.00	5.51
9	Pesticides (PPC)		Kgs / ltrs	2.47	2470.00	2.75
10	Irrigation		Number	12.35	0.00	0.00
11	Depreciation charges			0.00	3.21	0.00
12	Land revenue and Taxes			0.00	0.00	0.00
II	**Cost B1**					
13	Interest on working capital				6492.36	7.24
14	**Cost B1 = (Cost A1 + sum of 15 and 16)**				79113.57	88.21
III	**Cost B2**					
15	Rental Value of Land				333.33	0.37
16	**Cost B2 = (Cost B1 + Rental value)**				79446.90	88.58
IV	**Cost C1**					
17	Family Human Labour			27.17	2074.80	2.31
18	**Cost C1 = (Cost B2 + Family Labour)**				81521.70	90.90
V	**Cost C2**					
19	Risk Premium				10.00	0.01
20	**Cost C2 = (Cost C1 + Risk Premium)**				81531.70	90.91
VI	**Cost C3**					
21	Managerial Cost				8153.17	9.09
22	**Cost C3 = (Cost C2 + Managerial Cost)**				89684.87	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		123.50	247000.00	
		b) Main Crop Sales Price (Rs.)			2000.00	
		h) Intercrop Sales Price (Rs.)			0.00	
b.	Gross Income (Rs.)				247000.00	
c.	Net Income (Rs.)				157315.13	
d.	Cost per Quintal (Rs./q.)				726.19	
e.	Benefit Cost Ratio (BC Ratio)				1:2.75	

Adequacy of fodder: The data regarding the adequacy of fodder in Belur-2 micro-watershed is presented in Table 36. The results indicated that, 18.60 per cent of the households opined that dry fodder was adequate, 11.63 per cent of the households opined that dry fodder was inadequate and 18.60 per cent of the households opined that green fodder was adequate.

Table 36: Adequacy of fodder in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	0	0.00	1	7.69	4	33.33	3	27.27	0	0.00	8	18.60
2	Inadequate-Dry Fodder	0	0.00	2	15.38	0	0.00	3	27.27	0	0.00	5	11.63
3	Adequate-Green Fodder	1	16.67	1	7.69	2	16.67	1	9.09	3	300.00	8	18.60

Average Annual gross income of households: The results of the overall average annual gross income of the household in Belur-2 is presented in table 37. The results indicated that, in landless farmers, the average income from wage was Rs. 27000. In marginal farmers the average income from service/salary was Rs.7384.62, wage was Rs. 30384.62, agriculture was Rs. 32015.38 and dairy farm was Rs. 5230.77. In small farmers the average income from business was Rs. 1000, wage was Rs. 21166.67, agriculture was Rs. 43470.83 and dairy farm was Rs. 1166.67. In semi medium farmers the average income from service/salary was Rs. 16272.73, wage was Rs. 22454.55, agriculture was Rs. 187236.36 and dairy farm was Rs.363.64. In medium farmers the average income from business was Rs. 6000 and agriculture was Rs. 375000.

Table 37: Average Annual gross income (Rs.) of households in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
1	Service/salary	0.00	7,384.62	0.00	16,272.73	0.00	6,395.35
2	Business	0.00	0.00	1,000.00	0.00	6,000.00	418.60
3	Wage	27,000.00	30,384.62	21,166.67	22,454.55	0.00	24,604.65
4	Agriculture	0.00	32,015.38	43,470.83	187,236.36	375,000.00	78,429.07
5	Farm income	500.00	0.00	0.00	0.00	0.00	69.77
6	Dairy Farm	0.00	5,230.77	1,166.67	363.64	0.00	2,000.00
7	Goat Farming	3,333.33	0.00	0.00	0.00	10,000.00	697.67
Income(Rs.)		30,833.33	75,015.38	66,804.17	226,327.27	391,000.00	112,615.12

Table 38: Average Annual expenditure of households in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)	MF (13)	SF (12)	SMF (11)	MDF (1)	All (43)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0.00	0.00	0.00	40,500.00	0.00	1,883.72
2	Business	0.00	0.00	4,000.00	0.00	4,000.00	186.05
3	Wage	25,000.00	9,090.91	11,500.00	8,375.00	0.00	7,767.44
4	Agriculture	0.00	16,307.69	28,727.27	60,090.91	50,000.00	33,465.12
5	Farm income	500.00	0.00	0.00	0.00	0.00	11.63
6	Dairy Farm	0.00	9,333.33	5,000.00	2,000.00	0.00	930.23
7	Goat Farming	5,000.00	0.00	0.00	0.00	2,000.00	162.79
Total		30,500.00	34,731.93	49,227.27	110,965.91	56,000.00	281,425.12
Average		5,083.33	2,671.69	4,102.27	10,087.81	56,000.00	6,544.77

