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

## RAMPURA-2 (4D5B1P2c) MICROWATERSHED

**Sydhapur Hobli, Yadgir Taluk and District, Karnataka**

Karnataka Watershed Development Project – II

**SUJALA – III**

**World Bank funded Project**

**ICAR – NATIONAL BUREAU OF SOIL SURVEY AND LAND USE PLANNING**

ICAR - NBSS & LUP

**WATERSHED DEVELOPMENT DEPARTMENT**
**GOVT. OF KARNATAKA, BANGALORE**

## About ICAR - NBSS&LUP

The ICAR-National Bureau of Soil Survey and Land Use Planning (ICAR-NBSS&LUP), Nagpur, a premier Institute of the Indian Council of Agricultural Research (ICAR), was set up during 1976 with the objective to prepare soil resource maps at national, state and district levels and to provide research inputs in soil resource mapping and its applications, land evaluation, land use planning, land resource management, and database management using GIS for optimising land use on different kinds of soils in the country.

The Bureau has been engaged in carrying out soil resource survey, agro-ecological and soil degradation mapping at the country, state and district levels for qualitative assessment and monitoring the soil health towards viable land use planning. The research activities have resulted in identifying the soil potentials and problems, and the various applications of the soil surveys with the ultimate objective of sustainable agricultural development. The Bureau has the mandate to correlate and classify soils of the country and maintain a National Register of all the established soil series. The Institute is also imparting in-service training to staff of the soil survey agencies in the area of soil survey, land evaluation and soil survey interpretations for land use planning. The Bureau in collaboration with Panjab rao 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., B.A. Dhanorkar, S. Srinivas, M. Lalitha, K.V. Niranjana, R.S. Reddy and S.K. Singh (2019), "Land Resource Inventory and Socio-Economic Status of Farm Households for Watershed Planning and Development of Rampura-2 (4D5B1P2c) Microwatershed, Sydhapura Hobli, Yadgir Taluk and District, Karnataka", ICAR-NBSS&LUP Sujala MWS Publ 181, ICAR – NBSS & LUP, RC, Bangalore. P.115 & 30.

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

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

Nagpur
Date: 11.04.2019

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# PART-A

## LAND RESOURCE INVENTORY

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## *EXECUTIVE SUMMARY*

*The land resource inventory of Ramapura-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 the 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 577 ha in Yadgir taluk & district, Karnataka. The climate is semiarid and categorized as drought-prone with an average annual rainfall of 866 mm, of which about 652 mm is received during south-west monsoon, 138 mm during north-east and the remaining 76 mm during the rest of the year. An area of 549 ha in the microwatershed is covered by soils, 0.05 ha by rock outcrops and about 28 ha by others (habitation and water bodies). The salient findings from the land resource inventory are summarized briefly below.*

- *The soils belong to 12 soil series and 26 soil phases (management units) and 6 land use class.*
- *The length of crop growing period is about 120-150 days starting from 1$^{st}$ week of June to 4$^{th}$ week of October.*
- *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 250 m grid interval.*
- *Land suitability for growing 26 major agricultural and horticultural crops was assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area in the microwatershed is suitable for agriculture.*
- *About 59 per cent area of the microwatershed has soils that are moderately deep to very deep (75 - >150 cm) and 36 per cent soils are shallow to moderately shallow (25-75 cm).*
- *About 6 per cent area in the microwatershed has sandy soils, 26 per cent of loamy soils and 64 per cent clayey soils at the surface.*
- *About 63 per cent area in the microwatershed is non gravelly (<15%) and 32 per cent is gravelly (15-35%) at the surface.*
- *About 57 per cent area of the microwatershed is very high (>200 mm/m) in available water capacity, 2 per cent is medium (101-150 mm/m), 32 per cent area is low (51-100 mm/m) and 4 per cent area is very low (<50 mm/m) in available water capacity.*

- *Entire area in the microwatershed has very gently sloping (1-3% slope) lands.*
- *An area of about 76 per cent is moderately (e2) eroded and 19 per cent area is severely (e3) eroded.*
- *An area of about 2 per cent soils are neutral (pH 6.5-7.3) in soil reaction, 33 per cent soil are slightly to moderately alkaline (pH 7.3-8.4) and 60 per cent soils are strongly to very strongly alkaline (pH 8.4 - >9.0).*
- *The Electrical Conductivity (EC) of the soils in the entire area of the microwatershed is dominantly <2 $dsm^{-1}$ indicating that the soils are non-saline.*
- *About 3 per cent of the soils are low (<0.5%) in organic carbon, 44 per cent medium (0.5-0.75%) and 48 per cent high (>0.75).*
- *About 40 per cent area is low in available phosphorus, 50 per is medium (23-57 kg/ha) and 5 per cent is high (>57 kg/ha).*
- *About 70 per cent is medium (145-337 kg/ha) in available potassium and 25 per cent is high (>337 kg/ha).*
- *Available sulphur is low (<10 ppm) in an area of about 49 per cent, medium (10 -20 ppm) in 41 per cent and high in 5 per cent area of the microwatershed.*
- *Available boron is low (<0.5 ppm) in an area of about 20 per cent, medium (0.5-1.0 ppm) in 64 per cent and high in 11 per cent of the microwatershed.*
- *Available iron is sufficient (>4.5 ppm) in an area of 77 per cent and deficient in 18 per cent area of the microwatershed.*
- *Available manganese and copper are sufficient in entire area of the microwatershed.*
- *Available zinc is deficient (<0.6 ppm) in entire area of the microwatershed.*
- *The land suitability for 26 major crops grown in the microwatershed were assessed and the areas that are highly suitable (S1) and moderately suitable (S2) are given below. It is however to be noted that a given soil may be suitable for various crops but what specific crop to be grown may be decided by the farmer looking to his capacity to invest on various inputs, marketing infrastructure, market price and finally the demand and supply position.*

***Land suitability for various crops in the Microwatershed***

| ***Crop*** | ***Suitability Area in ha (%)*** | | | ***Crop*** | ***Suitability Area in ha (%)*** | |
|---|---|---|---|---|---|---|
| | ***Highly suitable (S1)*** | ***Moderately suitable (S2)*** | | | ***Highly suitable (S1)*** | ***Moderately suitable (S2)*** |
| *Sorghum* | - | *522(91)* | | *Sapota* | - | - |
| *Maize* | - | *183(32)* | | *Pomegranate* | - | *339(59)* |
| *Bajra* | - | *522(91)* | | *Musambi* | - | *339(59)* |
| *Groundnut* | - | *183(32)* | | *Lime* | - | *339(59)* |
| *Sunflower* | - | *339(59)* | | *Amla* | - | *522(91)* |
| *Redgram* | - | *339(59)* | | *Cashew* | - | - |
| *Bengal gram* | - | *522(91)* | | *Jackfruit* | - | - |
| *Cotton* | - | *522(91)* | | *Jamun* | - | *326(57)* |
| *Chilli* | - | *523(91)* | | *Custard apple* | - | *523(91)* |
| *Tomato* | - | *183(32)* | | *Tamarind* | - | *326(57)* |
| *Drumstick* | - | *339(59)* | | *Mulberry* | - | - |
| *Mango* | - | - | | *Marigold* | - | *523(91)* |
| *Guava* | - | - | | *Chrysanthemum* | - | *523(91)* |

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the 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 treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. This would help in not only supplementing the farm income but also provide fodder and fuel and generate lot of biomass which would help in maintaining an ecological balance and also contribute to mitigating the climate change.*

*Chapter 1*

# INTRODUCTION

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

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

In this critical juncture, the challenge before us is not only to increase the productivity per unit area which is steadily declining and showing a fatigue syndrome, but also to prevent or at least reduce the severity of degradation. If the situation is not reversed at the earliest, then the sustainability of the already fragile crop production system and the overall ecosystem will be badly affected in the state. The continued neglect and unscientific use of the resources for a long time has led to the situation observed at present in the state. It is a known fact and established beyond doubt by many studies in the past that the cause for all kinds of degradation is the neglect and irrational use of the land resources. Hence, there is an 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 the 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 has already been 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 Ramapura-2 microwatershed in Yadgir Taluk &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 Ramapura-2 microwatershed is located in the northern part of Karnataka in Yadgir Taluk &District, Karnataka State (Fig.2.1). It comprises parts of Balacheda, Ramapur, Daddala and Sydhapura villages. It lies between $16^0$ 33' and$16^0$ 34' North latitudes and $77^0$ 16' and $77^0$ 19' East longitudes covering an area of about 577 ha. It is about 37 km southeast of Yadgir town and is surrounded by Ramapura on the north, Balacheda on the east, Daddala on the southeast, Rachanalli on the south and Sydhapura village on the western side.

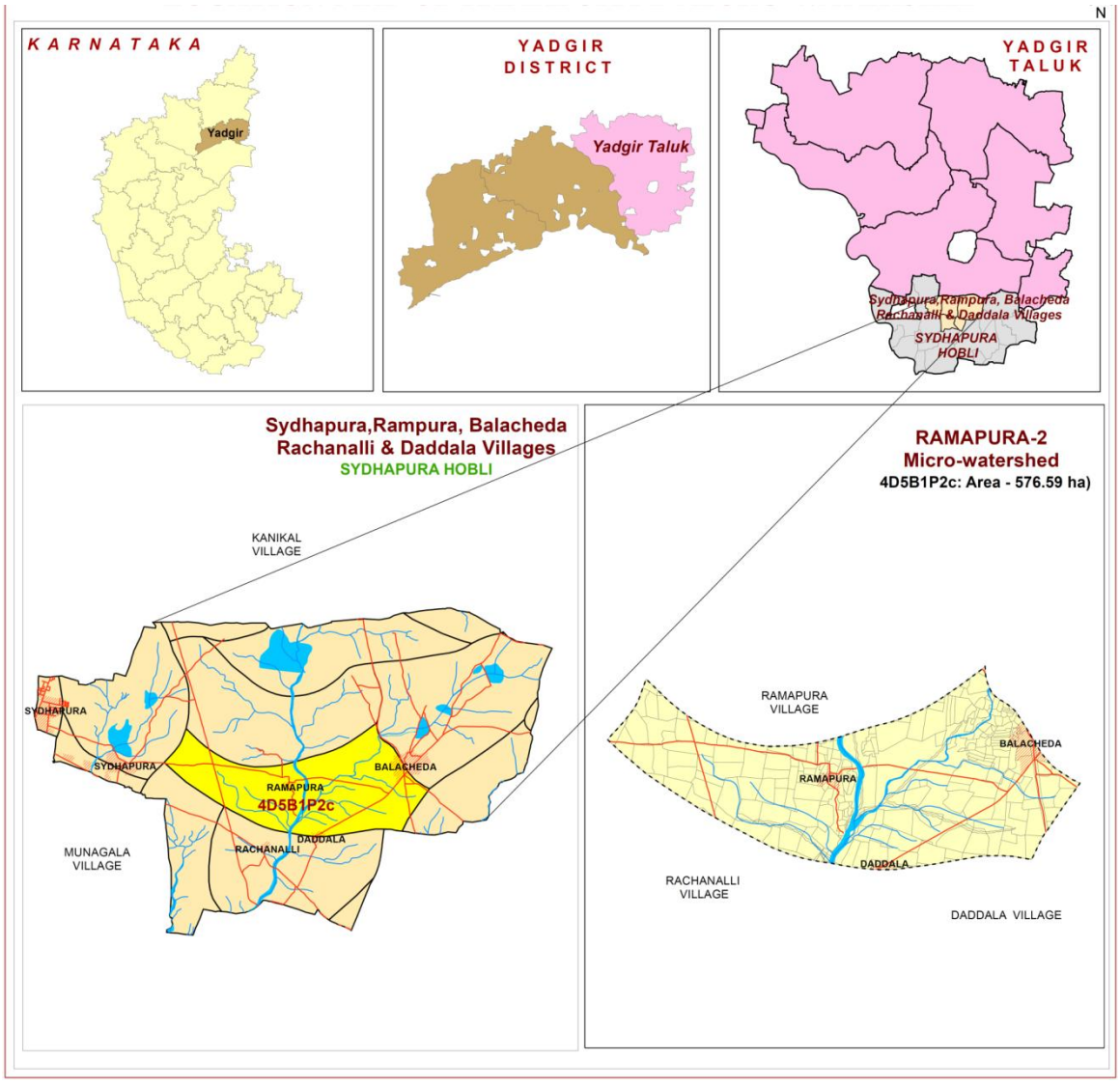



Fig.2.1 Location map of Ramapura-2 Microwatershed

## 2.2 Geology

Major rock formations observed in the microwatershed are granite gneiss and alluvium (Figs.2.2a 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 Ramapura-2microwatershed. The most widespread and characteristic development of alluvium in the watershed region lying between the rivers Krishna and Bhima is a wide belt, the underlying formation is gneiss and alluvial soils occur over gneiss, limestone and shale. 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 palaeo 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 area has been further subdivided into five landforms, *viz;* mounds/ridges, summits, side slopes and very gently sloping uplands, plains and valleys based on slope and its relief features. The elevation ranges from 366-379 m above MSL. The mounds and ridges are mostly covered by rock outcrops.

## 2.4 Drainage

The area is drained by several parallel streams like Bori, Amerja and Kanga which finally join the river Bhima along its course. Though, they are not perennial, during rainy season they carry large quantities of rain water. The microwatershed has only few small tanks which are not capable of storing the water that flows during the rainy season. Due to this, the ground water recharge is very much affected. This is reflected in the failure of many bore wells in the villages. If the available rain water is properly harnessed by constructing new 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 parallel to sub parallel and dendritic.

## 2.5 Climate

The Yadgir district lies in the northern plains of Karnataka and falls under semiarid tract of the state and is categorized as drought- prone with total annual rainfall of 866mm (Table 2.1). Of the total rainfall, maximum of 652 mm is received during the south–west monsoon period from June to September, the north-east monsoon from October to early December contributes about 138 mm and the remaining 76 mm during the rest of the year. The summer season starts during the middle of February and continues up to the first week of June. The period from December to the middle of February is the coldest season. December is the coldest month with mean daily maximum and minimum temperatures being $29.5^0$C and $10^0$C respectively. During peak summer, temperature shoots up to $45^0$C. Relative humidity varies from 26% in summer to 62% in winter. Rainfall distribution is shown in Figure 2.3. The average Potential Evapo-Transpiration (PET) is 141 mm and varies from a low of 81 mm in December to 199 mm in the month of May. The PET is always higher than precipitation in all the months except end of July to end of September. Generally, the Length of crop Growing Period (LGP) is 120-150 days and starts from $1^{st}$ week of June to $4^{th}$week of October.

**Table 2.1 Mean Monthly Rainfall, PET, 1/2 PET at Yadgir Taluk, Yadgir District**

| Sl.No. | Months | Rainfall | PET | 1/2 PET |
|---|---|---|---|---|
| 1 | January | 4.30 | 86.0 | 43.0 |
| 2 | February | 2.30 | 125.5 | 62.7 |
| 3 | March | 15.10 | 166.0 | 83.0 |
| 4 | April | 18.50 | 179.8 | 89.9 |
| 5 | May | 36.0 | 198.8 | 97.9 |
| 6 | June | 118.0 | 175.1 | 87.5 |
| 7 | July | 171.80 | 156.3 | 78.1 |
| 8 | August | 182.9 | 150.3 | 75.1 |
| 9 | September | 179.7 | 142.0 | 71.0 |
| 10 | October | 105.3 | 138.5 | 69.2 |
| 11 | November | 26.4 | 97.60 | 48.6 |
| 12 | December | 6.0 | 80.90 | 40.4 |
| **Total** | | **866.3** | | |

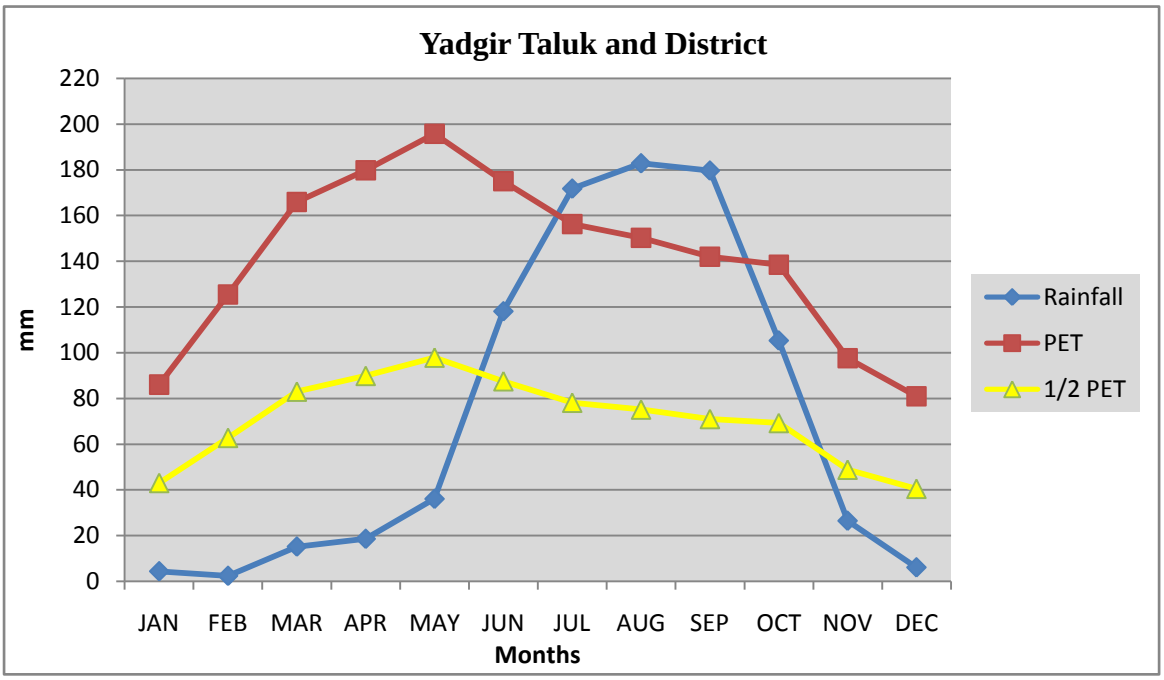



Fig 2.3 Rainfall distribution in Yadgir Taluk, Yadgir District

## 2.6 Natural Vegetation

The natural vegetation is sparse comprising few tree species, shrubs and herbs. The mounds, ridges and boulders occupy very sizeable area which is 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.

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 that eventually result in the heavy siltation of tanks and reservoirs in the microwatershed.

## 2.7 Land Utilization

About 72 per cent area (Table 2.2) in Yadgir district is cultivated at present. An area of about 2 per cent is permanently under pasture, 20 per cent under current fallows and 6 per cent under non-agricultural land and 5 per cent under currently barren. Forests occupy an area of about 7 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and bouldery areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, cotton, sunflower, groundnut, red gram, mango, pomegranate, marigold and sapota. The cropping intensity is 120 per cent in the district. 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 Ramapura-2 microwatershed is presented in Fig. 2.4. The different crops and cropping systems adopted in the microwatershed is presented in the Figures 2.5a & b. simultaneously, enumeration of wells (bore wells and open wells) and other conservation structures in the microwatershed was made and their location in different survey numbers is marked on the cadastral map is presented in Fig. 2.6.

**Table 2.2 Land Utilization in Yadgir District**

| Sl. No. | Agricultural land use | Area ( ha) | Per cent |
|---|---|---|---|
| 1. | Total geographical area | 516088 | - |
| 2. | Total cultivated area | 373617 | 72.4 |
| 3. | Area sown more than once | 74081 | 14.3 |
| 4. | Cropping intensity | - | 119.8 |
| 5. | Trees and grooves | 737 | 0.14 |
| 6. | Forest | 33773 | 6.54 |
| 7. | Cultivable wasteland | 2385 | 0.46 |
| 8. | Permanent Pasture land | 11755 | 2.28 |
| 9. | Barren land | 27954 | 5.41 |
| 10. | Non- Agriculture land | 29623 | 5.73 |
| 11. | Current Fallows | 105212 | 20.4 |