Average Annual expenditure of households: The results of the overall average annual expenditure of the households in Belur-2 were presented in Table 38. The results indicated that, in landless farmers, the average expenditure from wage was Rs. 25000, farm income was Rs.500 and goat farming was Rs.5000. In marginal farmers the average expenditure from wage was Rs.9090.91, agriculture was Rs.16307.69 and dairy farm was Rs.9333.33. In case of small farmers the average expenditure from business was Rs. 4000, wage was Rs. 11500, agriculture was Rs. 28727.27 and dairy farm was Rs. 2000. In case of semi medium farmers the average expenditure from service/salary was Rs.40500, wage was Rs. 8375, dairy farm was Rs.2000 and agriculture was Rs. 60090.91. In case of medium farmers the average expenditure from business was Rs.4000, agriculture was Rs. 50000 and goat farming was Rs. 2000.

Horticulture species grown: The data regarding horticulture species grown in Belur-2 micro-watershed is presented in Table 39. The results indicated that, sampled households have grown 34 coconut trees in their field and also planted 1 coconut tree in their back yard.

Table 39: Horticulture species grown in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Coconut	0	0	5	0	0	1	29	0	0	0	34	1

***F=Field & *B=Back yard**

Forest species grown: The data regarding forest species grown in Belur-2 micro-watershed is presented in Table 40. The results indicated that, households have planted 1 eucalyptus, 5 teak, 58 neem, 1 tarmind tree, 3 pongamia trees and 1 banyan tree in their field and also planted 2 neem tree in their back yard.

Table 40: Forest species grown in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		LF (0)		All (43)	
		F	B	F	B	F	B	F	B	F	B	F	B	F	B
1	Eucalyptus	0	0	0	0	0	0	1	0	0	0	0	0	1	0
2	Teak	0	0	2	0	0	0	3	0	0	0	0	0	5	0
3	Neem	0	0	2	0	26	1	25	1	5	0	0	0	58	2
4	Tamarind	0	0	0	0	0	0	1	0	0	0	0	0	1	0
5	Pongamia	0	0	0	0	2	0	0	0	1	0	0	0	3	0
6	Banyan	0	0	0	0	1	0	0	0	0	0	0	0	1	0

***F=Field & *B=Back yard**

Table 41: Average additional investment (Rs.) capacity of households in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)	SF (12)	SMF (11)	All (43)
1	Land development	6,846.15	3,666.67	6,454.55	4,744.19
2	Irrigation facility	769.23	83.33	727.27	441.86
3	Improved crop production	384.62	666.67	0.00	302.33

Average additional investment capacity: The data regarding average additional investment capacity in Belur-2 micro-watershed is presented in Table 41. The results

indicate that, households have an average investment capacity of Rs. 4744.19 for land development, Rs. 441.86 in irrigation facility and 302.33 Rs.2714.29 for improved crop production.

Marginal households have an average investment capacity of Rs. 6846.15 for land development, Rs. 769.23 for irrigation facility and Rs.384.62 for improved crop production. Small farmers have an average investment capacity of Rs. 3666.67 for land development, Rs. 83.33 in irrigation facility and Rs.666.67 for improved crop production. Semi medium farmers have an average investment capacity of Rs. 6454.55 for land development and Rs. 727.27 in irrigation facility.

Source of funds for additional investment: The data regarding source of funds for additional investment in Belur-2 micro-watershed is presented in Table 42. The results indicated that, for land development, 31.11 per cent of the farmers were depend on government subsidy, 22.22 per cent were depend on loan from the bank. 4.44 per cent of the households were dependent on government subsidy and 8.89 per cent of the households were dependent on loan from the bank for irrigation facility. Similarly for improved crop production, 4.44 per cent of the households were dependent on government subsidy.

Table 42: Source of funds for additional investment capacity in Belur-2 micro-watershed

Sl. No	Item	Land development		Irrigation facility		Improved crop production	
		N	%	N	%	N	%
1	Government subsidy	14	31.11	2	4.44	2	4.44
2	Loan from bank	10	22.22	4	8.89	0	0.0

Table 43: Marketing of the agricultural produce in Belur-2 micro-watershed

Sl.No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained(Rs/q)
1	Bajra	23.0	20	3	13.04	1550.0
2	Banana	50.0	5	45	90.00	2000.0
3	Cotton	27.0	0.0	27.0	100.00	5466.67
4	Greengram	3.0	3.0	0	0.00	5000.0
5	Groundnut	64.0	20	44	68.75	4978.57
6	Maize	437.0	1.0	436.0	99.77	1211.33
7	Onion	1098.0	0.0	1098.0	100.00	1043.75
8	Redgram	9.0	1.0	8.0	88.89	4050.0
9	Sorghum	2.0	2.0	0.0	0.00	2500.0
10	Sunflower	21.0	0.0	21.0	100.00	4725.0

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Belur-2 micro-watershed is presented in Table 43. The results indicated that, cotton, onion and sunflower crops were sold to the extent of 100 per cent.