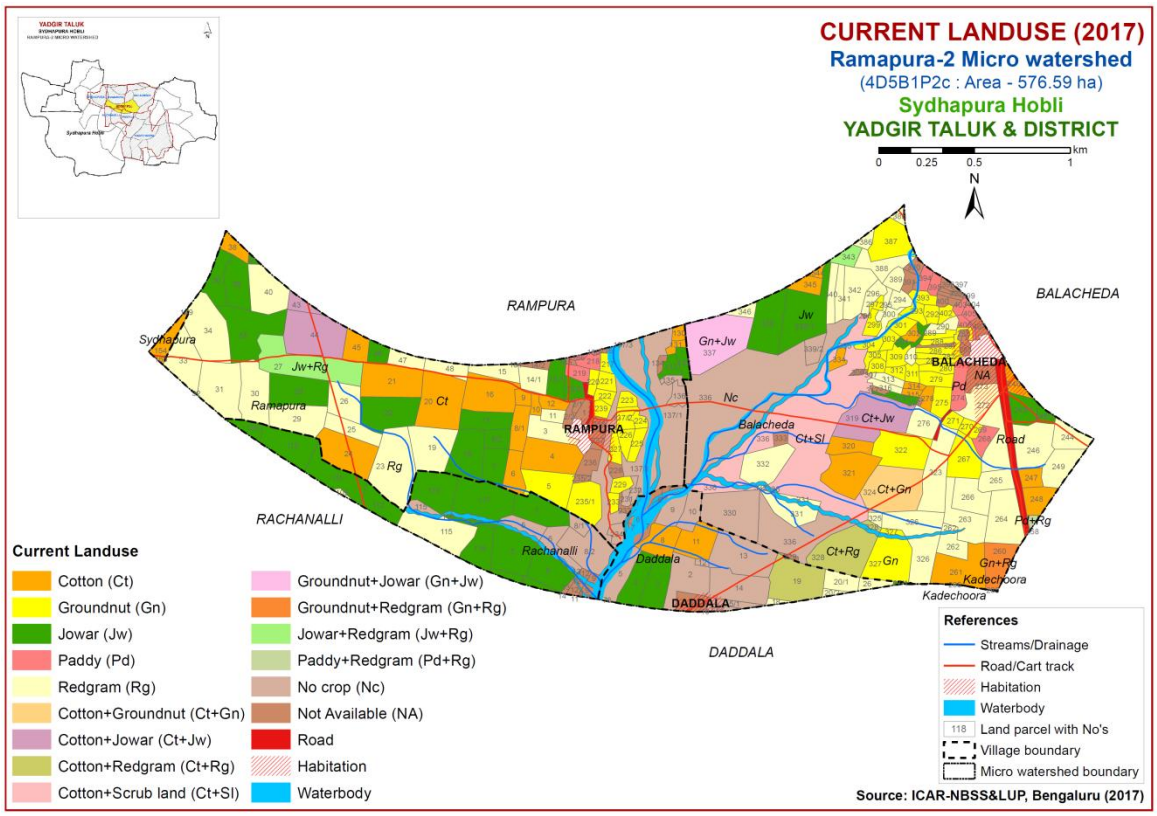



Fig.2.4 Current Land Use map of Ramapura-2 Microwatershed


Fig 2.5a. Different Crops and Cropping Systems in Ramapura-2 Microwatershed

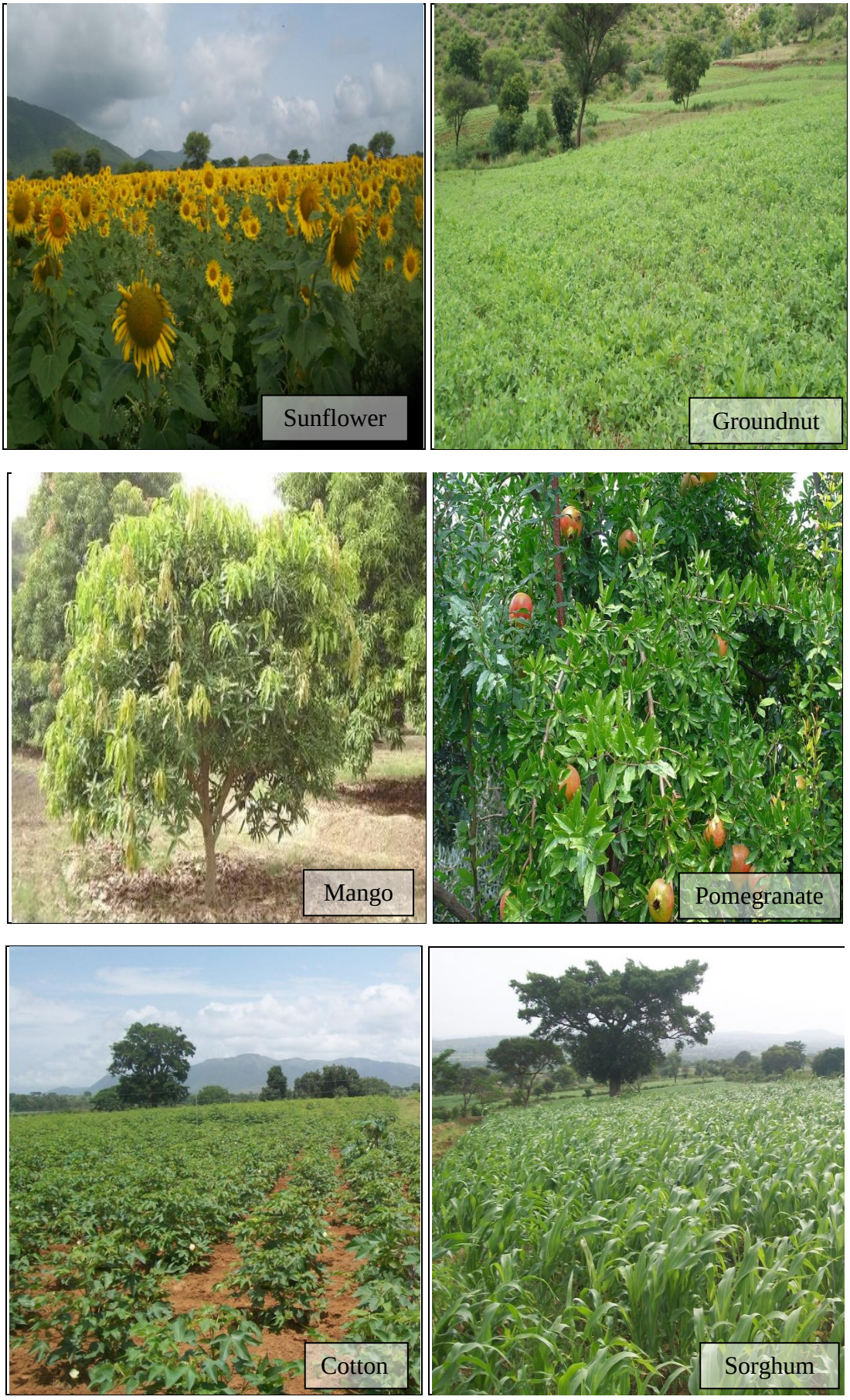


Fig 2.5b. Different Crops and Cropping Systems in Ramapura-2 Microwatershed

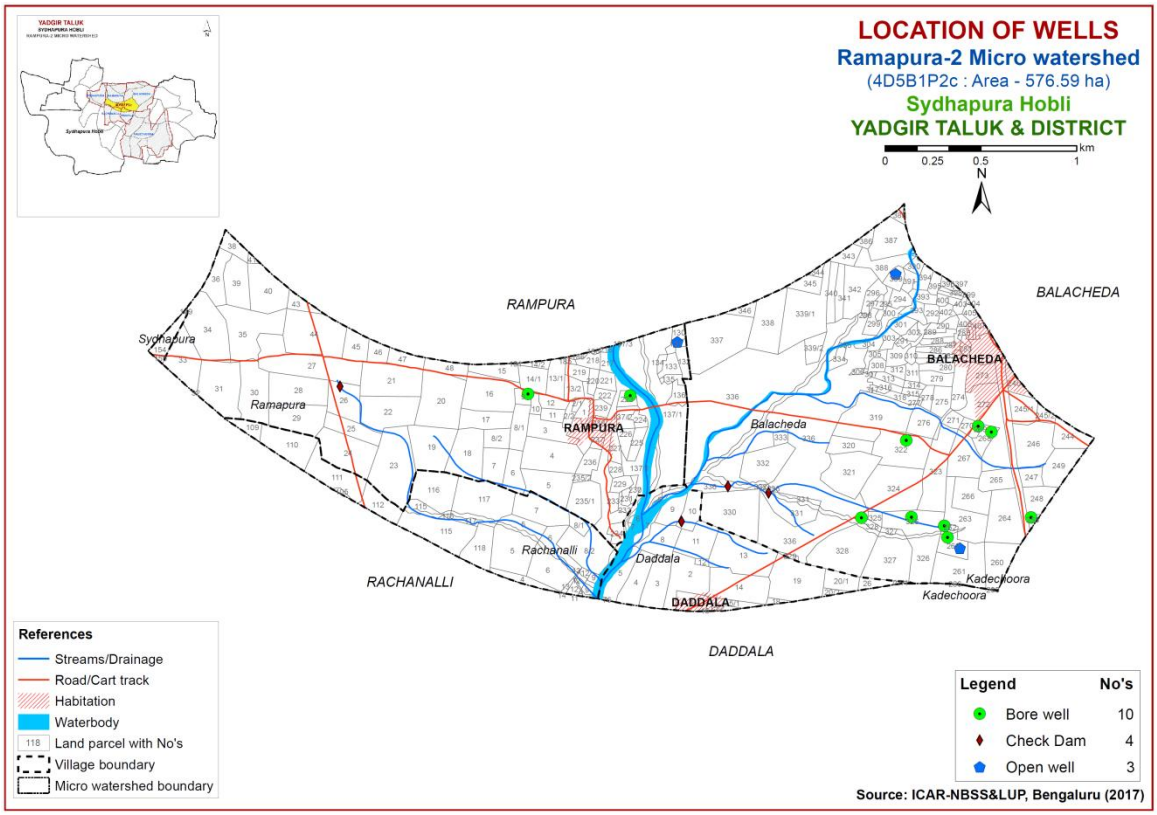



Fig 2.6. Location of Wells map of Ramapura-2 Microwatershed

*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 to a given level of management. This was achieved in Ramapura-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 of the land, 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 the area extent and their geographic distribution on the microwatershed cadastral map. The detailed survey at 1:7920 scale was carried out in an area of 577 ha. 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 as a base supplied by 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 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 also used for initial traversing, identification of geology 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 (FCCs) of Cartosat-I and LISS-IV merged satellite data covering 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 and granite gneiss landscape and alluvial landscapes. It was divided into five landforms, *viz;* ridges and mounds, gently and very gently sloping uplands and lowlands based on slope and image characteristics. 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) |
| | G24 | | Valleys/ lowlands |
| | | G241 | Valleys, pink tones |
| | | G242 | Valleys gray mixed with pink tones |

**DSe – Alluvial Landscape**

**DSe1 – Summit**

DSe11 –

DSe12 –

**DSe2 – Very genetly sloping**

DSe21 – Very gently sloping, dark gray tone

DSe22 – Very gently sloping, medium gray tone

DSe23 – Very gently sloping, yellowish grey tone

DSe24 – Very gently sloping, whitish grey tone

DSe25 – Very gently sloping, whitish/ eroded/ calcareous tone

DSe 26- Very gently sloping, medium pink

**DSe3 – Valley/ Lowland**

DSe31 – Whitish gray/Calcareous

DSe32 – Gray with pink patches

DSe 33 – Medium gray tone

DSe 34 – Lightish gray tone

DSe 35 – Dark gray tone

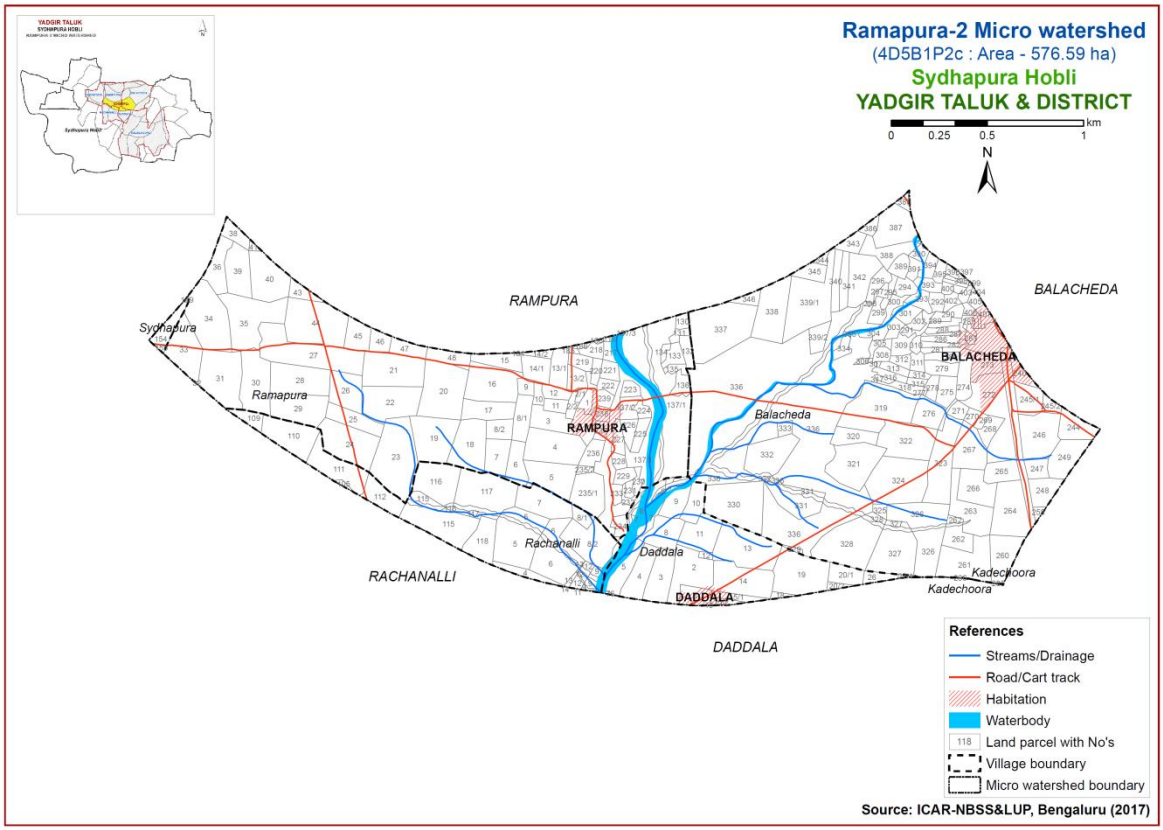



Fig 3.1 Scanned and Digitized Cadastral map of Ramapura-2 Microwatershed

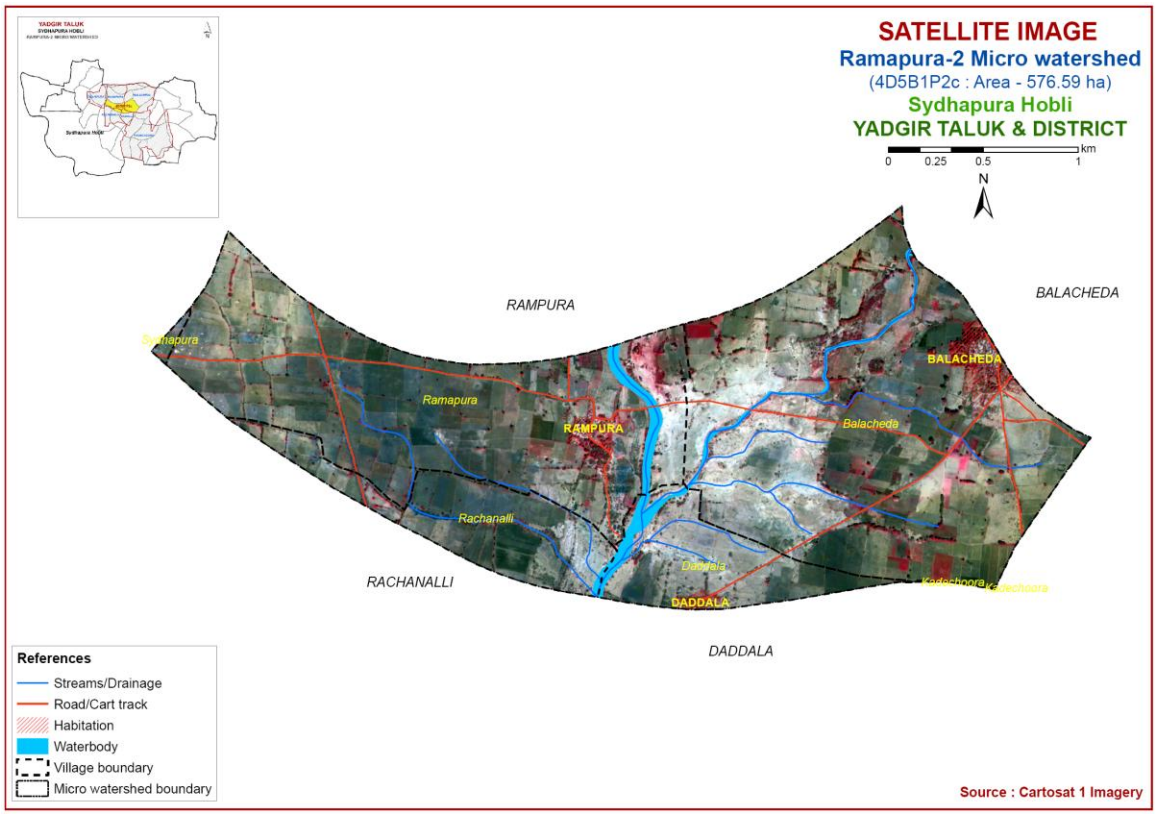



Fig.3.2 Satellite Image of Ramapura-2 Microwatershed

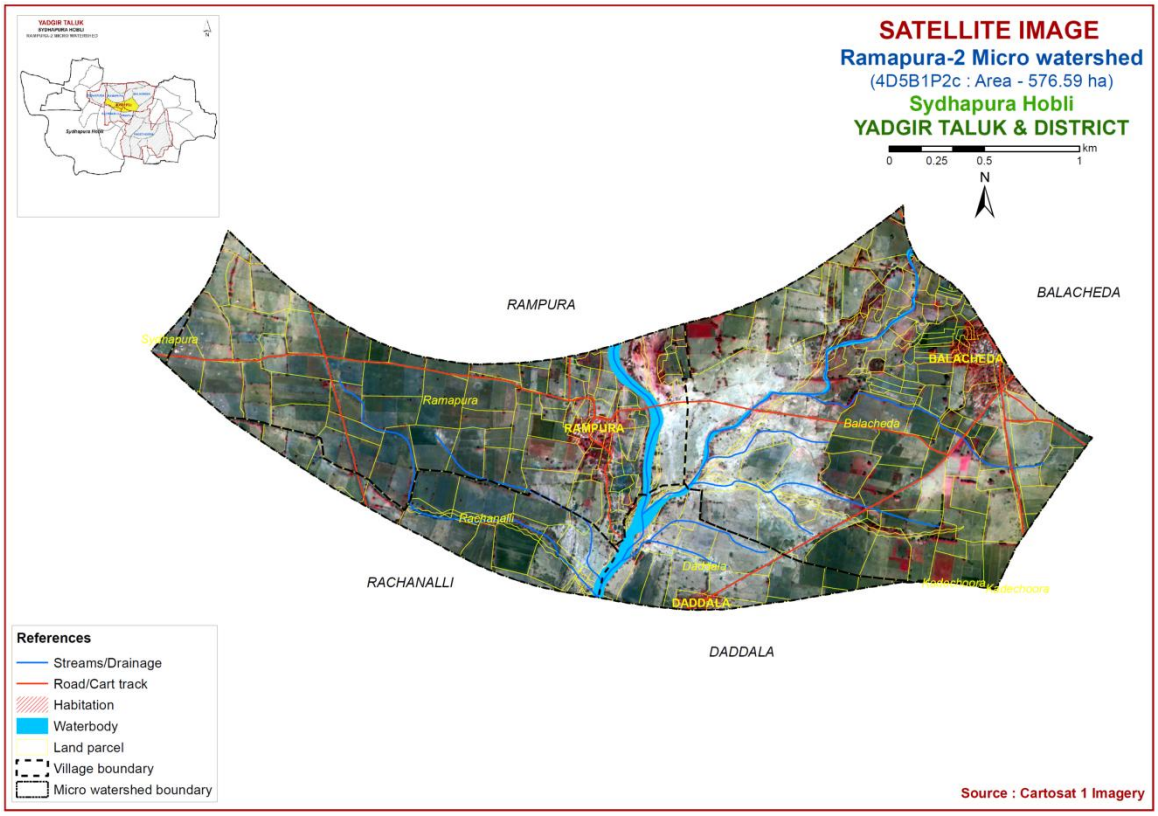



Fig.3.3Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Ramapura-2 Microwatershed

### 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, *nalas*, 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 valleys 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).

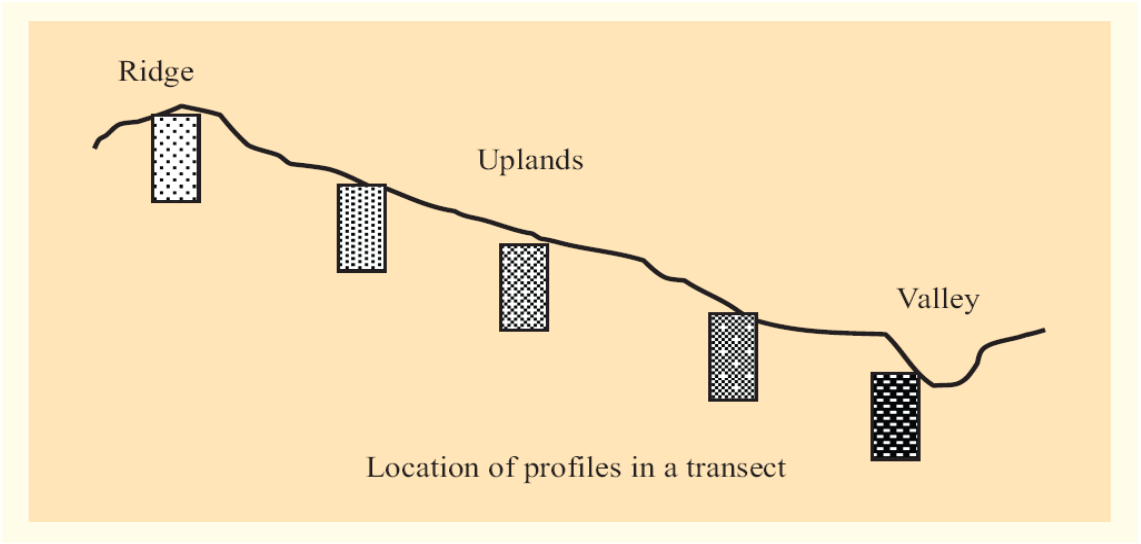



Fig: 3.4. Location of profiles in a transect

In the selected transect, soil profiles were located (Fig. 3.4) 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.

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, calcareousness, amount and nature of gravel present, 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, 12 soil series were identified in the Ramapura-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** | **Calcareous-ness** |
| **Soil of Granite and Granite Gneiss Landscape** | | | | | | | |
| 1 | BDL (Badiyala) | 25-50 | 7.5YR2.5/3,2.5/2,3/3 10YR 3/4,4/3 | sl | - | Ap-Aw | e |
| 2 | HLG (Halagera) | 50-75 | 10YR 3/2,4/4 7.5YR 4/3,4/2 | scl | - | Ap-Bw | es |
| 3 | YLR (Yalleri) | 50-75 | 2.5YR 3/4,4/4, 5YR 3/4, 7.5YR 4/4 | c | 15-35 | Ap-Bt | - |
| 4 | ANR (Anur) | 100-150 | 10YR 4/3,4/1 | c | - | Ap-Bw | es |
| 5 | TMK (Thunakur) | >150 | 10YR 3/1,3/2,3/3,4/3 | c | - | Ap-Bw | e |
| **Soil of Alluvial Landscape** | | | | | | | |
| 6 | GDL (Gudalagunta) | 25-50 | 10YR3/1 | c | - | Ap-$A_{11}$-$A_{12}$ | es |
| 7 | KYT (Kyathanala) | 25-50 | 7.5YR 4/4,5/6, 5YR 3/3,4/4 | scl | - | Ap-A2-C | - |
| 8 | RMP (Ramapur) | 50-75 | 10YR 3/1,5/4 | scl | - | Ap-Bt | - |
| 9 | RHN (Rachanalli) | 75-100 | 10YR 3/2,4/3 | scl | - | Ap-Bw | e |
| 10 | KDR (Kudlura) | 100-150 | 10YR 3/1,3/2,4/1,5/2 | c | - | Ap-Bw | es |
| 11 | SWR (Sowrashtrahalli) | 100-150 | 10YR4/1,3/2,3/1 | c | - | Ap-Bss | es |
| 12 | HGN (Hegganakera) | >150 | 10YR4/2,4/1,3/1,4/1 | c | - | Ap-BA-Bss | e |

### 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 profile pits, few minipits and a few auger bores representing different landforms occurring in the microwatershed were studied. In addition to the profile study, spot observations in the form of minipits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map.

The soil map shows the geographic distribution of 26 mapping units representing 12soil 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 26soilphases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one phase will have similar management needs and have to be treated accordingly.

### 3.5 Land Management Units (LMU's)

The26 soil phases identified and mapped in the microwatershed were grouped into 6 Land Management Units (LMU's) for the purpose of preparing a Proposed Crop Plan for sustained development of the microwatershed. The database (soil phases) generated under LRI was utilized for identifying Land Management Units (LMU's) based on the management needs. One or more than one soil site characteristic having influence on the management have been choosen for identification and delineation of LMUs. For Ramapura-2 microwatershed, five soil and site characteristics, namely soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The Land Management Units are expected to behave similarly for a given level of management.

### 3.6 Laboratory Characterization

Soil samples for each soil 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 from farmer's fields (56samples) for fertility status (major and micronutrients) at 250 m grid interval in the year 2017were 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 by using Kriging method for the microwatershed.

**Table 3.2 Soil map unit description of Ramapura-2 Microwatershed**

| Soil Map unit No. | Soil Series | Soil Phase | Mapping Unit Description | Area in ha (%) |
|---|---|---|---|---|
| **Soils of Granite Gneiss Landscape** | | | | |
| | BDL | Badiyala soils are shallow (25-50 cm), well drained, have dark brown to very dark brown and dark yellowish brown, slightly calcareous sandy loam soils occurring on very gently to gently sloping uplands under cultivation | | **4 (0.74)** |
| 5 | | BDLiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 4 (0.74) |
| | HLG | Halagera soils are moderately shallow (50-75 cm), well drained, have dark brown to dark yellowish brown and dark grayish brown, calcareous sandy clay loam soils occurring on very gently sloping uplands under cultivation | | **107 (18.64** |
| 15 | | HLGbB3 | Loamy sand surface, slope 1-3%, severe erosion | 13 (2.2) |
| 16 | | HLGcB2 | Sandy loam surface, slope 1-3%, moderate erosion | 27 (4.75) |
| 17 | | HLGiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 9 (1.56) |
| 18 | | HLGiB2g1 | Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 32 (5.54) |
| 19 | | HLGiB3g1 | Sandy clay surface, slope 1-3%, severe erosion, gravelly (15-35%) | 26 (4.59) |
| | YLR | Yalleri soils are moderately shallow (50-75 cm), well drained, have brown to reddish brown and dark reddish brown, gravelly clay red soils occurring on very gently to gently sloping uplands under cultivation | | **76 (13.25** |
| 27 | | YLRbB2 | Loamy sand surface, slope 1-3%, moderate erosion | 8 (1.33) |
| 29 | | YLRcB2g1 | Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 62 (10.8) |
| 31 | | YLRiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 6 (1.12) |
| | ANR | Anur soils are deep (100-150 cm), moderately well drained, have dark gray to brown, calcareous sodic clay alluvial soils occurring on very gently sloping uplands under cultivation | | **91 (15.8)** |
| 55 | | ANRiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 40 (6.88) |
| 56 | | ANRiB3g1 | Sandy clay surface, slope 1-3%, severe erosion, gravelly (15-35%) | 51(8.92) |
| **Soil of Alluvial Landscape** | | | | |
| | GDL | Gudalagunta soils are shallow (25-50 cm), well drained, have very dark gray, calcareous sodic clay alluvial soils occurring on very gently sloping plains under cultivation | | **5 (0.94)** |
| 67 | | GDLcB3 | Sandy loam surface, slope 1-3%, severe erosion | 5 (0.94) |
| | KYT | Kyathanala soils are shallow (25-50 cm), well drained, have brown to strong brown and reddish to dark reddish brown, sandy clay loam alluvial soils occurring on very gently sloping plains under cultivation | | **16 (2.7)** |
| 68 | | KYTcB2 | Sandy loam surface, slope 1-3%, moderate | 16 (2.7) |

| | | | | |
|---|---|---|---|---|
| | | | erosion | |
| | RMP | Rampur soils are moderately shallow (50-75 cm), well drained, have yellowish brown to very dark gray, sandy clay loam alluvial soils occurring on very gently sloping plains under cultivation | | **0 (0.03)** |
| 70 | | RMPcB2 | Sandy loam surface, slope 1-3%, moderate erosion | 0 (0.03) |
| | RHN | Rachanalli soils are moderately deep (75-100 cm), well drained, have brown to very dark grayish brown, slightly calcareous sodic sandy clay loam alluvial soils occurring on very gently sloping plains under cultivation | | **13 (2.28)** |
| 77 | | RHNcB2 | Sandy loam surface, slope 1-3%, moderate erosion | 10 (1.81) |
| 79 | | RHNmB2 | Clay surface, slope 1-3%, moderate erosion | 3 (0.47) |
| | KDR | Kudlura soils are deep (100-150 cm), moderately well drained, have dark gray to very dark grayish brown, calcareous sodic alluvial clay soils occurring on nearly level to very gently sloping plains under cultivation | | **58 (9.75)** |
| 83 | | KDRbB2g1 | Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%) | 12 (2.06) |
| 84 | | KDRcB2 | Sandy loam surface, slope 1-3%, moderate erosion | 24 (4.1) |
| 87 | | KDRiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 3 (0.56) |
| 88 | | KDRiB3 | Sandy clay surface, slope 1-3%, severe erosion | 13 (2.34) |
| 89 | | KDRmB2 | Clay surface, slope 1-3%, moderate erosion | 4 (0.69) |
| | SWR | Sowrashtrahalli soils are deep (100-150 cm), moderately well drained, have dark gray to very dark grayish brown, calcareous black cracking alluvial clay soils occurring on very gently sloping plains under cultivation | | **124 (21.52)** |
| 91 | | SWRmB2 | Clay surface, slope 1-3%, moderate erosion | 124 (21.52) |
| | HGN | Hegganakera soils are very deep (>150 cm), moderately well drained, have dark gray to very dark grayish brown and brown, slightly calcareous black cracking clay soils occurring on very gently sloping plains under cultivation | | **27 (4.6)** |
| 92 | | HGNcB2 | Sandy loam surface, slope 1-3%, moderate erosion | 5 (0.92) |
| 93 | | HGNiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 17 (2.88) |
| 95 | | HGNmB2 | Clay surface, slope 1-3%, moderate erosion | 5 (0.8) |
| **Low land soils** | | | | |
| | TMK | Thumakur soils are very deep (>150 cm), moderately well drained, have brown to very dark grayish brown, slightly calcareous sodic clay black soils occurring on nearly level to very gently sloping lowlands under cultivation | | **28 (4.94)** |
| 104 | | TMKiB2 | Sandy clay surface, slope 1-3%, moderate erosion | 28 (4.94) |
| 999 | Rock outcrops | Both massive and bouldery | | 0.05(0.01) |
| 1000 | | Others | Habitation and water bodies | 28(4.8) |

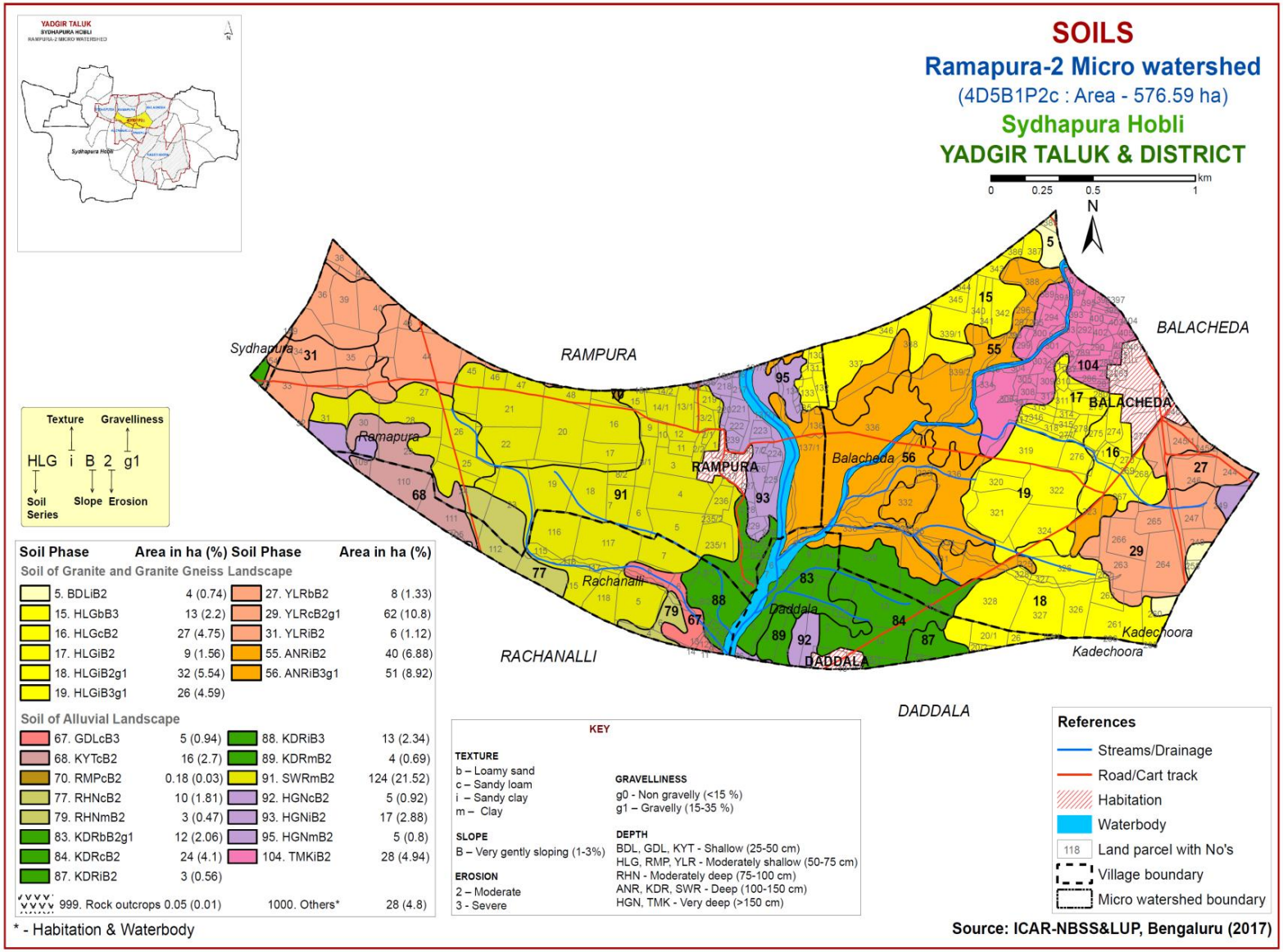



Fig 3.5 Soil Phase or Management Units- Ramapura-2 Microwatershed

*Chapter 4*

# THE SOILS

Detailed information pertaining to the nature, extent and their distribution of different kinds of soils occurring in Ramapura-2 microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscapes based on geology. In all, 12 soil series are identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. In the granite gneiss landscape, it is by parent material, relief and climate and in alluvial landscape, it is by parent material, climate and time.

A brief description of each of the 12 soil series identified followed by 26 soil phases (management units) mapped are furnished below. The physical and chemical characteristics of soil series identified in Ramapura-2 microwatershed are given in Table 4.1. The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

## 4.1 Soils of granite gneiss landscape

In this landscape,5soil series are identified and mapped. Of these, HLG series occupies maximum area of 107ha (19%) followed by ANR91 ha (16%),YLR76 ha (13%),TMK 28 (5%) andBDL4 ha (1%).Brief description of each series identified and number of soil phases mapped is given below.

**4.1.1 Badiyala (BDL) Series:** Badiyala soils are shallow (25-50 cm), well drained, have very dark brown, dark yellow brown and dark brown, slightly calcareous sandy loam soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Badiyala series has been classified as a member of the coarse-loamy, mixed, isohyperthermic family of Fluventic Haplustepts.

The thickness of the solum ranges from 28 to 50 cm. The thickness of A horizon ranges from 4 to 12 cm. Its colour is in 10YR hue with value 3 to 4 and chroma 3 to 4. The texture is loamy sand, sandy clay loam and sandy clay. The thickness of B horizon ranges from 27 to 45 cm. Its colour is in 10 YR and 7.5 YR hue with value 2 to 4 and chroma 3 to 4. Its texture is sandy loam to sandy clay loam and is slightly calacreous. The available water capacity is very low (<50mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Badiyala (BDL) Series

**4.1.2Halagera (HLG) Series:** Halagera soils are moderately shallow (50-75 cm), well drained, have very dark grayish brown to dark yellowish brown, calcareous sandy clay loam soils. They are developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Halagera series has been classified as a member of the fine-loamy, mixed (calcareous),isohyperthermic family of Typic Haplustepts.

The thickness of the solum ranges from 51 to 75 cm. The thickness of A horizon ranges from 9 to 15 cm. Its colour is in 7.5 YR and 10 YR hue with value 3 to 4and chroma 2 to 4. The texture is loamy sand to sandy clay loam. The thickness of B horizon ranges from 44 to 66 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 to 4 and chroma 2 to 3. Its texture varies from sandy clay loam to sandy clay and is calcareous. The available water capacity is low (51-100 mm/m).Five phases were identified and mapped.

Landscape and Soil Profile characteristics of Halagera (HLG) Series

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

The thickness of the solum ranges from 50 to 74 cm. The thickness of A horizon ranges from 10 to 13 cm. Its colour is in 7.5 YR and 5 YR hue with value and chroma 2 to 4. The texture is sandy loam, loamy sand, and sandy clay loam. The thickness of B horizon ranges from 45 to 64 cm. Its colour is in 10 YR, 7.5 YR and 5 YR hue with value 2 to 4 and chroma 2 to 4. Its texture is clay with gravel content of 15-35 per cent. The available water capacity is low (51-100 mm/m).Three phases were identified and mapped.

Landscape and Soil Profile characteristics of Yalleri (YLR) Series

**4.1.4 Anur (ANR) Series:** Anur soils are deep (100-150 cm), moderately well drained, have dark gray to dark brown, calcareous sodic clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Anur series has been classified as a member of the fine, mixed (calcareous), isohyperthermic family of Typic Haplustepts.

The thickness of the solum ranges from 102 to 148 cm. The thickness of A-horizon ranges from 9 to 17 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 2 to 4. The texture ranges from loamy sand to sandy clay loam and sandy clay and are calcareous. The thickness of B horizon ranges from 102 to 135 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 6. Texture is sandy clay loam to sandy clay and clay and is calcareous sodic soils. The available water capacity is very high (>200 mm/m).Two phases were identified and mapped.


Landscape and Soil Profile characteristics of Anur (ANR) Series

**4.1.5Thumakur (TMK) Series:** Thumakur soils are very deep (>150 cm), moderately well drained, have very dark gray to dark brown, slightly calcareous sodic clay soils. They are developed from weathered granite gneiss and occur on nearly level to very gently sloping low lands under cultivation. The Thumakur series has been classified as a member of the fine, mixed, isohyperthermicfamily of Typic Haplustepts.

The thickness of the solum ranges from 150-200cm. The thickness of A horizon ranges from 7 to 14 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 3. Texture varies from sandy loam to sandy clay and clay. The thickness of B horizon is>150 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 3. Texture varies from sandy clay to clay and is slightly calcareous sodic soils. The available water capacity is very high (>200 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Thumakur (TMK) Series

**4.2 Soils of Alluvial Landscape**

In this landscape, 7soil series are identified and mapped. Of these, HGN series occupies maximum area of 101 ha (19%) followed by RMP 50 ha (9%), MYP 34 ha (6%) and SWR 12 ha (2%). The other series occupy minor area in the microwatershed. Brief description of each series identified and number of soil phases mapped is given below.

**4.2.1 Gudalagunta (GDL) Series:** Gudalagunta soils are shallow (25-50 cm), well drained, have very dark gray, calcareous sodic clay soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Gudalagunta series has been classified as a member of the clayey, mixed, (calcareous), isohyperthermic family of Paralithic Ustorthents.

The thickness of the soil ranges from 26 to 49 cm. The thickness of A horizon ranges from 6 to 13 cm. Its colour is in 10YR hue with value 3 to 4 and chroma 1 to 3. The texture is sandy clay. The thickness of subsurface horizon range from 22 to 42 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. Its texture is clay loam to clay and is calcareous sodic soils. The available water capacity is very low (<50 mm/m). Only one phase was identified and mapped.


Landscape and Soil Profile characteristics of Gudalagunta (GDL) Series

**4.2.2 Kyathanala (KYT) Series:** Kyathanala soils are shallow (25-50 cm), well drained, have dark brown to strong brown and dark reddish brown sandy clay loam soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Kyathanala series has been classified as a member of the loamy, mixed, isohyperthermic family of Paralithic Ustorthents.

The thickness of the solil ranges from 25 to 49 cm. The thickness of A horizon ranges from 5 to 11 cm. Its colour is in 5YR hue with value and chroma of 3 to 4. The texture is sandy clay. The thickness of subsurface horizon range from 20 to 44 cm. Its colour is in 5 YR and 7.5 YR hue with value 3 to 4 and chroma 4 to 6. Its texture is sandy

loam to sandy clay loam and sandy clay. The available water capacity is very low (<50 mm/m). Only one phase was identified and mapped.


Landscape and Soil Profile characteristics of Kyathanala (KYT) Series

**4.2.3 Rampur (RMP) Series:** Rampur soils are moderately shallow (50-75 cm), well drained, have very dark to yellowish brown, sandy clay loam soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Rampur series has been classified as a member of the fine-loamy, mixed, isohyperthermic family of Typic Haplustalfs.


Landscape and Soil Profile characteristics of Rampur (RMP) Series

The thickness of the solum ranges from 53 to 75 cm. The thickness of A horizon ranges from 6 to 12 cm. Its colour is in 7. 5 YR and 10 YR hue with value 4 to 5 and chroma 3 to 6. The texture is sandy loam to sandy clay loam. The thickness of B horizon ranges from 48 to 65 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 to 5 and

chroma 1 to 6. Its texture is sandy clay loam to sandy clay. The available water capacity is medium (101-150 mm/m). Only one phase was identified and mapped.

**4.2.4 Rachanalli (RHN) Series:** Rachanalli soils are moderately deep (75-100 cm), well drained, have very dark grayish brown to dark brown, slightly calcareous sodic sandy clay loam soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Rachanalli series has been classified as a member of the fine-loamy, mixed, isohyperthermicfamily of Typic Haplustepts.

The thickness of the solum ranges from 76 to 100 cm. The thickness of A horizon ranges from 6 to 13 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 2 to 4. Its texture varies from sandy loam to sandy clay loam and sandy clay. The thickness of B horizon ranges from 66 to 92 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 1 to 3. Its texture varies from sandy loam to sandy clay loam and is slightly calcareous sodic soils. The available water capacity is medium (101-150 mm/m).Two phases were identified and mapped.

Landscape and Soil Profile characteristics of Rachanalli (RHN) Series

**4.2.5 Kudlura (KDR) Series:**Kudlura soils are deep (100-150 cm), moderately well drained, have very dark gray to grayish brown, calcareous sodic cracking clay soils. They have developed from alluvium and occur on nearly level to very gently sloping plains under cultivation. The Kudlura series has been classified as a member of the fine, mixed, (calcareous), isohyperthermic family of Fluventic Haplustepts.

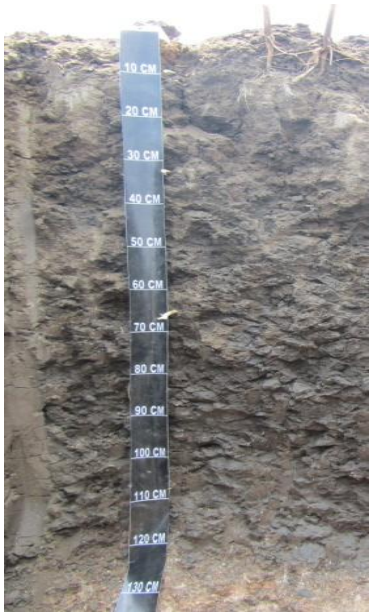
The thickness of the solum ranges from 110 to 149 cm. The thickness of A horizon ranges from 6 to 22 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. The texture ranges from sandy loam, sandy clay loam, sandy clay and clay. The thickness of B horizon ranges from 115 to 143 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 3. Texture is sandy clay loam, sandy clay to clay and is calcareous

sodic soils. The available water capacity is very high (>200 mm/m). Five phases were identified and mapped.

Landscape and Soil Profile characteristics of Kudlura (KDR)Series

**4.2.6Sowrashtrahalli (SWR) Series:** Sowrashtrahalli soils are deep (100-150 cm), moderately well drained, have very dark gray to dark gray, calcareous cracking clay soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Sowrashtrahalli series has been classified as a member of the fine, smectitic (calcareous), isohyperthermic family of Typic Haplusterts.

The thickness of the solum ranges from 107 to 150 cm. The thickness of A horizon ranges from 7 to 13 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 2. The texture varies from sandy clay to clay. The thickness of B horizon ranges from 104 to 142 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 2. The texture is clay and is calcareous. The available water capacity is very high (>200 mm/m).Only one phase was identified and mapped.


Landscape and Soil Profile characteristics of Sowrashtrahalli (SWR) Series

**4.2.7Hegganakera (HGN) Series:** Hegganakera soils are very deep (>150 cm), moderately well drained, have very dark gray to dark grayish brown, slightly calcareous cracking clay soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Hegganakera series has been classified as a member of the fine, smectitic,isohyperthermic family of Typic Haplusterts.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 7 to 9 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 3 with clay texture. The thickness of B horizon ranges from 152 to 175 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 3. Its texture is clay and is slightly calcareous. The available water capacity is very high (>200 mm/m).Three phases were identified and mapped.