Bajra, banana, groundnut, maize and red gram were sold to an extent 13.04 per cent, 90 per cent, 68.75 per cent, 99.77 per cent and 88.89 per cent respectively.

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Belur-2 micro-watershed is presented in Table 44. The results indicated that, 2.33 percent of the households have sold their produce to agents/ traders, 16.28 per cent of the households have sold their produce to local/village merchant, 74.42 percent of the households sold their produce in regulated markets and 2.33 percent of the households sold their produce in cooperative marketing society.

Table 44: Marketing Channels used for sale of agricultural produce in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Agent/Traders	1	7.69	0	0.00	0	0.00	0	0.00	1	2.33
2	Local/village Merchant	0	0.00	5	41.67	2	18.18	0	0.00	7	16.28
3	Regulated Market	12	92.31	8	66.67	12	109.09	0	0.00	32	74.42
4	Cooperative marketing Society	0	0.00	0	0.00	0	0.00	1	100.00	1	2.33

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Belur-2 micro-watershed is presented in Table 45. The results indicated that 18.60 per cent of the households have used cart as a mode of transport, 72.09 per cent of them have used tractor and 2.33 per cent have used bus as a mode of transport.

Table 45: Mode of transport of agricultural produce in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Cart	2	15.38	5	41.67	1	9.09	0	0.00	8	18.60
2	Tractor	11	84.62	8	66.67	11	100.00	1	100.00	31	72.09
3	Bus	0	0.00	0	0.00	1	9.09	0	0.00	1	2.33

Incidence of soil and water erosion problems: The data regarding incidence of soil and water erosion problems in Belur-2 micro-watershed is presented in Table 46. The results indicated that, 34.88 per cent of the households have experienced the soil and water erosion problems i.e. 46.15 percent of marginal farmers, 33.33 per cent of small farmers and 45.45 per cent of semi medium farmers.

Table 46: Incidence of soil and water erosion problems in Belur-2 micro-watershed

Sl. No.	Particulars	MF (13)		SF (12)		SMF (11)		All (43)	
		N	%	N	%	N	%	N	%
1	Soil and water erosion problems in the farm	6	46.15	4	33.33	5	45.45	15	34.88

Interest towards soil testing: The data regarding interest shown towards soil testing in Belur-2 micro-watershed is presented in Table 47. The results indicated that, 65.12 per

cent of the households have shown interest in soil testing including 92.31 per cent of marginal farmers, 58.33 per cent of the small farmers and 81.82 semi medium farmers.

Table 47: Interest shown towards soil testing in Belur-2 micro-watershed

Sl.No.	Particulars	MF (13)		SF (12)		SMF (11)		All (43)	
		N	%	N	%	N	%	N	%
1	Interest in soil test	12	92.31	7	58.33	9	81.82	28	65.12

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Belur-2 micro-watershed is presented in Table 48. The results indicated that, 100 percent used fire wood as a source of fuel.

Table 48: Usage pattern of fuel for domestic use in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	6	100.00	13	100.00	12	100.00	11	100.00	1	100.00	43	100.00

Source of drinking water: The data regarding source of drinking water in Belur-2 micro-watershed is presented in Table 49. The results indicated that, piped supply was the source of drinking water for 90.70 per cent and 11.63 per cent of them were using bore well for drinking water.

Table 49: Source of drinking water in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF(11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	6	100.00	11	84.62	12	100.00	9	81.82	1	100.00	39	90.70
2	Bore Well	0	0.00	3	23.08	0	0.00	2	18.18	0	0.00	5	11.63

Source of light: The data regarding source of light in Belur-2 micro-watershed is presented in Table 50. The results indicated that, electricity was the major source of light for 100 per cent of the households.

Table 50: Source of light in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Electricity	6	100.00	13	100.00	12	100.00	11	100.00	1	100.00	43	100.00

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facilit**y** in Belur-2 micro-watershed is presented in Table 51. The results indicated that, 46.51 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, semi medium and medium farmers, 7.69 per cent of marginal and 8.33 per cent of small farmers had sanitary toilet facility.