Landscape and Soil Profile characteristics of Hegganakera (HGN) Series

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

**Soil Series:** Badiyala **(**BDL) **Pedon:** R-5

**Location:** $16^0$37'10.0"N $77^0$20'21.5", Gudalagunta village, Balichakra hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Coarse-loamy, mixed, isohyperthermic Fluventic Haplustepts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-12 | Ap | 87.13 | 7.04 | 5.83 | 10.03 | 24.32 | 23.61 | 23.51 | 5.67 | <15 | ls | 6.27 | 2.44 |
| 12-28 | Bw1 | 64.63 | 13.30 | 22.07 | 6.74 | 13.07 | 22.30 | 17.01 | 5.50 | <15 | scl | 16.34 | 7.83 |
| 28-52 | BC | 73.11 | 12.02 | 14.87 | 3.93 | 16.03 | 26.89 | 18.41 | 7.86 | <15 | sl | 12.94 | 5.47 |

| Depth (cm) | pH (1:2.5) | | | E.C. (1:2.5) | O.C. | $CaCO_3$ | Exchangeable bases | | | | | CEC | CEC/ Clay | Base saturation | ESP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ca | Mg | K | Na | Total | | | | |
| | Water | $CaCl_2$ | M KCl | dS $m^{-1}$ | % | % | cmol $kg^{-1}$ | | | | | | | % | % |
| 0-12 | 6.20 | - | - | 0.074 | 1.00 | 0.00 | 2.80 | 0.98 | 0.14 | 0.01 | 3.92 | 4.20 | 0.72 | 93 | 0.20 |
| 12-28 | 9.04 | - | - | 0.253 | 0.80 | 3.20 | - | - | 0.16 | 0.69 | - | 16.90 | 0.77 | 100 | 4.09 |
| 28-52 | 9.41 | - | - | 0.364 | 1.10 | 3.60 | - | - | 0.16 | 1.39 | - | 11.10 | 0.75 | 100 | 12.52 |

*Contd...*

**Soil Series:** Halagera **(**HLG) **Pedon:** R-4

**Location:** $16^0$44'29.3"N $77^0$13'56.3"E, Halagera village, Yadgir hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine-loamy, mixed (calcareous), 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 |
| 0-8 | Ap | 81.02 | 8.42 | 10.56 | 10.41 | 24.08 | 18.98 | 19.08 | 8.47 | <15 | ls | 9.10 | 4.79 |
| 8-22 | Bw1 | 61.00 | 11.50 | 27.50 | 8.29 | 9.35 | 21.89 | 14.35 | 7.12 | <15 | scl | 16.91 | 12.28 |
| 22-53 | Bw2 | 61.41 | 13.80 | 24.79 | 15.98 | 15.67 | 12.62 | 11.78 | 5.36 | 15-35 | scl | 17.08 | 11.26 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-8 | 8.49 | - | - | 0.185 | 0.30 | 2.99 | - | - | 0.24 | 0.06 | - | 8.80 | 0.83 | 100 | 0.69 |
| 8-22 | 8.57 | - | - | 0.116 | 0.45 | 4.03 | - | - | 0.11 | 0.02 | - | 19.50 | 0.71 | 100 | 0.12 |
| 22-53 | 8.70 | - | - | 0.113 | 0.27 | 7.67 | - | - | 0.11 | 0.05 | - | 15.50 | 0.63 | 100 | 0.33 |

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**Soil Series:** Yalleri (YLR) **Pedon:** R-16

**Location:** $16^0$32'54.3"N $77^0$22'71.2"E, Duppalli village, Sydhapura hobli, Yadgir taluk and district

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

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-5 | Ap | 81.69 | 5.44 | 12.87 | 6.10 | 8.65 | 33.88 | 21.57 | 11.50 | - | sl | 8.60 | 3.37 |
| 5-34 | Bt1 | 38.78 | 6.73 | 54.49 | 3.38 | 9.91 | 12.42 | 8.93 | 4.14 | - | c | 25.33 | 15.82 |
| 34-75 | Bt2 | 40.35 | 2.90 | 56.75 | 12.91 | 6.83 | 10.30 | 7.48 | 2.82 | 35-60 | c | 24.49 | 16.20 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-5 | 6.91 | - | - | 0.069 | 0.70 | 0.00 | 5.29 | 1.37 | 0.28 | 0.03 | 6.96 | 6.90 | 0.54 | 100 | 0.45 |
| 5-34 | 7.05 | - | - | 0.053 | 0.62 | 0.00 | 16.43 | 3.89 | 0.26 | 0.09 | 20.67 | 21.60 | 0.40 | 96 | 0.42 |
| 34-75 | 7.25 | - | - | 0.058 | 0.59 | 0.00 | 15.22 | 3.46 | 0.25 | 0.14 | 19.06 | 19.90 | 0.35 | 96 | 0.69 |

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**Soil Series:** Anur (ANR) **Pedon:** R-15

**Location:** $16^0$32'45.0"N $77^0$23'57.4"E, Duppalli village, Sydhapura hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed (calcareous), 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 |
| 0-18 | Ap | 64.60 | 13.44 | 21.96 | 7.33 | 10.42 | 18.68 | 20.12 | 8.05 | <15 | scl | 16.59 | 7.96 |
| 18-49 | Bw1 | 56.66 | 12.19 | 31.15 | 4.73 | 9.80 | 18.66 | 17.02 | 6.45 | - | scl | 33.38 | 13.51 |
| 49-95 | Bw2 | 39.94 | 17.81 | 42.25 | 3.09 | 3.30 | 15.44 | 10.65 | 7.45 | <15 | c | 44.68 | 25.23 |
| 95-123 | Bw3 | 30.65 | 17.58 | 51.77 | 1.50 | 5.57 | 10.18 | 9.65 | 3.75 | <15 | c | 54.94 | 32.07 |

| 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 | 10.17 | - | - | 0.365 | 0.48 | 6.11 | - | - | 0.25 | 3.52 | - | 19.90 | 0.91 | 100 | 17.70 |
| 18-49 | 10.32 | - | - | 1.38 | 0.30 | 6.76 | - | - | 0.21 | 16.03 | - | 24.60 | 0.79 | 100 | 65.17 |
| 49-95 | 10.08 | - | - | 2.55 | 0.17 | 6.11 | - | - | 0.33 | 21.49 | - | 32.60 | 0.77 | 100 | 65.91 |
| 95-123 | 9.92 | - | - | 2.56 | 0.12 | 7.93 | - | - | 0.51 | 26.03 | - | 36.00 | 0.70 | 100 | 72.30 |

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**Soil Series:** Thumakuru (TMK) **Pedon:** R-10

**Location:** $16^0$38'01.3"N $77^0$16'49.8"E, Kilankera village, Balichakra hobli, Yadgir taluk and district

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

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-12 | Ap | 62.92 | 15.76 | 21.32 | 5.56 | 9.37 | 21.83 | 18.33 | 7.83 | - | scl | 17.98 | 6.60 |
| 12-29 | Bw1 | 45.91 | 18.53 | 35.56 | 6.08 | 8.18 | 15.41 | 11.43 | 4.82 | - | sc | 33.40 | 11.79 |
| 29-74 | Bw2 | 48.47 | 16.24 | 35.29 | 5.93 | 9.84 | 16.40 | 11.75 | 4.55 | - | sc | 28.66 | 11.19 |
| 74-132 | Bw3 | 38.25 | 20.59 | 41.16 | 3.21 | 8.23 | 14.64 | 8.97 | 3.21 | - | c | 38.85 | 14.72 |
| 132-158 | Bw4 | 36.87 | 19.99 | 43.14 | 3.54 | 7.61 | 13.08 | 8.57 | 4.07 | - | c | 44.36 | 15.75 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-12 | 9.60 | - | - | 0.35 | 0.48 | 1.44 | - | - | 0.23 | 3.62 | - | 21.83 | 1.02 | 100 | 16.57 |
| 12-29 | 9.72 | - | - | 1.27 | 0.50 | 1.44 | - | - | 0.59 | 20.88 | - | 30.50 | 0.86 | 100 | 68.48 |
| 29-74 | 9.16 | - | - | 3.44 | 0.31 | 3.72 | - | - | 0.38 | 25.84 | - | 28.68 | 0.81 | 100 | 90.10 |
| 74-132 | 9.33 | - | - | 2.52 | 0.23 | 4.92 | - | - | 0.82 | 20.25 | - | 34.99 | 0.85 | 100 | 57.87 |
| 132-158 | 9.23 | - | - | 2.07 | 0.31 | 3.48 | - | - | 0.70 | 21.03 | - | 34.24 | 0.79 | 100 | 61.41 |

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**Soil Series:** Gudalgunta (GDL) **Pedon:** T1/P3

**Location:** $16^0$54'30.8"N $77^0$28'88.3"E, Rachanala village, Sydhapur hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey, mixed, (calcareous), isohyperthermic Paralithic Ustorthents

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-6 | Ap | 52.36 | 18.74 | 28.90 | 7.43 | 9.74 | 12.25 | 15.08 | 7.85 | - | scl | 27.97 | 10.23 |
| 6-22 | A11 | 42.38 | 18.75 | 38.87 | 8.58 | 8.69 | 10.41 | 9.66 | 5.04 | - | cl | 38.30 | 18.65 |
| 22-47 | A12 | 27.73 | 21.44 | 50.83 | 5.19 | 5.41 | 7.07 | 6.41 | 3.65 | - | c | 61.43 | 35.38 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-6 | 9.72 | - | - | 1.21 | 0.60 | 7.80 | - | - | 0.43 | 27.56 | - | 30.39 | 1.05 | 100 | 90.68 |
| 6-22 | 9.43 | - | - | 2.55 | 0.76 | 8.40 | - | - | 0.44 | 40.71 | - | 41.09 | 1.06 | 100 | 99.08 |
| 22-47 | 9.25 | - | - | 3.83 | 0.48 | 9.00 | - | - | 0.57 | 40.90 | - | 49.76 | 0.98 | 100 | 82.21 |

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**Soil Series:** Kyathanala (KYT) **Pedon:** R-4

**Location:** $16^0$32'22.9"N $77^0$15'35.4"E, Mungala village, Sydhapura hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Loamy, mixed, isohyperthermic Paralithic Ustorthents

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-5 | Ap | 82.54 | 8.12 | 9.34 | 20.10 | 23.15 | 16.14 | 16.24 | 6.90 | - | ls | 13.51 | 4.10 |
| 5-17 | A2 | 53.13 | 10.20 | 36.66 | 23.91 | 12.65 | 6.80 | 5.53 | 4.25 | - | sc | 26.61 | 13.69 |
| 17-32 | C | 79.51 | 9.41 | 11.08 | 16.63 | 24.04 | 15.42 | 17.24 | 6.19 | - | sl | 12.95 | 4.45 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-5 | 7.07 | - | - | 0.12 | 0.77 | 0.00 | 6.00 | 1.74 | 0.33 | 0.01 | 8.08 | 8.20 | 0.88 | 99 | 0.17 |
| 5-17 | 6.74 | - | - | 0.13 | 0.66 | 0.00 | 17.96 | 2.78 | 0.16 | 0.15 | 21.05 | 22.40 | 0.61 | 94 | 0.65 |
| 17-32 | 6.78 | - | - | 0.06 | 0.48 | 0.00 | 6.15 | 1.32 | 0.14 | 0.07 | 7.68 | 9.00 | 0.81 | 85 | 0.75 |

*Contd...*

**Soil Series:** Ramapura (RMP) **Pedon:** T1/P1

**Location:** $16^0$33'54.7"N $77^0$20'45.1"E, Sowrashtralli village, Sydhapura hobli, Yadgir taluk and district

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

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-7 | Ap | 93.37 | 4.32 | 2.31 | 18.39 | 21.91 | 24.62 | 19.90 | 8.54 | - | s | 3.89 | 1.01 |
| 7-28 | A2 | 83.08 | 7.65 | 9.26 | 14.60 | 18.23 | 21.75 | 20.85 | 7.65 | - | ls | 6.25 | 1.94 |
| 28-70 | Bt1 | 61.88 | 6.38 | 31.74 | 19.17 | 13.54 | 14.17 | 12.29 | 2.71 | - | scl | 15.95 | 8.69 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-7 | 5.97 | - | - | 0.04 | 0.34 | 0.00 | 0.70 | 0.18 | 0.06 | 0.01 | 0.95 | 1.70 | 0.74 | 56 | 0.77 |
| 7-28 | 6.06 | - | - | 0.03 | 0.26 | 0.00 | 1.83 | 0.53 | 0.07 | 0.05 | 2.48 | 3.30 | 0.36 | 75 | 1.58 |
| 28-70 | 6.65 | - | - | 0.20 | 0.26 | 0.00 | 7.05 | 3.19 | 0.15 | 0.95 | 11.34 | 13.00 | 0.41 | 87 | 7.31 |

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**Soil Series:** Rachanalli (RHN) **Pedon:** R-2

**Location: 16$^0$**44'40.9"N 77$^0$17'35.0"E, Gopalpura village, Gurumitkal hobli, Yadgir taluk and district

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

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-8 | Ap | 77.72 | 14.09 | 8.19 | 6.31 | 13.12 | 18.82 | 27.16 | 12.31 | - | sl | 10.76 | 3.53 |
| 8-43 | Bw1 | 76.00 | 10.38 | 13.62 | 13.29 | 17.92 | 16.99 | 20.60 | 7.21 | - | sl | 21.48 | 7.91 |
| 43-87 | Bw2 | 52.64 | 19.95 | 27.41 | 2.69 | 4.66 | 16.79 | 16.89 | 11.61 | - | scl | 40.80 | 16.55 |

| 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$^{-1}$ | | | | | | | % | % |
| 0-8 | 8.16 | - | - | 0.22 | 0.38 | 1.20 | 5.43 | 2.49 | 0.16 | 0.79 | 8.87 | 8.99 | 1.10 | 99 | 8.81 |
| 8-43 | 9.63 | - | - | 0.26 | 0.19 | 0.60 | 6.25 | 4.72 | 0.09 | 4.31 | 15.37 | 14.66 | 1.08 | 105 | 29.43 |
| 43-87 | 10.09 | - | - | 1.01 | 0.15 | 5.76 | - | - | 0.21 | 11.77 | - | 24.08 | 0.88 | 100 | 48.87 |

*Contd...*

**Soil Series:**Kudlura (KDR) **Pedon:** $T_1/P_2$

**Location:** $16^0$34'03.1"N $77^0$14'71.7"E, Kyathanala village, Sydhapura Hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed, (calcareous), isohyperthermic Fluventic Haplustepts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | | |
| | | Sand (2.0-0.05) | Silt (0.05-0.002) | Clay (<0.002) | Very coarse (2.0-1.0) | Coarse (1.0-0.5) | Medium (0.5-0.25) | Fine (0.25-0.1) | Very fine (0.1-0.05) | | | 1/3 Bar | 15 Bar |
| 0-6 | Ap | 49.52 | 14.58 | 35.90 | 5.71 | 7.41 | 14.81 | 15.66 | 5.93 | - | sc | 26.86 | 12.10 |
| 6-26 | BA | 50.79 | 13.31 | 35.90 | 7.41 | 9.10 | 15.56 | 13.12 | 5.61 | - | sc | 25.65 | 12.24 |
| 26-67 | Bw1 | 43.49 | 15.97 | 40.54 | 5.86 | 7.38 | 13.56 | 10.85 | 5.86 | - | c | 31.22 | 16.48 |
| 67-115 | Bw2 | 37.42 | 18.93 | 43.66 | 6.51 | 6.83 | 10.95 | 8.68 | 4.45 | - | c | 36.13 | 22.34 |
| 115-144 | Bw3 | 39.74 | 18.88 | 41.38 | 8.16 | 7.84 | 10.63 | 8.70 | 4.40 | - | c | 35.83 | 20.57 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-6 | 8.34 | - | - | 0.15 | 0.72 | 3.55 | - | - | 0.42 | 0.07 | - | 33.20 | 0.92 | 100 | 0.22 |
| 6-26 | 8.55 | - | - | 0.11 | 0.85 | 4.90 | - | - | 0.33 | 0.25 | - | 32.70 | 0.91 | 100 | 0.76 |
| 26-67 | 9.08 | - | - | 0.17 | 0.60 | 5.02 | - | - | 0.18 | 1.34 | - | 36.20 | 0.89 | 100 | 3.69 |
| 67-115 | 9.44 | - | - | 0.37 | 0.52 | 6.61 | - | - | 0.25 | 6.72 | - | 39.30 | 0.90 | 100 | 17.09 |
| 115-144 | 9.53 | - | - | 0.43 | 0.56 | 6.10 | - | - | 0.26 | 7.85 | - | 33.70 | 0.81 | 100 | 23.29 |

*Contd...*

**Soil Series:** Sowrashtrahalli (SWR) **Pedon:** R-8

**Location:** $16^0$38'49.0"N $77^0$16'56.1"E, Killanakera village, Balichakra hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:**Fine, smectitic(calcareous), 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 |
| 0-9 | Ap | 32.07 | 21.06 | 46.87 | 2.72 | 4.78 | 8.37 | 10.43 | 5.76 | - | c | 33.69 | 16.51 |
| 9_34 | BA | 32.29 | 20.37 | 47.35 | 3.90 | 5.20 | 8.56 | 9.10 | 5.53 | - | c | 37.43 | 16.65 |
| 34-67 | Bss1 | 30.11 | 23.13 | 46.76 | 4.18 | 5.05 | 8.13 | 8.13 | 4.62 | - | c | 38.02 | 19.44 |
| 67-124 | Bss2 | 19.93 | 23.40 | 56.66 | 2.46 | 3.14 | 5.04 | 5.71 | 3.58 | - | c | 42.55 | 23.92 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-9 | 8.44 | - | - | 0.18 | 0.77 | 7.47 | - | - | 0.79 | 0.21 | - | 47.70 | 1.02 | 100 | 0.45 |
| 9_34 | 8.57 | - | - | 0.14 | 0.81 | 6.86 | - | - | 0.51 | 0.23 | - | 47.80 | 1.01 | 100 | 0.49 |
| 34-67 | 8.73 | - | - | 0.12 | 0.81 | 6.48 | - | - | 0.28 | 0.44 | - | 50.60 | 1.08 | 100 | 0.88 |
| 67-124 | 8.71 | - | - | 0.16 | 0.77 | 7.56 | - | - | 0.42 | 0.91 | - | 51.20 | 0.90 | 100 | 1.78 |

*Contd...*

**Soil Series:** Hegganakera (HGN) **Pedon:** R-12

**Location:** $16^0$46'19.9"N $77^0$04'34.0"E, Thumakura village, Yadgir hobli, Yadgir taluk and district

**Analysis at:** NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, smectitic, isohyperthermic Typic Haplusterts

| Depth (cm) | Horizon | Size class and particle diameter (mm) | | | | | | | | Coarse fragments w/w (%) | Texture Class (USDA) | % Moisture | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | | | Sand | | | | | | | 1/3 Bar | 15 Bar |
| | | 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) | | | | |
| 0-8 | Ap | 20.20 | 25.22 | 54.58 | 2.32 | 2.76 | 3.53 | 8.17 | 3.42 | - | c | 42.47 | 25.59 |
| 8-24 | BA | 21.18 | 21.70 | 57.12 | 2.07 | 3.28 | 4.69 | 7.31 | 3.82 | - | c | 41.88 | 24.67 |
| 24-50 | Bss1 | 18.76 | 21.67 | 59.57 | 1.20 | 2.51 | 3.93 | 7.09 | 4.03 | - | c | 40.46 | 23.34 |
| 50-86 | Bss2 | 16.74 | 22.24 | 61.02 | 0.88 | 1.53 | 4.27 | 6.02 | 4.05 | - | c | 42.18 | 24.76 |
| 86-146 | Bss3 | 18.64 | 20.20 | 61.16 | 2.30 | 2.41 | 3.73 | 6.36 | 3.84 | - | c | 40.03 | 28.61 |
| 146-170 | Bss4 | 16.08 | 19.33 | 64.59 | 0.88 | 2.75 | 3.41 | 5.95 | 3.08 | - | c | 40.28 | 29.90 |

| 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 $kg^{-1}$ | | | | | | | % | % |
| 0-8 | 8.77 | - | - | 1.33 | 1.16 | 8.19 | - | - | 1.10 | 5.21 | - | 36.23 | 0.66 | 100 | 14.38 |
| 8-24 | 8.93 | - | - | 1.11 | 0.64 | 5.46 | - | - | 0.87 | 4.23 | - | 35.50 | 0.62 | 100 | 11.93 |
| 24-50 | 8.85 | - | - | 0.984 | 0.32 | 3.38 | - | - | 0.71 | 3.78 | - | 36.69 | 0.62 | 100 | 10.30 |
| 50-86 | 8.54 | - | - | 0.562 | 0.24 | 3.38 | - | - | 0.58 | 3.07 | - | 39.16 | 0.64 | 100 | 7.84 |
| 86-146 | 8.45 | - | - | 0.526 | 0.24 | 3.38 | - | - | 0.62 | 2.82 | - | 38.52 | 0.63 | 100 | 7.31 |
| 146-170 | 8.64 | - | - | 0.517 | 0.20 | 4.29 | - | - | 0.60 | 2.99 | - | 36.87 | 0.57 | 100 | 8.12 |

*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 interpretative and 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*: Depth, texture, gravelliness, calcareousness.

*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 moderate limitations that reduce the choice of crops or that require special conservation practices.

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

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

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

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

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

The land capability subclasses are recognised based on the dominant limitations observed within a given land capability class. The subclasses are designated by adding a lower case letter like 'e', 'w', 's', or 'c' to the class numeral. The subclass "e" indicates that the main hazard is risk of erosion, "w" indicates drainage or wetness as a limitation for plant growth, "s" indicates shallow soil depth, coarse or heavy textures, calcareousness, salinity/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 26 soil map units identified in Ramapura-2microwatershed are grouped under 2land capability classes and3subclasses. An area of 549 ha (95%) in the microwatershed is suitable for agriculture and about 28 ha (5%) is covered by rock outcrops and others (habitation and water bodies) (Fig. 5.1).

Good cultivable lands (Class II) cover an area of about 75per cent and are distributed in the major part of the microwatershed with minor problems of soil and erosion. Moderately good cultivable lands (Class III) cover an area of about 20per cent and are distributed in the central, southern, northeastern and southeastern part of the microwatershed with moderate problems of soil and erosion.

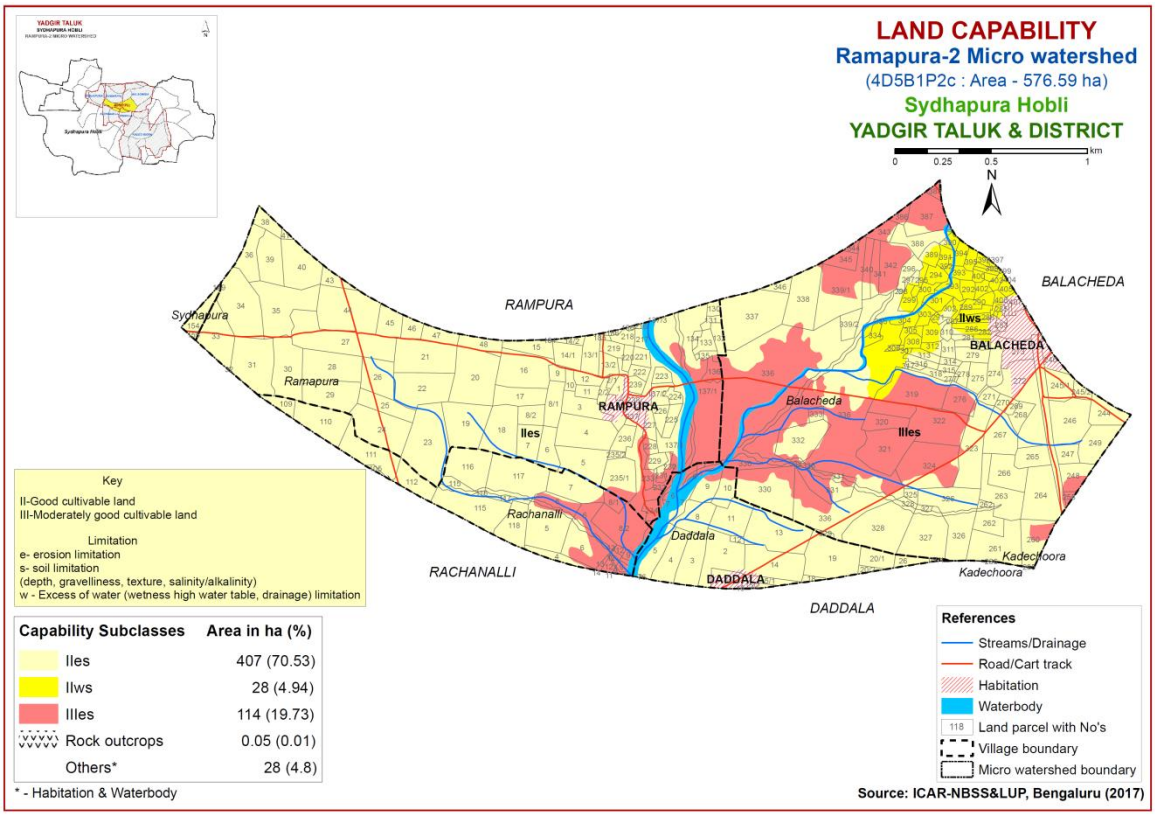



Fig. 5.1 Land Capability map of Ramapura-2 Microwatershed

## 5.2 Soil Depth

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

Shallow (25-50 cm) soils occur in small area of 25 ha (4%) and are distributed in the southwestern, southern, northeastern and southeastern part of the microwatershed. Moderately shallow (50-75 cm) soils occupy an area of about184 ha (32%) and are distributed in the northern, northeastern, western and southeastern part of the microwatershed. Moderately deep (75-100 cm) soils occupy an area of 13 ha (2%) and are distributed in the southern and central part of the microwatershed. Deep (100-150 cm) soils occupy maximum area of271 ha (47%) and are distributed in the all parts of the microwatershed. Very deep (>150 cm) soils cover an area of 55 ha (10%) and are distributed in the western, southern, northern, central, northeastern and eastern part of the microwatershed.

The most productive lands 326 ha (57%) with respect to soil rooting depth where all climatically adapted annual and perennial crops can be grown are deep to very deep (100 to >150 cm depth) soils occurring in major part of the microwatershed. The problem soils occupy about 4 per cent area where only short duration crops can be grown occasionally and the probability crop failure is high.

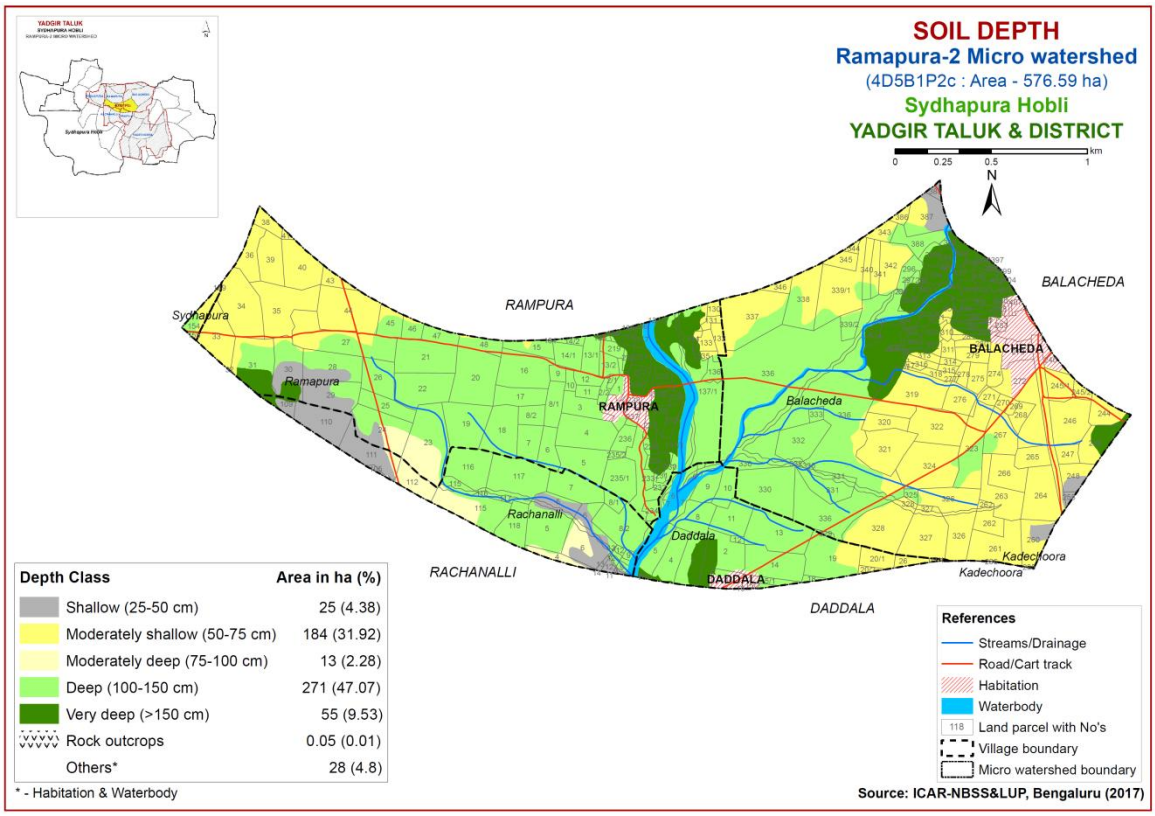



Fig. 5.2 Soil Depth map of Ramapura-2 Microwatershed

### 5.3 Surface Soil Texture

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

An area of about 32 ha (6%) has soils that are sandy at the surface and are distributed in the western, central, southern, northeastern and eastern part of the microwatershed. An area of 150 ha (26%) is loamy and are distributed in all parts of the microwatershed. An area of 366ha (64%) has soils that are clayey at the surface and is distributed in the major part of the microwatershed.

Maximum area of the microwatershed has most productive lands with respect to surface soil texture except 6 per cent which are sandy soils. The clayey soils (64%) 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 soils are loamy soils (26%) which also have high potential for soil-water retention and nutrient availability with no drainage or other physical problems. The sandy soils are also productive for root and tuber crops with good irrigation and nutrient management practices, but not ideal for other crops.

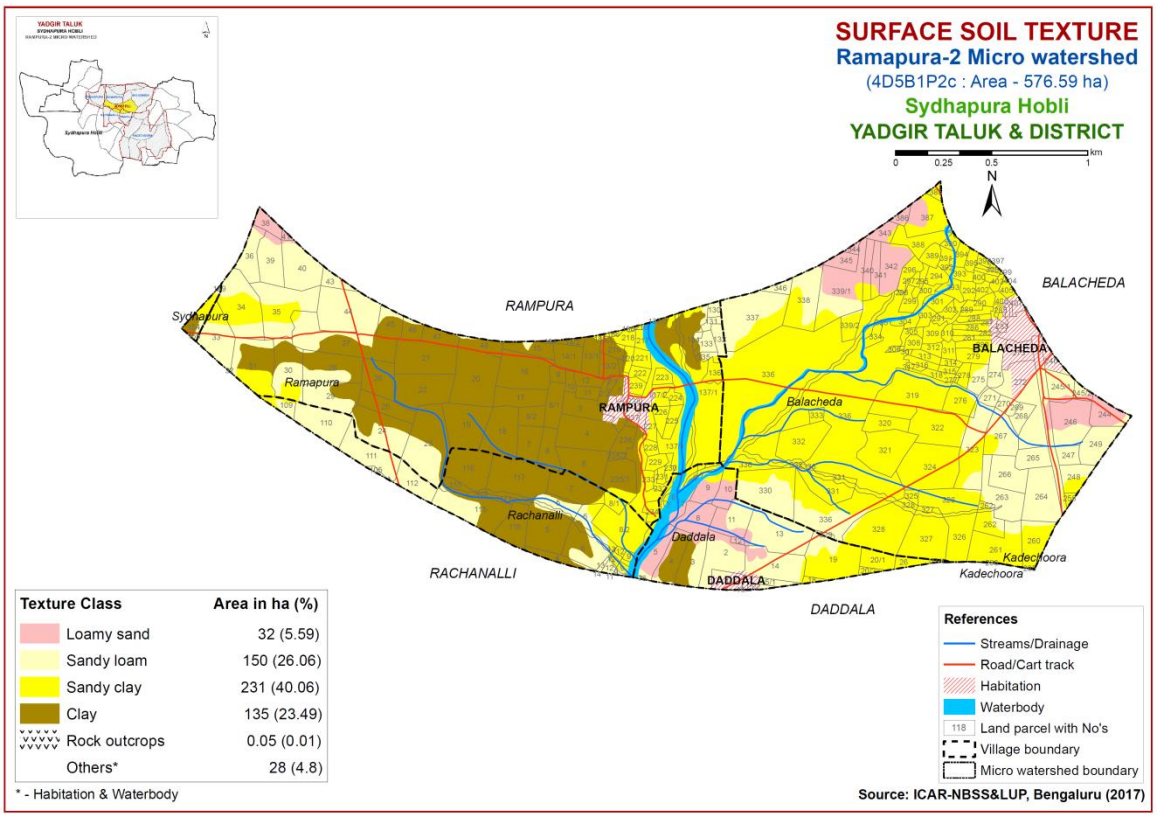



Fig. 5.3 Surface Soil Texture map of Ramapura-2 Microwatershed

## 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 Figure 5.4.

Non gravelly (<15%) soils cover a maximum of 365 ha (63%) area of the microwatershed and are distributed in the major part of the microwatershed. These are the most productive soils, where all climatically adapted short and long duration crops can be

grown. The gravelly soils (15-35%) occupy an area of 184 ha (32%) and are distributed in all parts of the microwatershed. In these areas, only short duration crops can be grown along with good nutrient and moisture conservation practices.

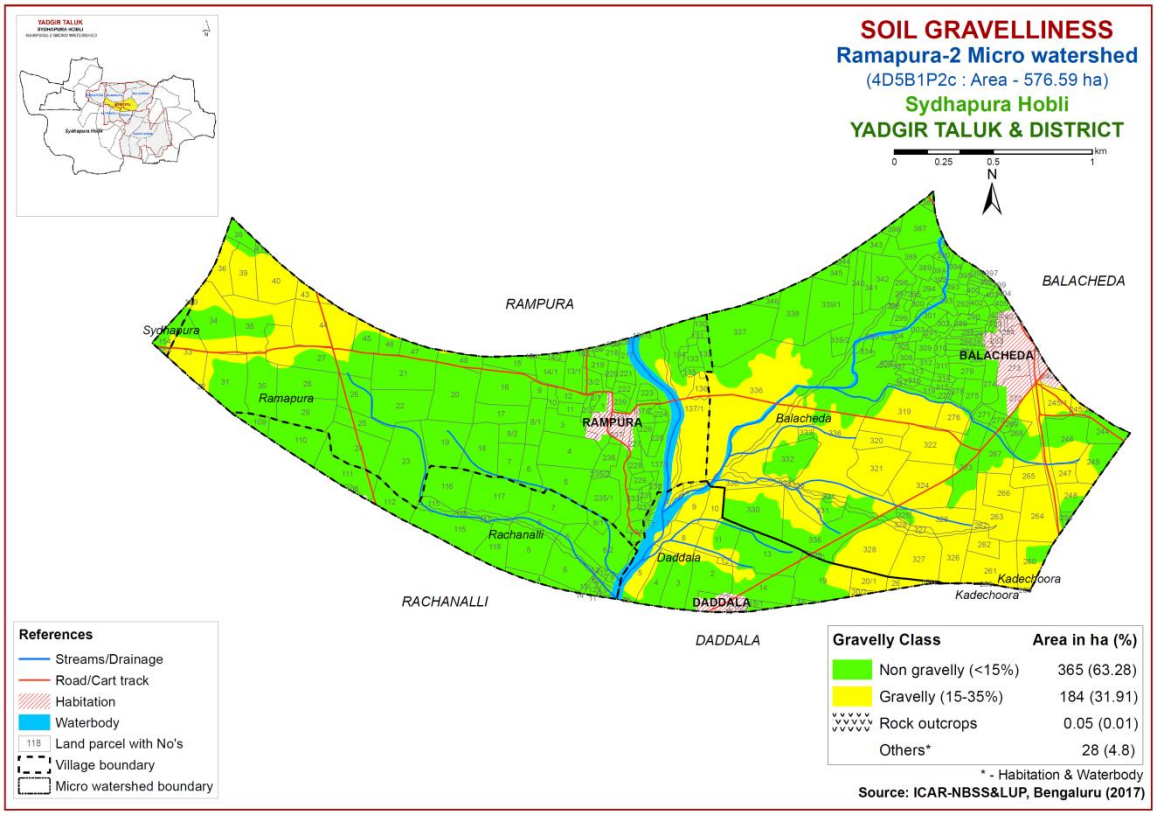



Fig. 5.4 Soil Gravelliness map of Ramapura-2 Microwatershed

## 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 given in Figure 5.5.

An area of about 25 ha (4%) in the microwatershed has soils that are very low (<50 mm/m) in available water capacity and are distributed in the southwestern and southern part of the microwatershed. An area of 184ha (32%) soils are low (51-100 mm/m) and are distributed in all parts of the microwatershed, A small area of 13 ha (2%) is medium(101-150mm/m) in available water capacity and are distributed in the southwestern part of the microwatershed. Very high (>200 mm/m) in maximum area of 326 ha (57%) and are distributed in the major part of the microwatershed.

About 209 ha (36%) area in the microwatershed has soils that are problematic with regard to available water capacity. Here, only short duration crops can be grown and probability of the crop failure is very high. These areas are best put to other alternative uses. An area of 326 ha (57%) are potential areas with regard to AWC where all climatically adapted annual and perennial crops can be grown.

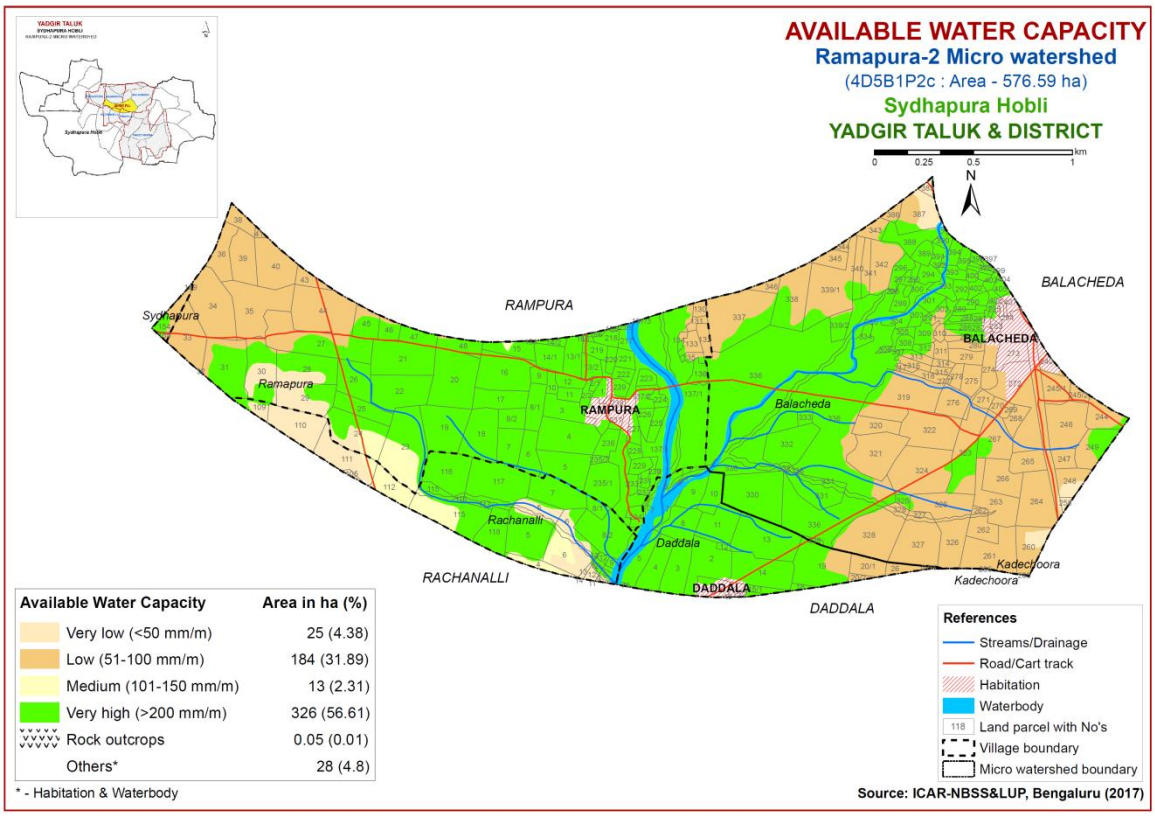



Fig. 5.5 Soil Available Water Capacity map of Ramapura-2 Microwatershed

## 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 single slope class and a slope map was generated showing the area extent and their geographic distribution in the microwatershed (Fig. 5.6).

Entire area of the microwatershed falls under very gently sloping (1-3% slope) lands and they have high potential in respect of soil slopes. In these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

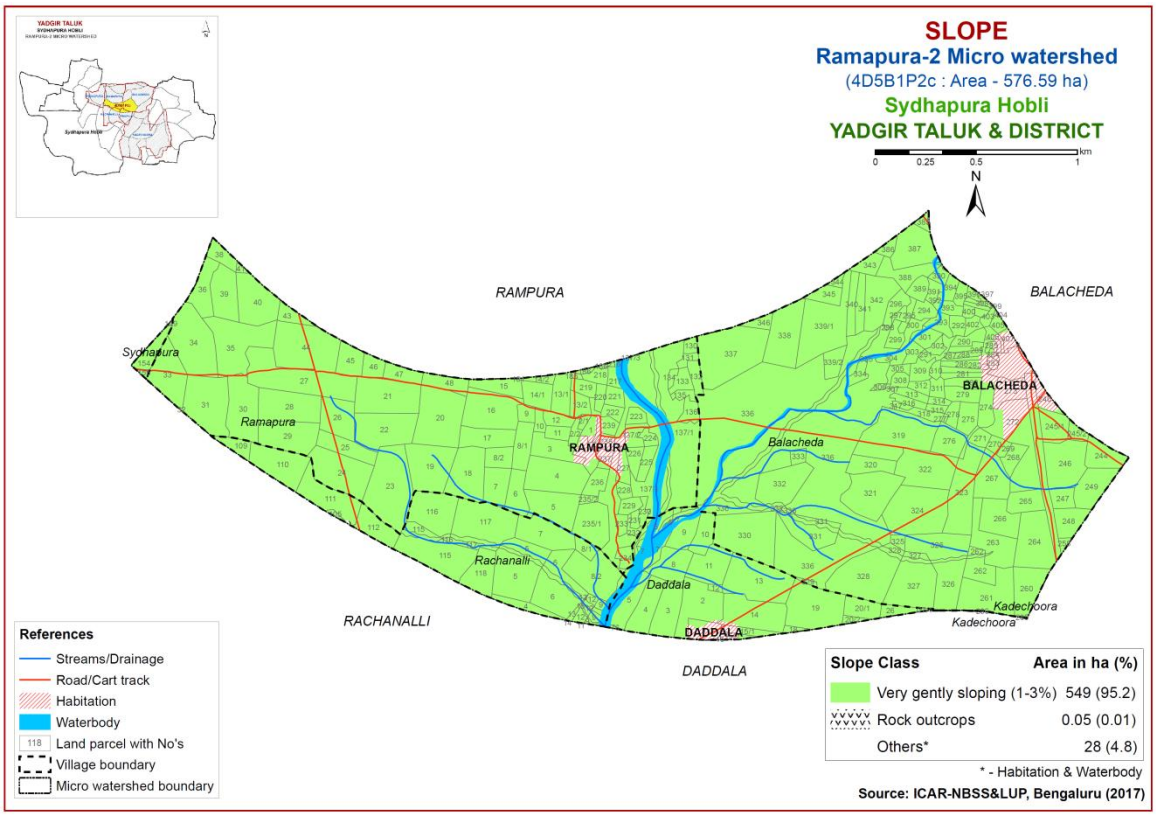



Fig. 5.6 Soil Slope map of Ramapura-2 Microwatershed

## 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.

Soils that are moderately eroded (e2 class) cover maximum area of 439 ha (76%) and are distributed in the major part of the microwatershed. Severely eroded soils cover an area of 109 ha (19%) and are distributed in all parts of the microwatershed.

Entire area in the microwatershed is problematic because of moderate and severe erosion. For these areas, taking up soil and water conservation and other land development measures are needed.

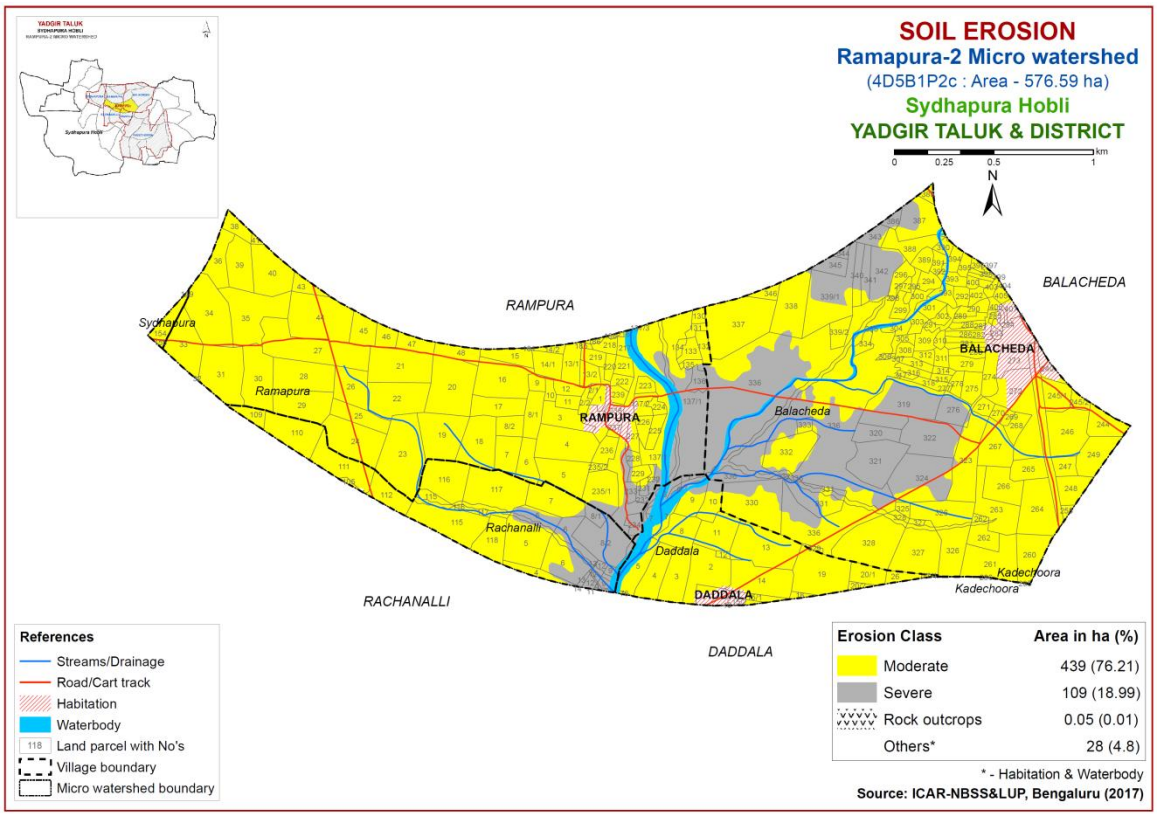



Fig. 5.7 Soil Erosion map of Ramapura-2 Microwatershed

*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 characterised by low rainfall and high temperatures. Hence, it is necessary to know the fertility (macro and micro nutrients) status of the soils of the watersheds for assessing the kind and amount of fertilizers required for each of the crop intended to be grown. For this purpose, the surface soil samples collected from the grid points (one soil sample at every 250 m interval) all over the microwatershed through land resource inventory in the year 2017 were analysed for pH, EC, organic carbon, available phosphorus and potassium, and for micronutrients like zinc, boron, copper, iron and manganese, and secondary nutrient sulphur.

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

## 6.1 Soil Reaction (pH)

The soil analysis of the Ramapura-2 microwatershed for soil reaction (pH) showed that an area of12 ha (2%) is neutral (pH 6.5-7.3) and are distributed in the northwester part of the microwatershed. An area of about 27 ha (4%) is slightly alkaline (pH 7.3-7.8) and are distributed in the northwestern and northeaster part of the microwatershed. An area of about 162 ha (28%) area is moderately alkaline (pH 7.8-8.4) and is distributed in the western, central, southern, eastern, northeastern and southeastern part of the microwatershed. Maximum area of 210 ha (36%) is strongly alkaline (pH 8.4-9.0) and are distributed in the major part of the microwatershed (Fig.6.1). An area about 138 ha (24%) is very strongly alkaline (pH >9.0) and are distributed in the northern, central and southern part of the microwatershed.

## 6.2 Electrical Conductivity (EC)

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

## 6.3 Organic Carbon

The soil organic carbon content (an index of available Nitrogen) in the soils of the microwatershed is high (>0.75) in maximum area of about 278 ha (48%) and are distributed in the major part of the microwatershed, medium (0.5-0.75%) covering an area of about252ha (44%) and are distributed in all parts of the microwatershed, whereas low (<0.5%) in an area of about18ha (3%) and are distributed in the northern, central, and northwestern part of the microwatershed (Fig.6.3).