Table 51: Existence of Sanitary toilet facility in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	6	100.00	1	7.69	1	8.33	11	100.00	1	100.00	20	46.51

Possession of PDS card: The data regarding possession of PDS card in Belur-2 micro-watershed is presented in Table 52. The results indicated that, 93.02 per cent of the

sampled households possessed BPL card and 6.98 per cent of the sampled households does not possessed BPL card.

Table 52: Possession of PDS card in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
2	BPL	6	100.00	13	100.00	11	91.67	9	81.82	1	100.00	40	93.02
3	Not Possessed	0	0.00	0	0.00	1	8.33	2	18.18	0	0.00	3	6.98

Participation in NREGA programme: The data regarding participation in NREGA programme in Belur-2 micro-watershed is presented in Table 53. The results indicated that, 60.47 per cent of the households participated in NREGA programme which included 50 per cent of the landless, 69.23 percent of the marginal, 50 per cent of the small, 63.64 per cent of the semi medium and 100 percent of the medium farmers.

Table 53: Participation in NREGA programme in Belur-2 micro-watershed

Sl. No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	3	50	9	69.23	6	50	7	63.64	1	100	26	60.47

Adequacy of food items: The data regarding adequacy of food items in Belur-2 micro-watershed is presented in Table 54. The results indicated that, cereals, pulses, oilseeds, vegetables, fruits , milk, egg and meat were adequate for 100 per cent, 53.49 per cent, 51.16 per cent, 39.53 per cent, 58.14 per cent, 51.16 per cent, 48.84 per cent and 9.30 per cent respectively.

Table 54: Adequacy of food items in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	6	100.00	13	100.00	12	100.00	11	100.00	1	100.00	43	100.00
2	Pulses	2	33.33	6	46.15	9	75.00	5	45.45	1	100.00	23	53.49
3	Oilseed	2	33.33	6	46.15	8	66.67	5	45.45	1	100.00	22	51.16
4	Vegetables	3	50.00	7	53.85	5	41.67	2	18.18	0	0.00	17	39.53
5	Fruits	3	50.00	11	84.62	4	33.33	7	63.64	0	0.00	25	58.14
6	Milk	3	50.00	7	53.85	6	50.00	6	54.55	0	0.00	22	51.16
7	Egg	3	50.00	8	61.54	6	50.00	4	36.36	0	0.00	21	48.84
8	Meat	2	33.33	0	0.00	1	8.33	1	9.09	0	0.00	4	9.30

Response on Inadequacy of food items: The data regarding inadequacy of food items in Belur-2 micro-watershed is presented in Table 55. The results indicated that, pulses, oilseed; vegetables, fruits, milk, egg and meat were inadequate for 46.51 per cent, 48.84 per cent, 60.47 per cent, 27.91 per cent, 23.26 per cent, 27.91 per cent and 6.98 per cent of the households respectively.

Table 55: Response on Inadequacy of food items in Belur-2 micro-watershed

Sl.No.	Particulars	LL (6)		MF (13)		SF (12)		SMF (11)		MDF (1)		All (43)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Pulses	4	66.67	7	53.85	3	25.00	6	54.55	0	0.00	20	46.51
2	Oilseed	4	66.67	6	46.15	5	41.67	6	54.55	0	0.00	21	48.84
3	Vegetables	3	50.00	6	46.15	7	58.33	9	81.82	1	100.00	26	60.47
4	Fruits	2	33.33	0	0.00	5	41.67	4	36.36	1	100.00	12	27.91
5	Milk	1	16.67	1	7.69	5	41.67	2	18.18	1	100.00	10	23.26
6	Egg	2	33.33	2	15.38	4	33.33	3	27.27	1	100.00	12	27.91
7	Meat	0	0.00	0	0.00	2	16.67	1	9.09	0	0.00	3	6.98

Farming constraints: The data regarding farming constraints experienced by households in Belur-2 micro-watershed is presented in Table 56. The results indicated that, Lower fertility status of the soil problem was experienced by 72.09 per cent of the households, and wild animal menace on farm field was experienced by 62.79 per cent of the households, frequent incidence of pest and diseases was experienced by 27.91 per cent of the farmers, inadequacy of irrigation water was experienced by 13.95 per cent of the households, high cost of Fertilizers and plant protection chemicals was experienced 44.19 per cent and high rate of interest on credit was experienced by 13.95 per cent of the farmers, low price for the agricultural commodities was experienced by 18.60 per cent of the farmers, lack of marketing facilities in the area was experienced 16.28 per cent of the households, inadequate of extension services experienced by 11.63 per cent of the households, lack of transport for safe transport of the agricultural produce to the market was experienced by 34.88 per cent of the households, less rainfall was experienced by 51.16 per cent and of the farmers and Source of Agri-technology information(Newspaper/TV/Mobile) 11.63 per cent of the households.

Table 56: Farming constraints Experienced in Belur-2 micro-watershed

Sl. No.	Particulars	MF (13)		SF(12)		SMF(11)		MDF(1)		All (43)	
		N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	12	92.31	9	75	10	90.91	0	0	31	72.09
2	Wild animal menace on farm field	11	84.62	9	75	7	63.64	0	0	27	62.79
3	Frequent incidence of pest and diseases	4	30.77	3	25	5	45.45	0	0	12	27.91
4	Inadequacy of irrigation water	3	23.08	2	16.67	1	9.09	0	0	6	13.95
5	High cost of Fertilizers and plant protection chemicals	9	69.23	3	25	6	54.55	1	100	19	44.19
6	High rate of interest on credit	3	23.08	1	8.33	2	18.18	0	0	6	13.95
7	Low price for the agricultural commodities	2	15.38	3	25	3	27.27	0	0	8	18.60
8	Lack of marketing facilities in the area	3	23.08	2	16.67	1	9.09	1	100	7	16.28
9	Inadequate extension services	3	23.08	1	8.33	1	9.09	0	0	5	11.63
10	Lack of transport for safe transport of the Agril produce to the market.	3	23.08	7	58.33	5	45.45	0	0	15	34.88
11	Less rainfall	8	61.54	8	66.67	5	45.45	1	100	22	51.16
12	Source of Agri-technology information(Newspaper/TV/Mobile)	1	7.69	2	16.67	2	18.18	0	0	5	11.63

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

Results indicated that, 35 farmers were sampled in Belur-2 micro-watershed among them 6 (13.95%) were marginal farmers, 12 (30.23 %) were small farmers, 11 (25.58 %) were semi medium farmers, 1 (2.33%) were medium farmers and 6 (13.95 %) landless farmers were also interviewed for the survey. The data indicated that there were 188 population households were there in the studied micro watershed. Among them 100 (53.19%) men and 88 (46.81 %) were women. The average family size of landless was 4.67, marginal farmer was 3.85, small farmer was 4.6, semi medium farmers were 4.45 and medium and large farmers were 5. The data indicated that 26 (13.83%) people were in 0-15 years of age, 85 (45.21 %) were in 16-35 years of age, 58 (30.85 %) were in 36-60 years of age and 19 (10.11%) were above 61 years of age.

The results indicated that the Belur-2 had 27.66 per cent illiterates, 32.98 per cent of them had primary school education, 6.91 per cent of them had middle school, 15.43 per cent them had high school education, 8.51 per cent of them had PUC education, 0.53 per cent of them had ITI education and 3.19 per cent of them had degree education. The results indicated that, 83.72 per cent of households practicing agriculture, 13.95 per cent of the household heads were agricultural labour and 2.33 per cent of the household heads were others.

The results indicated that agriculture was the major occupation for 29.26 per cent of the household members, 44.15 per cent were agricultural labourers, 2.13 per cent were general labours and 1.06 per cent were in private sector, 0.53 per cent were in government service, 2.66 per cent were housewives and children's and 15.43 per cent of them were students. In case of landless farmers 57.14 per cent of them were agriculture labours, 14.29 per cent were general labours and 10.71 per cent of them were students. In case of marginal farmers 32 per cent of them were doing agriculture, 48 per cent of them were agriculture and 16 per cent of them were students. In small farmers 32 per cent of them were doing agriculture, 30.36 per cent of them were agriculture labour, 8.93 per cent were children and 17.86 per cent of them were students. In case of semi medium farmers 28.57 per cent of them were agriculturist, 53.06 per cent of them were agriculture labour, 2.04 per cent of them were in private service. and 16.33 per cent of them were students. In

medium farmers 60 per cent of them were agriculturist, 20 per cent of them were government service and 20 per cent of them were doing other work.

The results showed that 1.06 per cent of them participated in Sthree Shakthi Sangha and 98.94 per cent of them have not participated in any local institutions. Landless, marginal, semi medium and medium farmers were found to have no participation in any local institutions. Small farmers were found to participate in one or the other local institutions. The results indicated that 6.98 per cent of the households possess thatched house, 83.72 per cent of the households possess Katcha house and 9.30 per cent of the households possess Pacca house.

The results showed that, 88.37 per cent of the households possess TV, 79.07 per cent of the households possess mixer/grinder, 55.81 per cent of the households possess bicycle, 44.19 per cent of the households possess motor cycle, 2.33 per cent of them possess tempo and 86.05 per cent of the households possess mobile phones. The results showed that the average value of television was Rs. 3526, mixer/grinder was Rs. 1188, bicycle was Rs.1041, motor cycle was Rs.48684, Tempo was Rs.2000, Edge shear was Rs.3000 and mobile phone was Rs.1093.