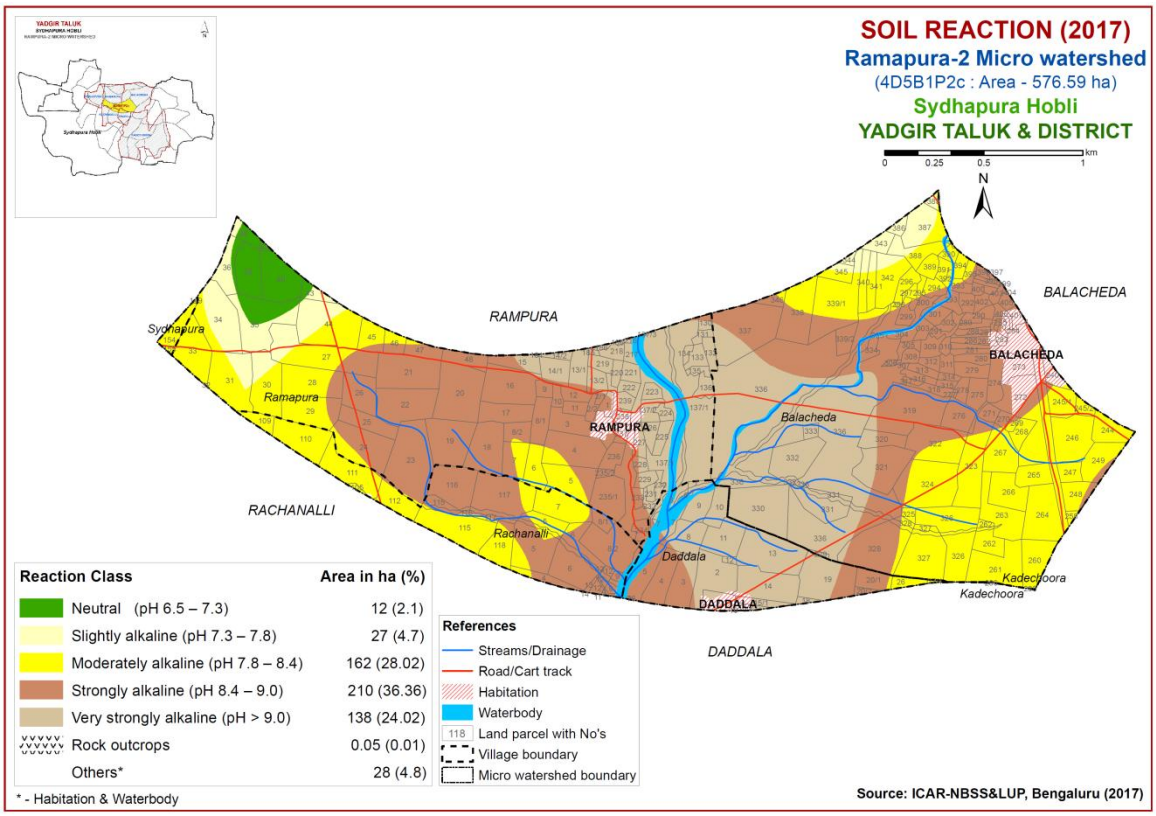



Fig.6.1 Soil Reaction (pH) map ofRamapura-2 Microwatershed

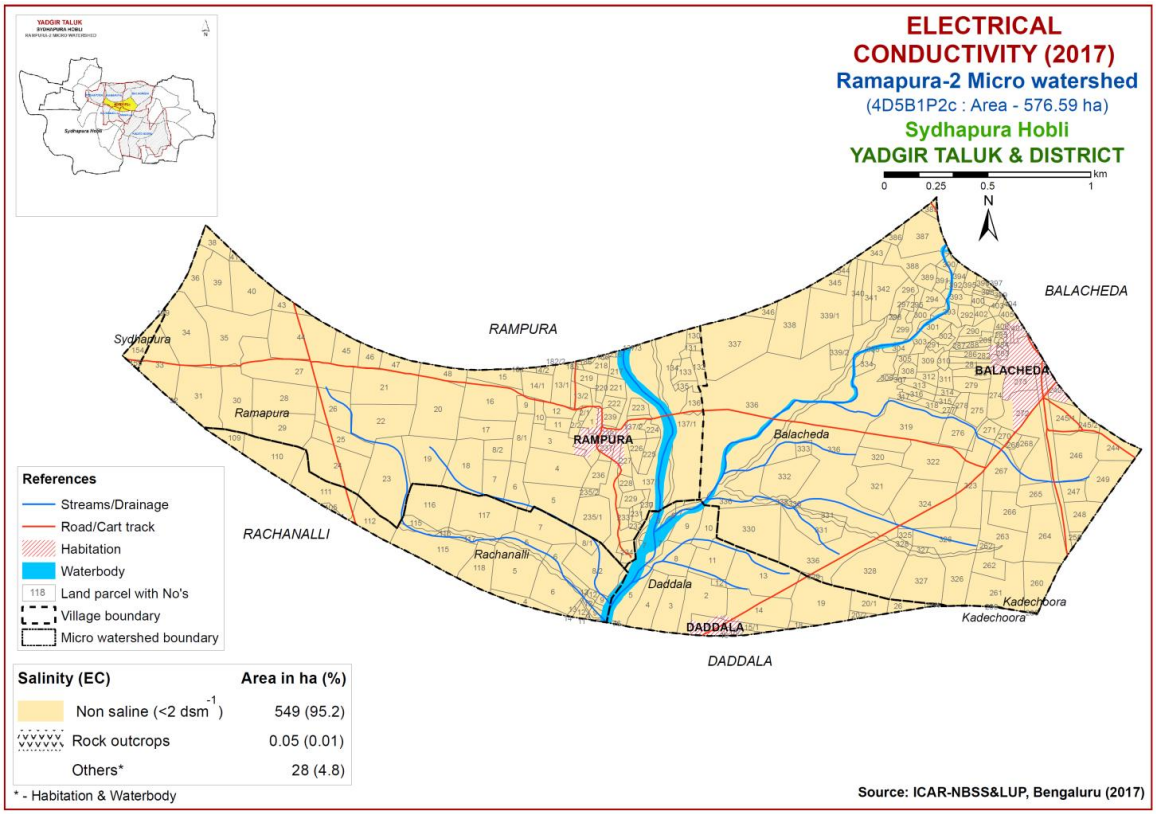



Fig.6.2 Electrical Conductivity (EC) map of Ramapura-2 Microwatershed

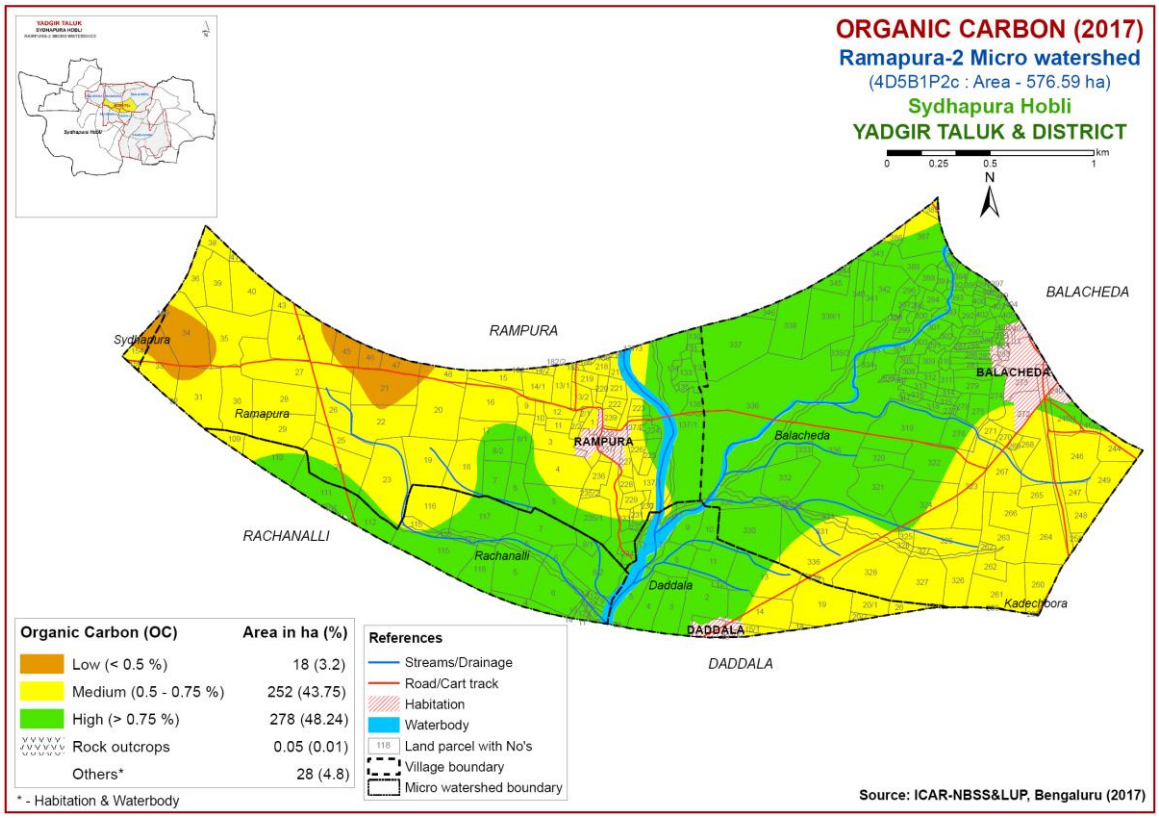



Fig.6.3 Soil Organic Carbon map of Ramapura-2 Microwatershed

### 6.4 Available Phosphorus

Available phosphorus content is low (<23 kg/ha) in an area of 231ha (40%) and are distributed in all parts of the microwatershed. Medium (23-57 kg/ha) in maximum area of287 ha (50%) and occur in the major part of the microwatershed and high (>57 kg/ha) in an area of about 31 ha (5%) and are distributed in the eastern, northeastern and southeastern part of the microwatershed (Fig. 6.4).

### 6.5 Available Potassium

Available potassium content is medium (145-337 kg/ha) in a maximum area of about 403 ha (70%) and are distributed in the major part of the microwatershed (Fig.6.5). High (>337 kg/ha) in an area of 146ha (25%) and are distributed in the central, southern, southwestern, northern and northeastern part of the microwatershed.

### 6.6 Available Sulphur

Maximum area of about 281ha (49%) is low (<10ppm) in available sulphur content and are distributed in the major part of the microwatershed, medium (10-20 ppm) in an area of about 238ha (7%) and are distributed in all parts of the microwatershed and high in 30 ha (5%) and are distributed in the southern, central and eastern part of the microwatershed (Fig.6.6).

### 6.7 Available Boron

Available boron content is high in (>10 ppm) 64 ha (11%) and are distributed in the northeastern, southern, central and southwestern part of the microwatershed (Fig. 6.7).Medium (0.5-1.0 ppm) in a maximum area of369 ha (64%) and are distributed in the major part of the microwatershed and low (<0.5 ppm) in an area of 116 ha (20%) and are distributed in the northwestern, central, northern and southeastern part of the microwatershed.

### 6.8 Available Iron

Available iron content is sufficient (>4.5 ppm) in maximum area of 444 ha (77%) and are distributed in the major part of the microwatershed and deficient in an area of 105 ha (18%) and are distributed in the southern, central and northern part of the microwatershed (Fig 6.8).