Results showed that, about 16.28 per cent of the households possess bullock cart, 25.58 per cent of them possess plough, 2.33 per cent of the households possess tractor, 11.63 per cent of the households possess sprayer, 79.07 per cent of the households possess weeder and 9.30 per cent of the households possess chaff cutter. The results showed that the average value of bullock cart was Rs.17428; the average value of plough was Rs. 911, the average value of tractor was Rs. 300000, the average value of sprayer was Rs. 20200, the average value of weeder was Rs. 36 and the average value of chaff cutter was Rs. 2175.

The results indicated that, 23.26 per cent of the households possess bullocks, 6.98 per cent of the households possess local cow, 2.33 per cent of the households possess crossbreed cow, 4.65 per cent of the households possess sheep and 9.30 per cent of the households possess buffalo and goat respectively. 16.67 per cent of the landless farmers possess sheep and goat respectively. In case of marginal farmers, 15.38 per cent of the households possess local cow and 7.69 per cent of the households possess local cow, crossbreed cow and goat respectively. In case of small farmers, 25 per cent of households possess bullock and 8.33 per cent possess local cow, buffalo, sheep and goat correspondingly. In case of semi medium farmers, 45.45 per cent of the households possess bullock and 9.09 per cent of the households possess local cow and buffalo respectively. 100 per cent of the medium farmers possess goat.

The results indicated that, average own labour men available in the micro watershed was 1.59, average own labour (women) available was 1.39, average hired labour (men) available was 7.70 and average hired labour (women) available was 8.11.

In case of marginal farmers, average own labour men available was 1.69, average own labour (women) was also 1.38, average hired labour (men) was 6.08 and average hired labour (women) available was 6.08. In case of small farmers, average own labour men available was 1.54, average own labour (women) was 1.50, average hired labour (men) was 7.08 and average hired labour (women) available was 7.25. In case of semi medium farmers, average own labour men available was 1.55, average own labour (women) was 1.27, average hired labour (men) was 10.55 and average hired labour (women) available was 11.73. In medium farmers average own labour men available was 2, average own labour (women) was 1. The results indicated that, 9.30 per cent of the household opined that the hired labour was adequate and 76.74 per cent of them opined that hired labour was inadequate. The results indicated that, households of the Belur-2 micro-watershed possess 28.99 ha (62.56%) of dry land and 17.35 ha (37.44 %) of irrigated land. Marginal farmers possess 7.55 ha (89.66%) of dry land 0.87 ha (10.34%) of irrigated land. Small farmers possess 15.78 ha (94.73%) of dry land and 0.88 ha (5.27%) of irrigated land. Semi medium farmers possess 5.67 ha (32.15%) of dry land and 11.95 ha (67.85%) of irrigated land. Medium farmers possess 3.64 ha (100%) of the irrigated land. The results indicated that, the average value of dry land was Rs. 298,275.86 and average value of irrigated was Rs. 403,406.44. In case of marginal famers, the average land value was Rs. 423,806.96 for dry land and Rs. 1,033,953.50 for irrigated land. In case of small famers, the average land value was Rs. 256,631.61 for dry land Rs. 569,124.40 for irrigated land. In case of semi medium famers, the average land value was Rs. 247,000 for dry land and Rs. 392,992.56 for irrigated land. In case of medium famers, the average land value was Rs. 247,000 for irrigated land.

The results indicated that, there were 14 defunctioning and 15 functioning bore wells in the micro watershed. The results indicated that, bore well was the major irrigation source for 34.88 per cent of the farmers. The results indicated that on an average the depth of the bore well was 23.09 meters. The results indicated that, in case of marginal farmers there was 0.87 per cent of irrigated land, in case of small farmers there was 1.28 ha of irrigated land, in case of semi medium farmers there was 12.10 ha of irrigated land and medium farmers were having 3.64 ha of irrigated land. On an average there were 17.90 ha of irrigated land.

The results indicated that, farmers have grown maize (19.93ha), onion (8.51 ha), groundnut (5.81 ha), sunflower (2.43 ha), cotton 1.88 ha), Red gram (1.83 ha), sorghum (1.62 ha), bajra (0.97 ha), banana (0.4 ha) and green gram (0.4 ha) in kharif season. Marginal farmers have grown maize, groundnut, sunflower, cotton, red gram and bajra. Small farmers have grown maize, onion, groundnut, sunflower and green gram. Small farmers have grown maize, onion, cotton, red gram, sorghum and banana. Medium farmers have grown only maize. The results indicated that, the cropping intensity in Belur-2 micro-watershed was found to be 82.12 per cent. In case of marginal farmers it

was 95.19 per cent, in small farmers it was 89.92, in semi medium farmers it was 69.54 and in medium farmers it was 100 per cent.