### 6.9 Available Manganese

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

### 6.10 Available Copper

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

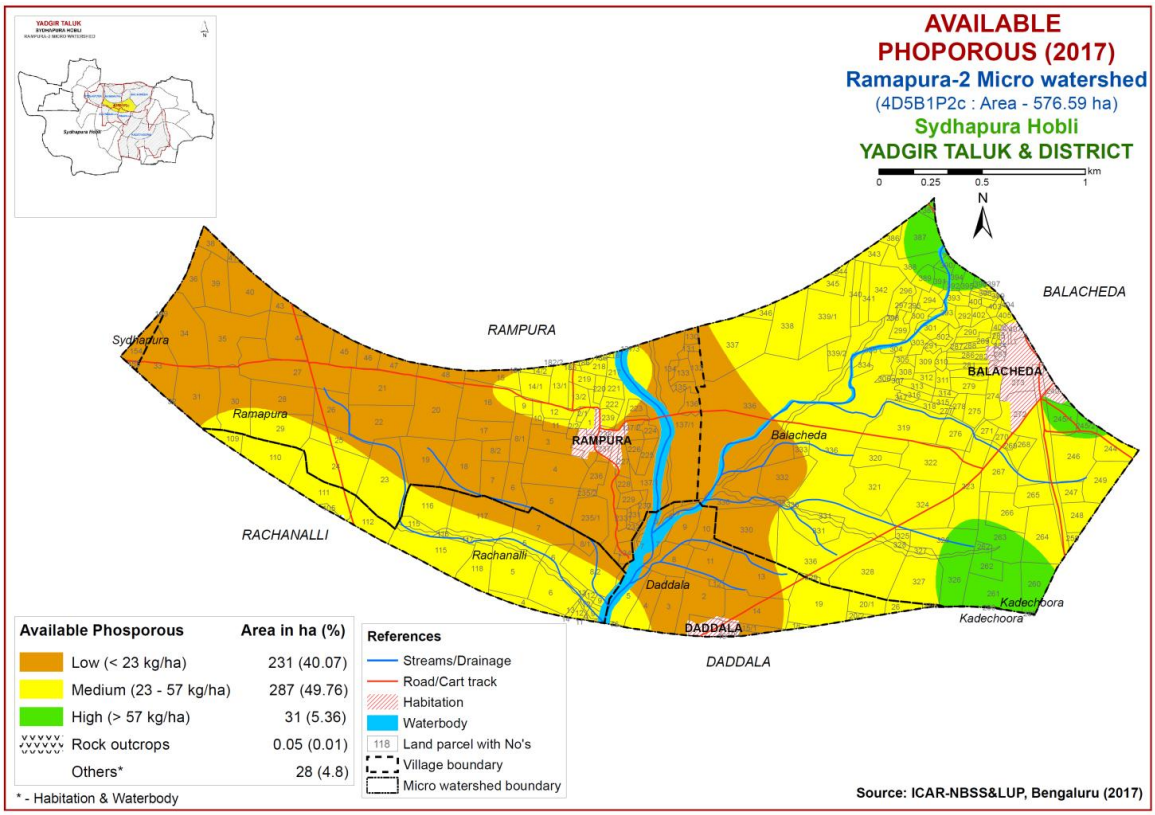



Fig.6.4 Soil Available Phosphorus map of Ramapura-2 Microwatershed

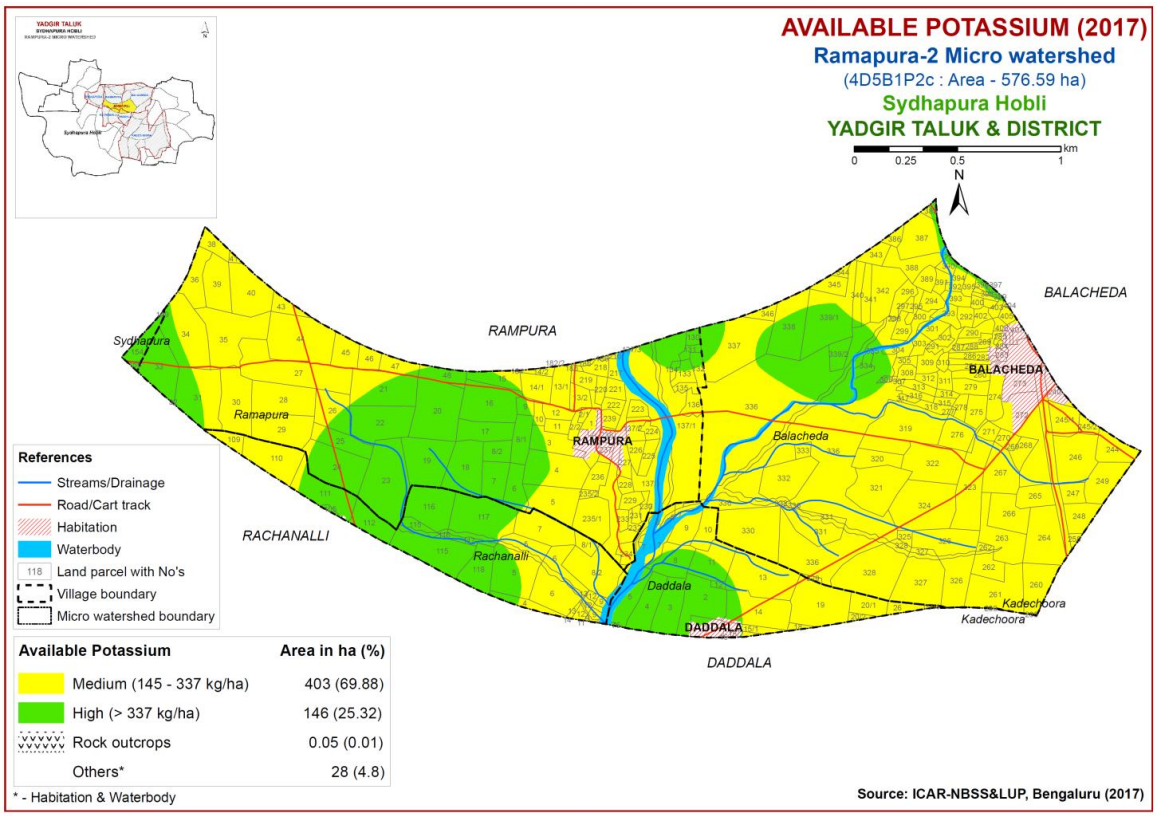



Fig.6.5 Soil Available Potassium map of Ramapura-2 Microwatershed

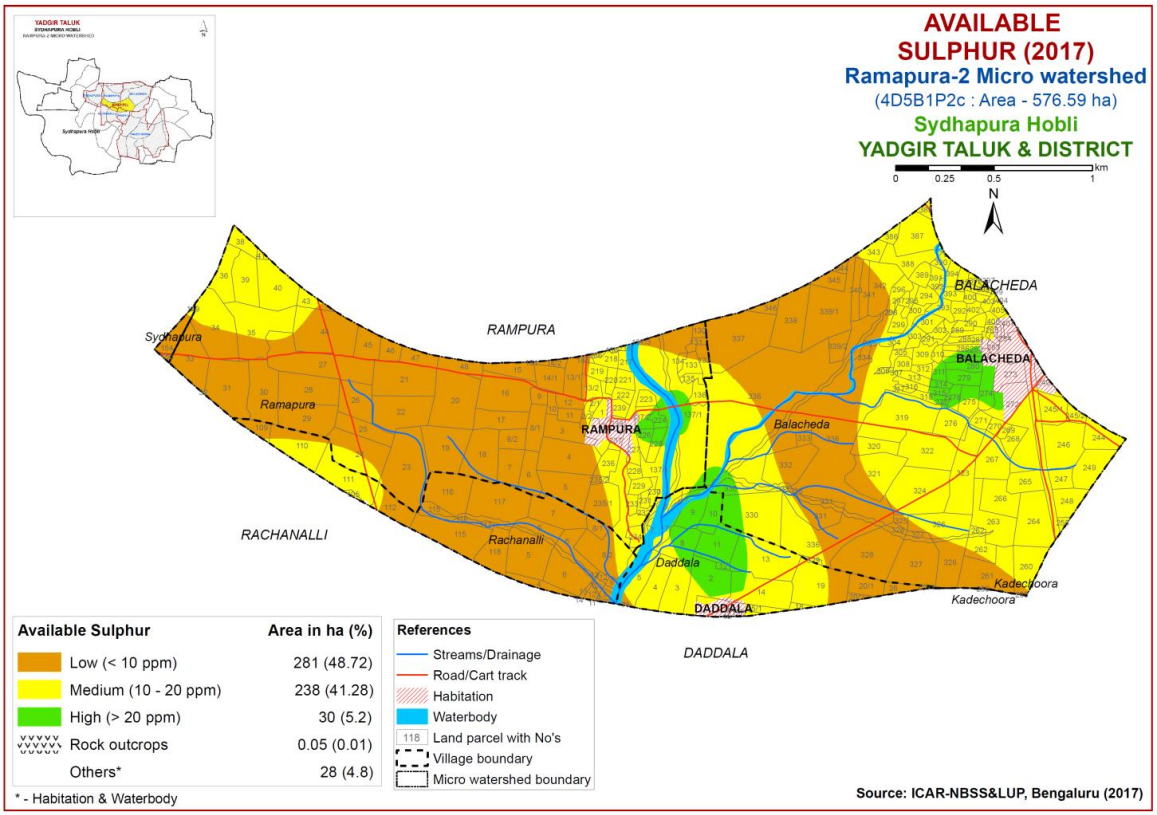



Fig.6.6 Soil Available Sulphur map of Ramapura-2 Microwatershed

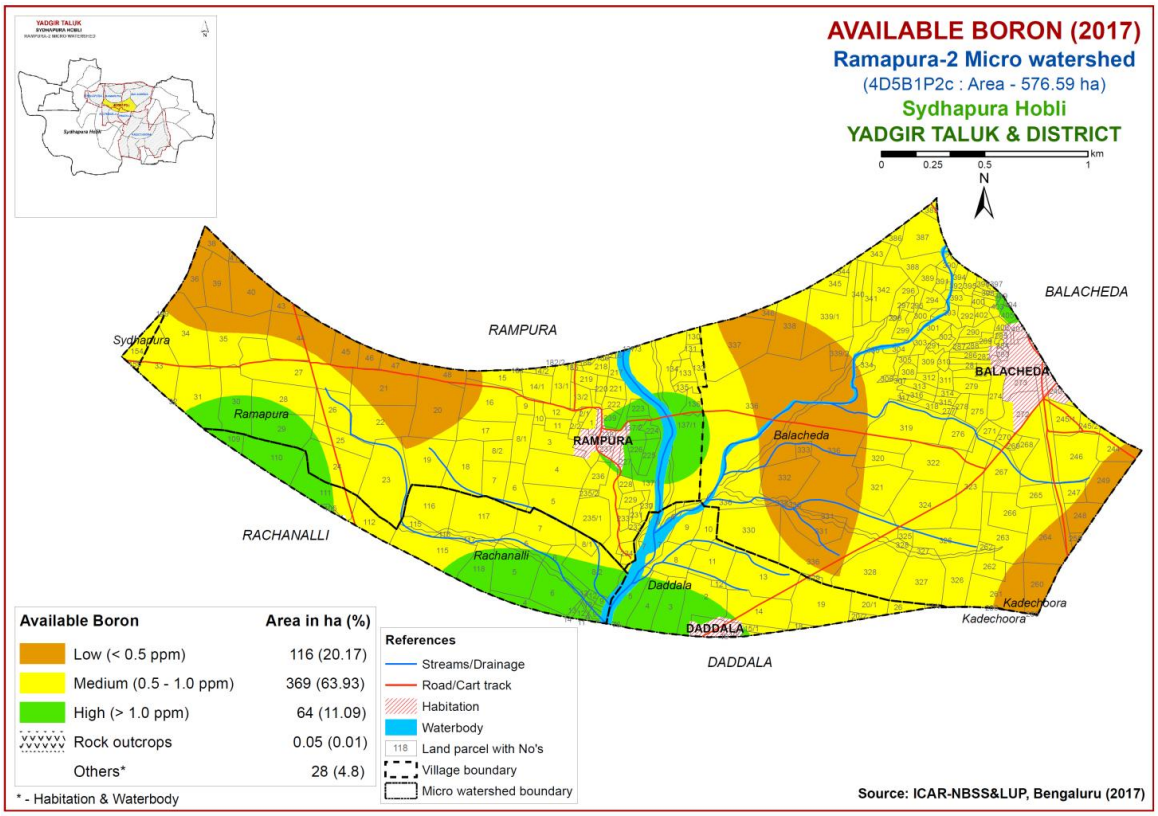



Fig.6.7 Soil Available Boron map of Ramapura-2 Microwatershed

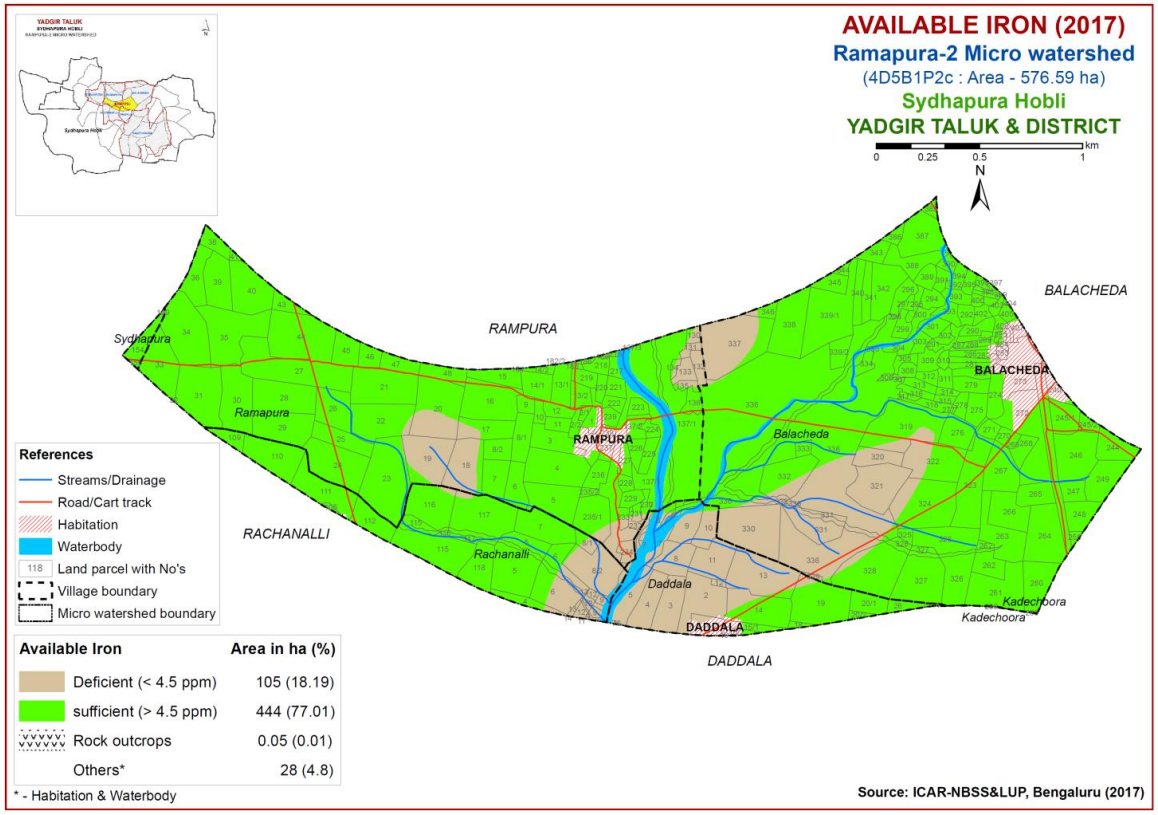



Fig.6.8 Soil Available Iron map of Ramapura-2 Microwatershed

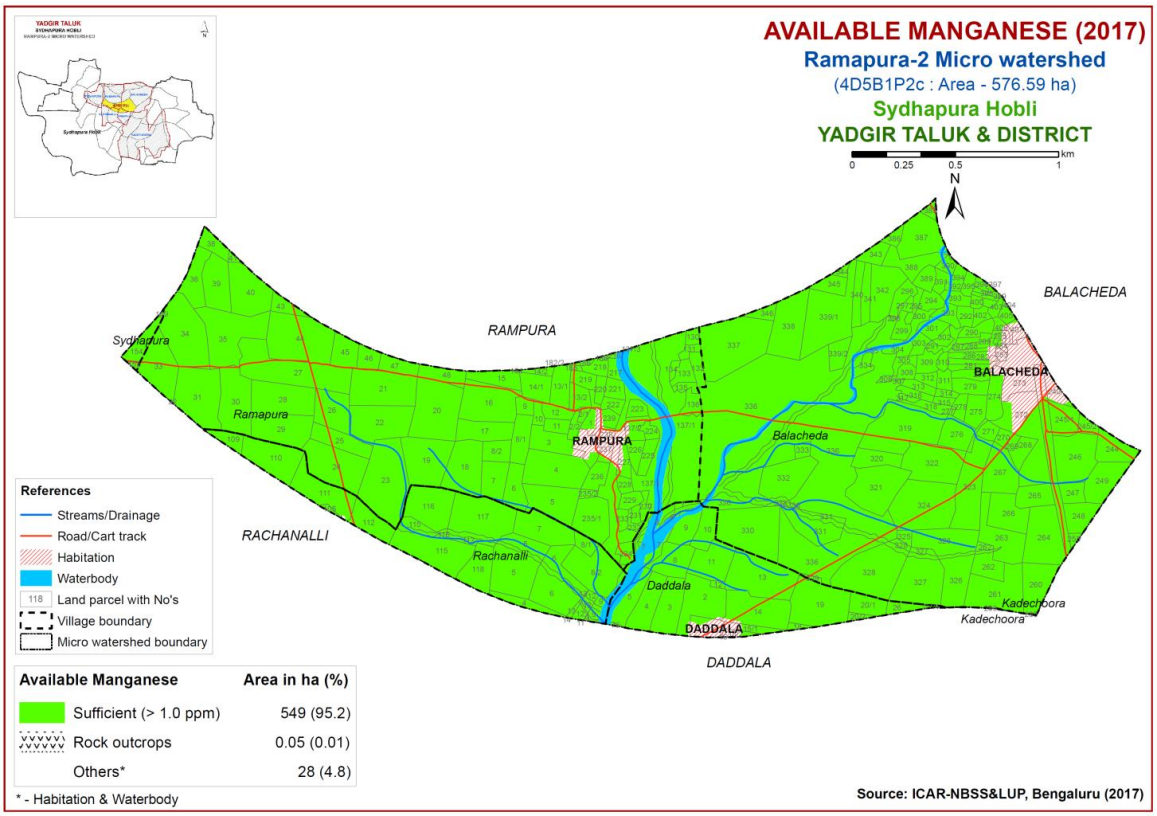



Fig.6.9 Soil Available Manganese map of Ramapura-2 Microwatershed

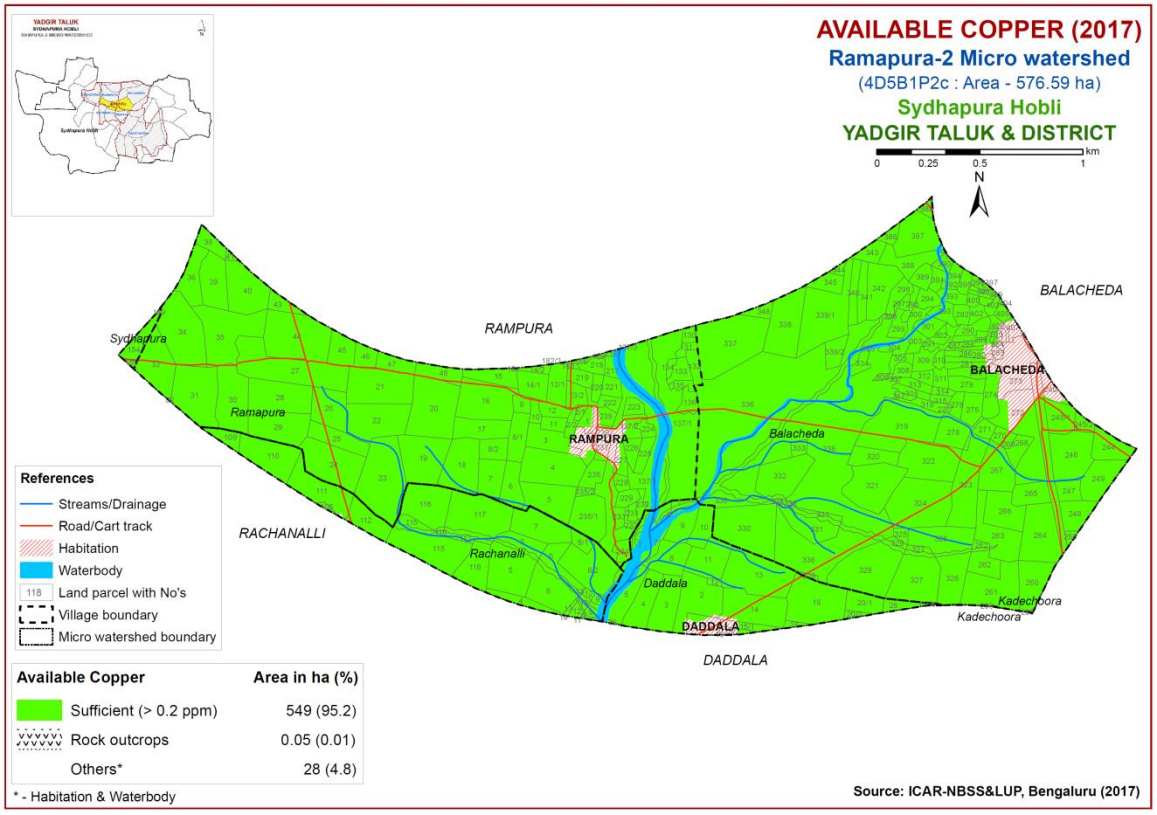



Fig.6.10 Soil Available Copper map of Ramapura-2 Microwatershed

## 6.11 Available Zinc

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

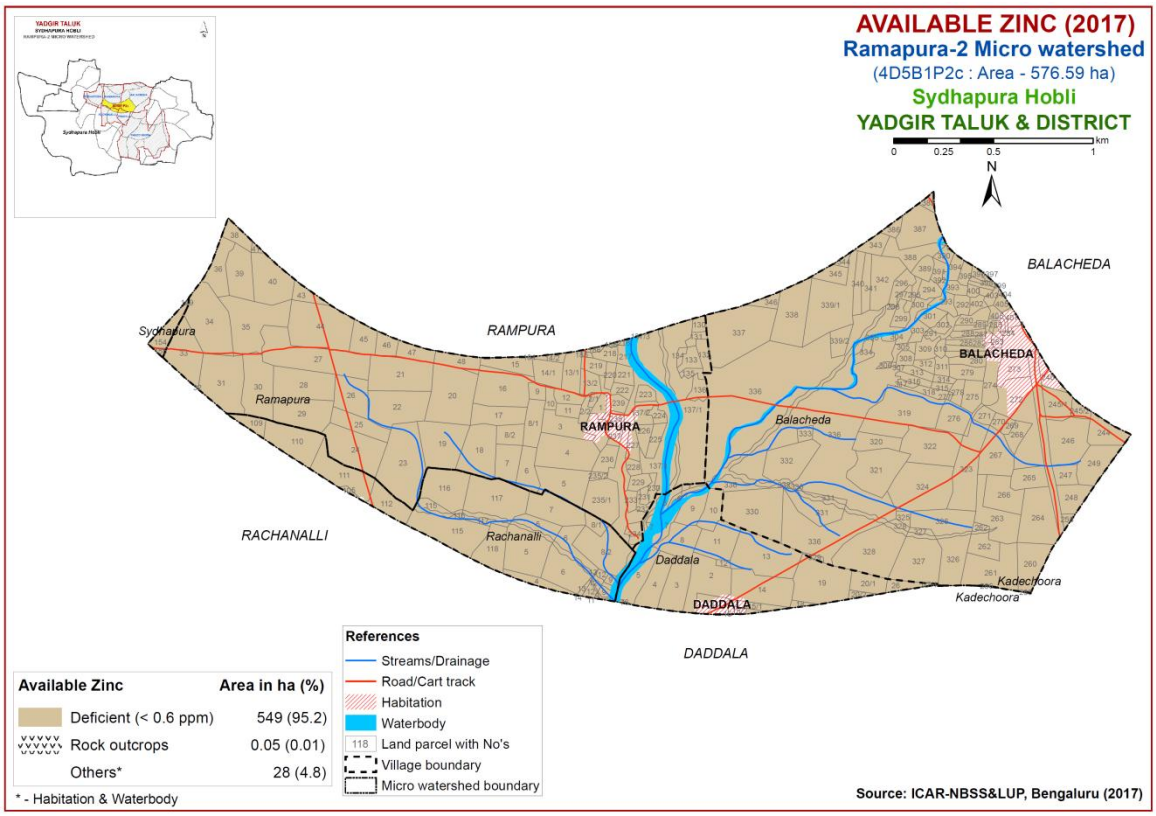



Fig.6.11 Soil Available Zinc map of Ramapura-2 Microwatershed

*Chapter 7*

# LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Ramapura-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 crop requirements were matched with the soil and land characteristics (Table 7.1) to arrive at the crop suitability. In FAO land suitability classification, two orders are recognized. Order S-Suitable and Order N-Not suitable. The orders have classes, subclasses and units. Order-S has three classes, Class S1-Highly Suitable, Class S2-Moderately Suitable and Class S3- Marginally Suitable. Order N has two classes, N1-Currently not Suitable and N2- Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2 and S3 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, 'w' for drainage, 's' for sodium and 'z' for calcareousness. 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 for26major agricultural and horticultural crops were generated. The detailed information on the kind of suitability of each of the soil phase for the crops assessed are given village/ survey number wise for the microwatershed in Appendix-III.

## 7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

Sorghum is one of the major crops grown in Karnataka in an area of 10.47 lakh ha in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad, Bellary, Chitradurga, Mysore and Tumakuru 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.

There are no highly suitable (Class S1) lands available for growing sorghum in the microwatershed. Maximum area of about522 ha (91%) is moderately suitable (Class S2) for growing sorghum and are distributed in the majorpart of the microwatershed. They have minor limitations of calcareousness, drainage, gravelliness and rooting

**Table 7.1 Soil-Site Characteristics of Ramapura-2 Microwatershed**

| Soil Map Units | Climate (P) (mm) | Growing period (Days) | Drain-age Class | Soil depth (cm) | Soil texture | | Gravelliness | | AWC (mm/m) | Slope (%) | Erosion | pH | EC ($dSm^{-1}$) | ESP (%) | CEC [Cmol ($p^{+}$)$kg^{-1}$] | BS (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Sur-face | Sub-surface | Surface (%) | Sub-surface (%) | | | | | | | | |
| BDLiB2 | 866 | 150 | WD | 25-50 | sc | sl | - | - | <50 | 1-3 | moderate | 6.20 | 0.07 | 0.20 | 4.20 | 93 |
| HLGbB3 | 866 | 150 | WD | 50-75 | ls | scl | - | - | 51-100 | 1-3 | severe | 8.49 | 0.18 | 0.69 | 8.80 | 100 |
| HLGcB2 | 866 | 150 | WD | 50-75 | sl | scl | - | - | 51-100 | 1-3 | moderate | 8.49 | 0.18 | 0.69 | 8.80 | 100 |
| HLGiB2 | 866 | 150 | WD | 50-75 | sc | scl | - | - | 51-100 | 1-3 | moderate | 8.49 | 0.18 | 0.69 | 8.80 | 100 |
| HLGiB2g1 | 866 | 150 | WD | 50-75 | sc | scl | 15-35 | - | 51-100 | 1-3 | moderate | 8.49 | 0.18 | 0.69 | 8.80 | 100 |
| HLGiB3g1 | 866 | 150 | WD | 50-75 | sc | scl | 15-35 | - | 51-100 | 1-3 | severe | 8.49 | 0.18 | 0.69 | 8.80 | 100 |
| YLRbB2 | 866 | 150 | WD | 50-75 | ls | c | - | 15-35 | 51-100 | 1-3 | moderate | 6.91 | 0.06 | 0.45 | 6.90 | 100 |
| YLRcB2g1 | 866 | 150 | WD | 50-75 | sl | c | 15-35 | 15-35 | 51-100 | 1-3 | moderate | 6.91 | 0.06 | 0.45 | 6.90 | 100 |
| YLRiB2 | 866 | 150 | WD | 50-75 | sc | c | - | 15-35 | 51-100 | 1-3 | moderate | 6.91 | 0.06 | 0.45 | 6.90 | 100 |
| ANRiB2 | 866 | 150 | MWD | 100-150 | sc | c | - | - | >200 | 1-3 | moderate | 10.17 | 0.36 | 17.70 | 19.90 | 100 |
| ANRiB3g1 | 866 | 150 | MWD | 100-150 | sc | c | 15-35 | - | >200 | 1-3 | severe | 10.17 | 0.36 | 17.70 | 19.90 | 100 |
| GDLcB3 | 866 | 150 | WD | 25-50 | sl | c | - | - | <50 | 1-3 | severe | 9.72 | 1.21 | 90.68 | 30.39 | 100 |
| KYTcB2 | 866 | 150 | WD | 25-50 | sl | scl | - | - | <50 | 1-3 | moderate | 7.07 | 0.12 | 0.17 | 8.20 | 99 |
| RMPcB2 | 866 | 150 | WD | 50-75 | sl | scl | - | - | 101-150 | 1-3 | moderate | 5.97 | 0.04 | 0.77 | 1.70 | 56 |
| RHNcB2 | 866 | 150 | WD | 75-100 | sl | scl | - | - | 101-150 | 1-3 | moderate | 8.16 | 0.22 | 8.81 | 8.99 | 99 |
| RHNmB2 | 866 | 150 | WD | 75-100 | c | scl | - | - | 101-150 | 1-3 | moderate | 8.16 | 0.22 | 8.81 | 8.99 | 99 |
| KDRbB2g1 | 866 | 150 | MWD | 100-150 | ls | c | 15-35 | - | >200 | 1-3 | moderate | 8.34 | 0.15 | 0.22 | 33.20 | 100 |
| KDRcB2 | 866 | 150 | MWD | 100-150 | sl | c | - | - | >200 | 1-3 | moderate | 8.34 | 0.15 | 0.22 | 33.20 | 100 |
| KDRiB2 | 866 | 150 | MWD | 100-150 | sc | c | - | - | >200 | 1-3 | moderate | 8.34 | 0.15 | 0.22 | 33.20 | 100 |
| KDRiB3 | 866 | 150 | MWD | 100-150 | sc | c | - | - | >200 | 1-3 | severe | 8.34 | 0.15 | 0.22 | 33.20 | 100 |
| KDRmB2 | 866 | 150 | MWD | 100-150 | c | c | - | - | >200 | 1-3 | moderate | 8.34 | 0.15 | 0.22 | 33.20 | 100 |
| SWRmB2 | 866 | 150 | MWD | 100-150 | c | c | - | - | >200 | 1-3 | moderate | 8.44 | 0.18 | 0.45 | 47.70 | 100 |
| HGNcB2 | 866 | 150 | MWD | >150 | sl | c | - | - | >200 | 1-3 | moderate | 8.77 | 1.33 | 14.38 | 36.23 | 100 |
| HGNiB2 | 866 | 150 | MWD | >150 | sc | c | - | - | >200 | 1-3 | moderate | 8.77 | 1.33 | 14.38 | 36.23 | 100 |
| HGNmB2 | 866 | 150 | MWD | >150 | c | c | - | - | >200 | 1-3 | moderate | 8.77 | 1.33 | 14.38 | 36.23 | 100 |
| TMKiB2 | 866 | 150 | MWD | >150 | sc | c | - | - | >200 | 1-3 | moderate | 9.60 | 0.35 | 16.57 | 21.83 | 100 |

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

-depth. Small area of about 25 ha (4%) is marginally suitable (Class S3) for growing sorghum and is distributed in the southeastern, eastern, northeastern, central, southern and southwestern part of the microwatershed with moderate limitations of rooting depth and calcareousness.

**Table 7.2 Land suitability criteria for Sorghum**

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

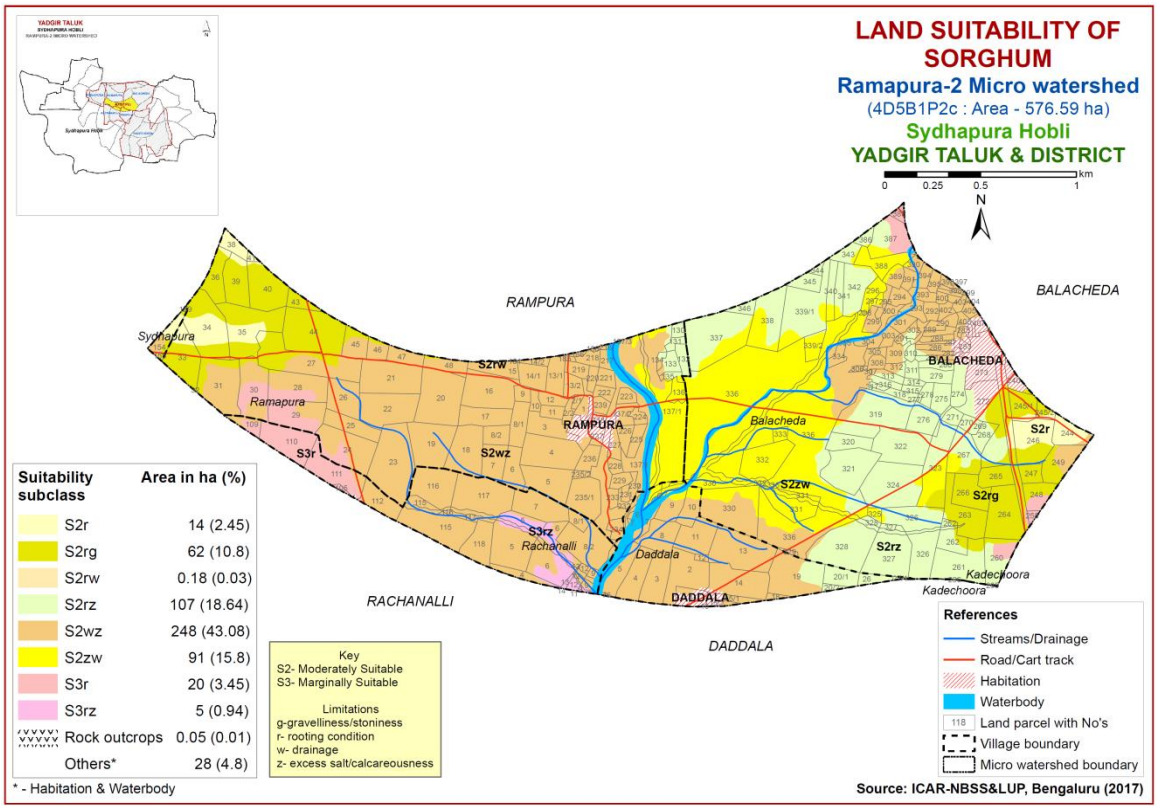



Fig. 7.1 Land Suitability map of Sorghum

### 7.2 Land Suitability for Maize (*Zea mays*)

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

**Table 7.3 Land suitability criteria for Maize**

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

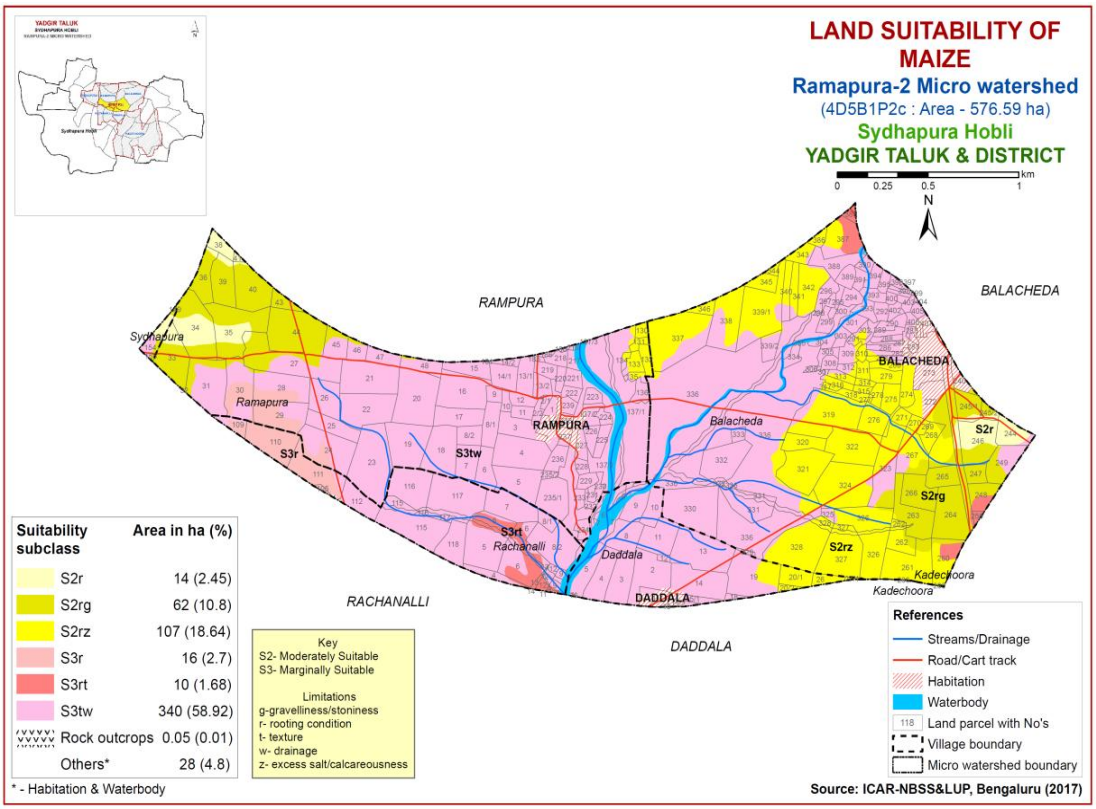



Fig. 7.2 Land Suitability map of Maize

There are no highly suitable (Class S1) lands available for growing maize in the microwatershed. Moderately suitable (Class S2) lands occur in an area of 183 ha (32%) and are distributed in all parts of the microwatershed with minor limitations of rooting

depth, gravelliness and calcareousness. Marginally suitable lands (Class S3) for growing maize occupy maximum area of about 366 ha (63%) and occur in the major part of the microwatershed. They have moderate limitations of rooting depth, drainage and texture.