The results indicated that, 69.77 per cent of the households have both bank account and savings respectively. 92.31 percent of marginal, small and large farmers possess both bank account savings respectively. In small farmers 66.67 per cent of the households have both bank account and savings respectively. In case of semi medium farmers, 90.91 per cent of possess bank account and savings respectively. The results indicated that, 92.31 per cent of marginal, 66.67 per cent of small and 90.91 per cent of semi medium farmers have borrowed credit from different sources. The results indicated that, the total cost of cultivation for maize was Rs. 32679.41. The gross income realized by the farmers was Rs. 35141.18. The net income from maize cultivation was Rs. 2461.78. Thus the benefit cost ratio was found to be 1:1.08.

The results indicated that, the total cost of cultivation for groundnut was Rs. 32679.41. The gross income realized by the farmers was Rs. 35141.18. The net income from groundnut cultivation was Rs. 2461.78. Thus the benefit cost ratio was found to be 1:1.08. The results indicated that, the total cost of cultivation for redgram was Rs. 92106.94. The gross income realized by the farmers was Rs. 37235.25. The net income from redgram cultivation was Rs. -54871.69. Thus the benefit cost ratio was found to be 1:0.4. The results indicated that, the total cost of cultivation for bajra was Rs. 49544.52. The gross income realized by the farmers was Rs. 37461.67. The net income from bajra cultivation was Rs. -12082.86. Thus the benefit cost ratio was found to be 1:0.76. The results indicated that, the total cost of cultivation for sorghum was Rs. 6593.64. The gross income realized by the farmers was Rs. 18278. The net income from sorghum cultivation was Rs. 11684.36. Thus the benefit cost ratio was found to be 1:2.77.

The results indicated that, the total cost of cultivation for green gram was Rs. 43774.34. The gross income realized by the farmers was Rs. 41990. The net income from green gram cultivation was Rs. -1784.34. Thus the benefit cost ratio was found to be 1:0.96. The results indicated that, the total cost of cultivation for onion was Rs. 31943.56. The gross income realized by the farmers was Rs. 132285.50. The net income from onion cultivation was Rs. 100341.94. Thus the benefit cost ratio was found to be 1:4.14. The results indicated that, the total cost of cultivation for Sunflower was Rs. 26042.92. The gross income realized by the farmers was Rs. 42306.47. The net income from Sunflower cultivation was Rs. 16263.55. Thus the benefit cost ratio was found to be 1:1.62.

The results indicated that, the total cost of cultivation for Cotton was Rs. 38511.39. The gross income realized by the farmers was Rs. 79607.03. The net income from Cotton cultivation was Rs. 41095.63. Thus the benefit cost ratio was found to be 1:2.07. The results indicated that, the total cost of cultivation for Banana was Rs. 89684.87. The gross income realized by the farmers was Rs. 247000. The net income from Banana cultivation was Rs. 157315.13. Thus the benefit cost ratio was found to be

1:2.75. The results indicated that, 18.60 per cent of the households opined that dry fodder was adequate, 11.63 per cent of the households opined that dry fodder was inadequate and 18.60 per cent of the households opined that green fodder was adequate.

The results indicated that, in landless farmers, the average income from wage was Rs. 27000. In marginal farmers the average income from service/salary was Rs.7384.62, wage was Rs. 30384.62, agriculture was Rs. 32015.38 and dairy farm was Rs. 5230.77. In small farmers the average income from business was Rs. 1000, wage was Rs. 21166.67, agriculture was Rs. 43470.83 and dairy farm was Rs. 1166.67. In semi medium farmers the average income from service/salary was Rs. 16272.73, wage was Rs. 22454.55, agriculture was Rs. 187236.36 and dairy farm was Rs.363.64. In medium farmers the average income from business was Rs. 6000 and agriculture was Rs. 375000. The results indicated that, in landless farmers, the average expenditure from wage was Rs. 25000, farm income was Rs.500 and goat farming was Rs.5000. In marginal farmers the average expenditure from wage was Rs.9090.91, agriculture was Rs.16307.69 and dairy farm was Rs.9333.33. In case of small farmers the average expenditure from business was Rs. 4000, wage was Rs. 11500, agriculture was Rs. 28727.27 and dairy farm was Rs. 2000. In case of semi medium farmers the average expenditure from service/salary was Rs.40500, wage was Rs. 8375, dairy farm was Rs.2000 and agriculture was Rs. 60090.91. In case of medium farmers the average expenditure from business was Rs.4000, agriculture was Rs. 50000 and goat farming was Rs. 2000.

The results indicated that, sampled households have grown 34 coconut trees in their field and also planted 1 coconut tree in their back yard. The results indicated that, households have planted 1 eucalyptus, 5 teak, 58 neem, 1 tarmind tree, 3 pongamia trees and 1 banyan tree in their field and also planted 2 neem tree in their back yard. The results indicate that, households have an average investment capacity of Rs. 4744.19 for land development, Rs. 441.86 in irrigation facility and 302.33 Rs.2714.29 for improved crop production. Marginal households have an average investment capacity of Rs. 6846.15 for land development, Rs. 769.23 for irrigation facility and Rs.384.62 for improved crop production. Small farmers have an average investment capacity of Rs. 3666.67 for land development, Rs. 83.33 in irrigation facility and Rs.666.67 for improved crop production. Semi medium farmers have an average investment capacity of Rs. 6454.55 for land development and Rs. 727.27 in irrigation facility.

The results indicated that, for land development, 31.11 per cent of the farmers were depend on government subsidy, 22.22 per cent were depend on loan from the bank. 4.44 per cent of the households were dependent on government subsidy and 8.89 per cent of the households were dependent on loan from the bank for irrigation facility. Similarly for improved crop production, 4.44 per cent of the households were dependent on government subsidy. The results indicated that, cotton, onion and sunflower crops were sold to the extent of 100 per cent. Bajra, banana, groundnut, maize and red gram were

sold to an extent 13.04 per cent, 90 per cent, 68.75 per cent, 99.77 per cent and 88.89 per cent respectively. The results indicated that, 2.33 percent of the households have sold their produce to agents/ traders, 16.28 per cent of the households have sold their produce to local/village merchant, 74.42 percent of the households sold their produce in regulated markets and 2.33 percent of the households sold their produce in cooperative marketing society. The results indicated that 18.60 per cent of the households have used cart as a mode of transport, 72.09 per cent of them have used tractor and 2.33 per cent have used bus as a mode of transport. The results indicated that, 34.88 per cent of the households have experienced the soil and water erosion problems i.e. 46.15 percent of marginal farmers, 33.33 per cent of small farmers and 45.45 per cent of semi medium farmers. The results indicated that, 65.12 per cent of the households have shown interest in soil testing including 92.31 per cent of marginal farmers, 58.33 per cent of the small farmers and 81.82 semi medium farmers.

The results indicated that, 100 percent used fire wood as a source of fuel. The results indicated that, piped supply was the source of drinking water for 90.70 per cent and 11.63 per cent of them were using bore well for drinking water. The results indicated that, electricity was the major source of light for 100 per cent of the households. The results indicated that, 46.51 per cent of the households possess sanitary toilet i.e. 100 per cent of landless, semi medium and medium farmers, 7.69 per cent of marginal and 8.33 per cent of small farmers had sanitary toilet facility. The results indicated that, 93.02 per cent of the sampled households possessed BPL card and 6.98 per cent of the sampled households does not possessed BPL card. The results indicated that, 60.47 per cent of the households participated in NREGA programme which included 50 per cent of the landless, 69.23 percent of the marginal, 50 per cent of the small, 63.64 per cent of the semi medium and 100 percent of the medium farmers.

The results indicated that, cereals, pulses, oilseeds, vegetables, fruits , milk, egg and meat were adequate for 100 per cent, 53.49 per cent, 51.16 per cent, 39.53 per cent, 58.14 per cent, 51.16 per cent, 48.84 per cent and 9.30 per cent respectively. The results indicated that, pulses, oilseed; vegetables, fruits, milk, egg and meat were inadequate for 46.51 per cent, 48.84 per cent, 60.47 per cent, 27.91 per cent, 23.26 per cent, 27.91 per cent and 6.98 per cent of the households respectively.

The results indicated that, Lower fertility status of the soil problem was experienced by 72.09 per cent of the households, and wild animal menace on farm field was experienced by 62.79 per cent of the households, frequent incidence of pest and diseases was experienced by 27.91 per cent of the farmers, inadequacy of irrigation water was experienced by 13.95 per cent of the households, high cost of Fertilizers and plant protection chemicals was experienced 44.19 per cent and high rate of interest on credit was experienced by 13.95 per cent of the farmers, low price for the agricultural commodities was experienced by 18.60 per cent of the farmers, lack of marketing

facilities in the area was experienced 16.28 per cent of the households, inadequate of extension services experienced by 11.63 per cent of the households, lack of transport for safe transport of the agricultural produce to the market was experienced by 34.88 per cent of the households, less rainfall was experienced by 51.16 per cent and of the farmers and Source of Agri-technology information(Newspaper/TV/Mobile) 11.63 per cent of the households.