### 7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

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

**Table 7.4 Land suitability criteria for Bajra**

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

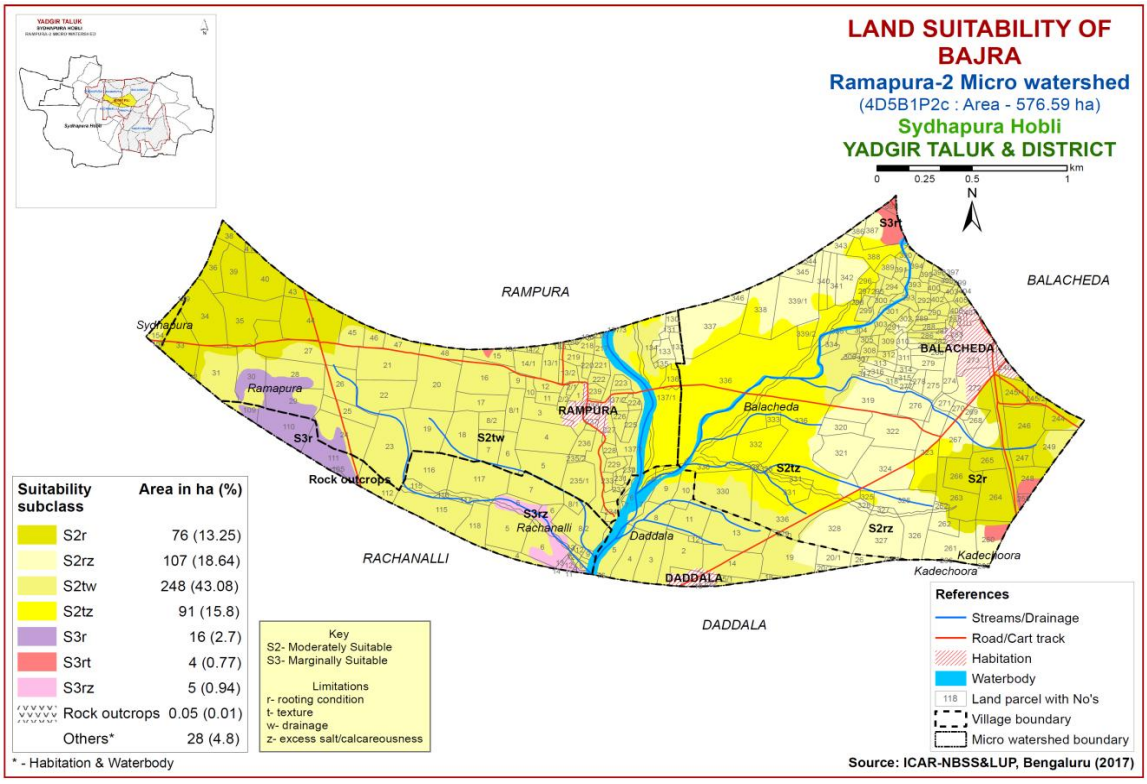



Fig. 7.3 Land Suitability map of Bajra

There are no highly (Class S1) suitable lands available for growing bajra in the microwatershed. Major area of about 522 ha (91%) is moderately suitable (Class S2) for growing bajra and are distributed in the major part of the microwatershed. They have minor limitations of texture, drainage, rooting depth and calcareousness. Marginally suitable lands (Class S3) occupy an area of about 25 ha (4%) and distributed in the central, southeastern, northeastern, southwestern and southern part of the microwatershed. They have moderate limitations of rooting depth, calcareousness and texture.

### 7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

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

There are no highly suitable (Class S1) lands available for growing Groundnut in the microwatershed. An area of about 183ha (32%) is moderately suitable (Class S2) for groundnut and are distributed in all parts of the microwatershed. They have minor limitations of calcareousness and rooting depth. Marginally suitable lands (Class S3) for growing groundnut occupy maximum area of about 366 ha (63%) and are distributed in the major part of the microwatershed. They have moderate limitations of texture, drainage and rooting depth.

**Table 7.5 Land suitability criteria for Groundnut**

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

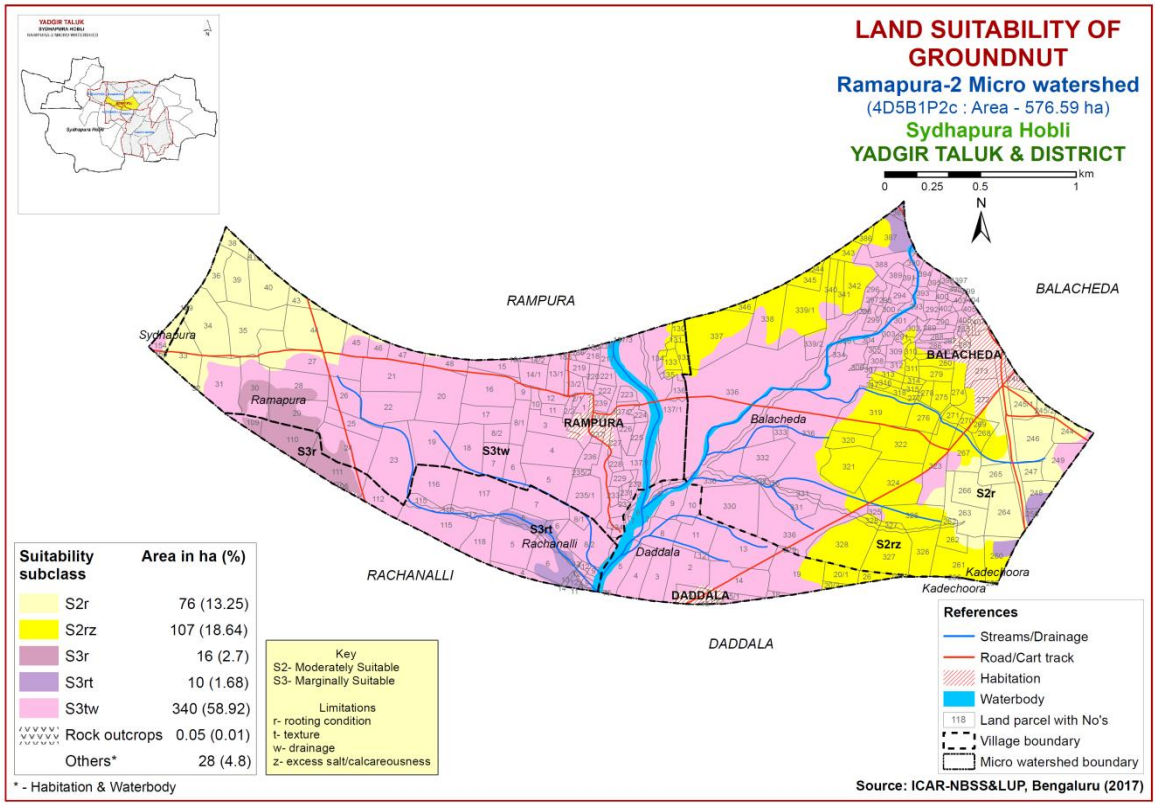



Fig. 7.4 Land Suitability map of Groundnut

### 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.

**Table 7.6 Land suitability criteria for Sunflower**

| Crop requirement | | Rating | | | |
|---|---|---|---|---|---|
| **Soil–site characteristics** | **Unit** | **Highly suitable(S1)** | **Moderately suitable (S2)** | **Marginally suitable(S3)** | **Not suitable(N)** |
| Slope | % | <3 | 3-5 | 5-10 | >10 |
| LGP | Days | >90 | 80-90 | 70-80 | <70 |
| Soil drainage | Class | Well drained | Mod. well rained | Imperfectly drained | Poorly drained |
| Soil reaction | pH | 6.5-8.0 | 8.1-8.55.5-6.4 | 8.6-9.0;4.5-5.4 | >9.0<4.5 |
| Surface soil texture | Class | l, cl, sil, sc | scl, sic, c, | c (>60%), sl | ls, s |
| Soil depth | Cm | >100 | 75-100 | 50-75 | <50 |
| Gravel content | % vol. | <15 | 15-35 | 35-60 | >60 |
| Salinity (EC) | $dSm^{-1}$ | <1.0 | 1.0-2.0 | >2.0 | |
| Sodicity (ESP) | % | <10 | 10-15 | >15 | |

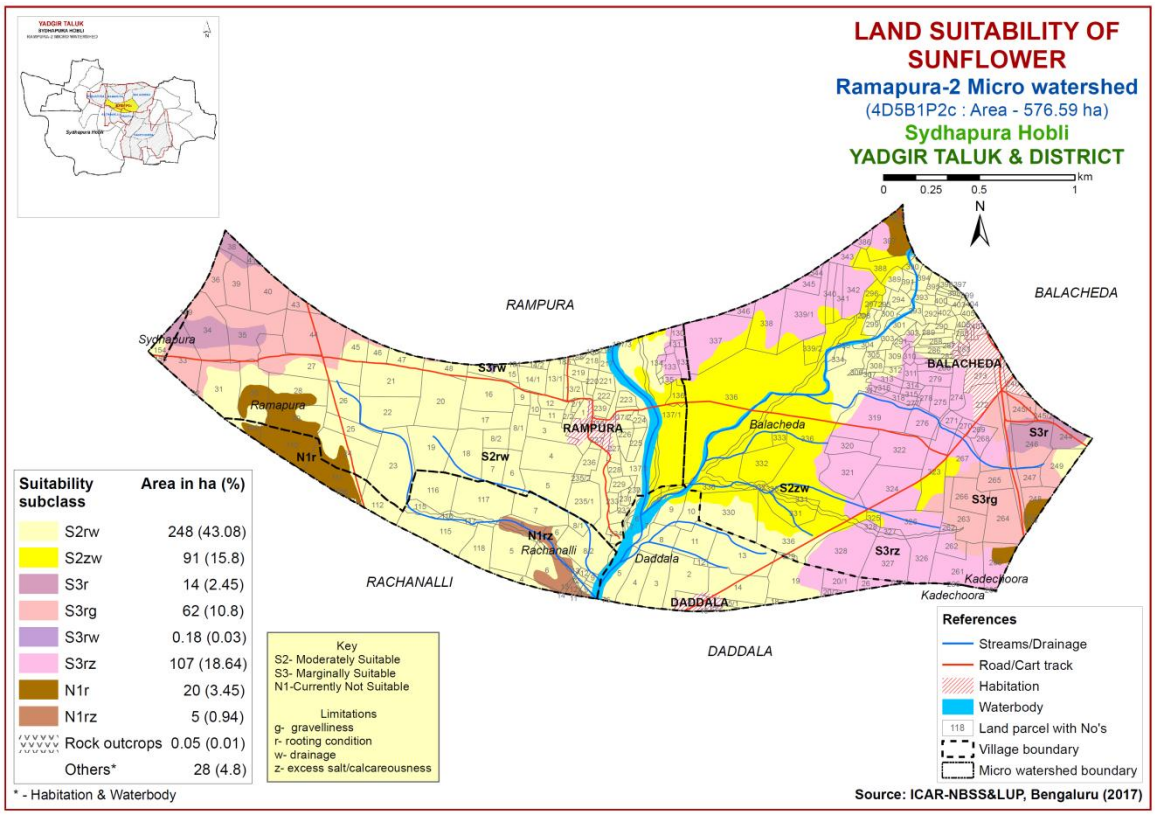



Fig. 7.5 Land Suitability map of Sunflower

There are no highly suitable (Class S1) lands available for growing sunflower in the microwatershed. Maximum area of about 339 ha (59%) is moderately suitable (Class S2) for sunflower and are distributed in the major part of the microwatershed. They have minor limitations of rooting depth, calcareousness and drainage. Marginally suitable (Class S3) lands for sunflower are found to occur in an area of 183 ha (32%) with moderate limitations of rooting depth, gravelliness, calcareousness and drainage and are distributed in all parts of the microwatershed. An area of about 25 ha (4%) is not suitable (Class N) and is distributed in the southeastern, northeastern, southern, southwestern and central part of the microwatershed with severe limitations of rooting depth and calcareousness.

### 7.6 Land suitability criteria for Red gram (*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 red gram (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 available for growing redgram in the microwatershed. Maximum area of about 339ha (59%) is moderately suitable (Class S2) for growing redgram and are distributed in the major part of the microwatershed. They have minor limitations of rooting depth, texture and drainage. Marginally suitable lands

(Class S3) for growing redgram occupy an area of about 187 ha (33%) and occur in all parts of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness, gravelliness and drainage. Not suitable (Class N) lands occur in an area of 21 ha (4%) and are distributed in the central, southwestern and southern part of the microwatershed.

**Table 7.7 Land suitability criteria for Red gram**

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

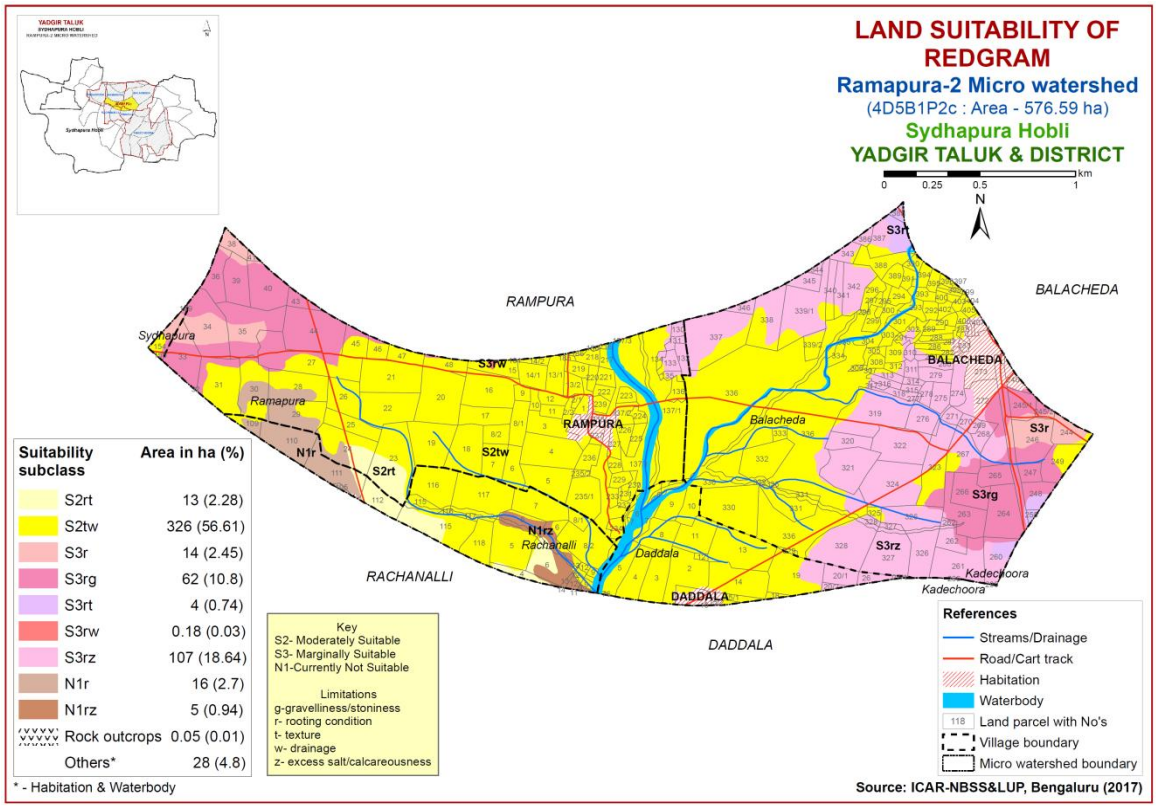



Fig. 7.6 Land Suitability map of Redgram

### 7.7 Land Suitability for Bengal gram (*Cicer aerativum*)

Bengal gram is one of the most important pulse crop grown in about 9.39 lakh ha area in Bijapur, Raichur, Kalaburgi, Dharwad, Belgaum and Bellary districts. The crop requirements for growing Bengal gram (Table 7.8) were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing Bengal gram was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.7.

**Table 7.8 Land suitability criteria for Bengal gram**

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

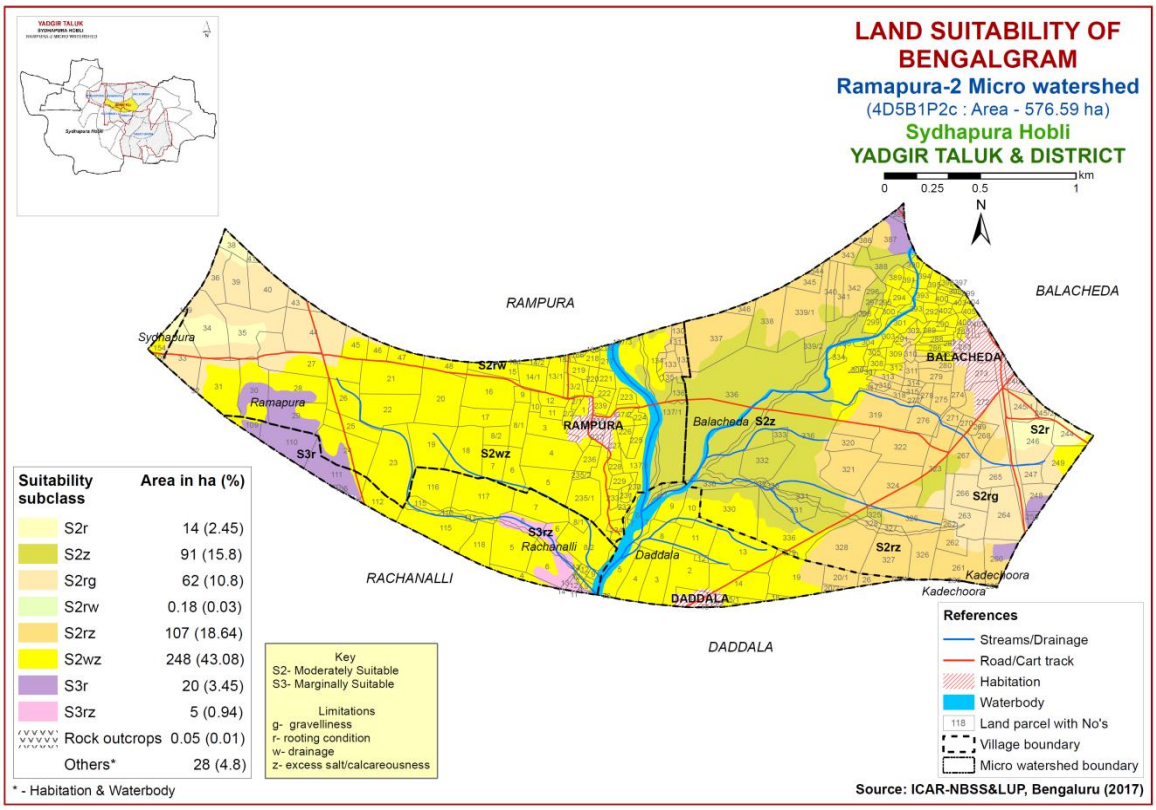



Fig. 7.7 Land Suitability map of Bengal gram.

There are no highly (Class S1) suitable lands available for growing Bengal in the microwatershed. Major area of about 522 ha (91%) is moderately suitable (Class S2) for growing Bengal gram and are distributed in the major part of the microwatershed. They have minor limitations of drainage, calcareousness, gravelliness and rooting depth. Marginally suitable lands (Class S3) occupy an area of about 25 ha (4%) and are distributed in the northeastern, southeastern, central, southern and southwestern part of the microwatershed. They have moderate limitations of rooting depth and calcareousness.

### 7.8 Land Suitability for Cotton (*Gossypium hirsutum*)

Cotton is the most important fibre crop grown in the State in about 8.75 lakh ha area in Raichur, Dharwad, Belgaum, Kalaburgi, Bijapur, Bidar, Bellary, Chitradurga and Chamarajnagar districts. The crop requirements for growing cotton (Table 7.9) 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.

No highly suitable (Class S1) lands available for growing cotton crop in the microwatershed. Moderately suitable (Class S2) lands are found to occur in maximum area of about 522ha (91%). The soils have minor limitations of rooting depth, drainage, gravelliness and calcareousness. They are distributed in the major part of the microwatershed. Marginally suitable (Class S3) lands for cotton are found to occur in an area of about 25ha (4%) with moderate limitations of rooting depth and calcareousness and are distributed in the northeastern, southeastern, southern and southwestern part the microwatershed.

**Table 7.9 Land suitability criteria for Cotton**

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

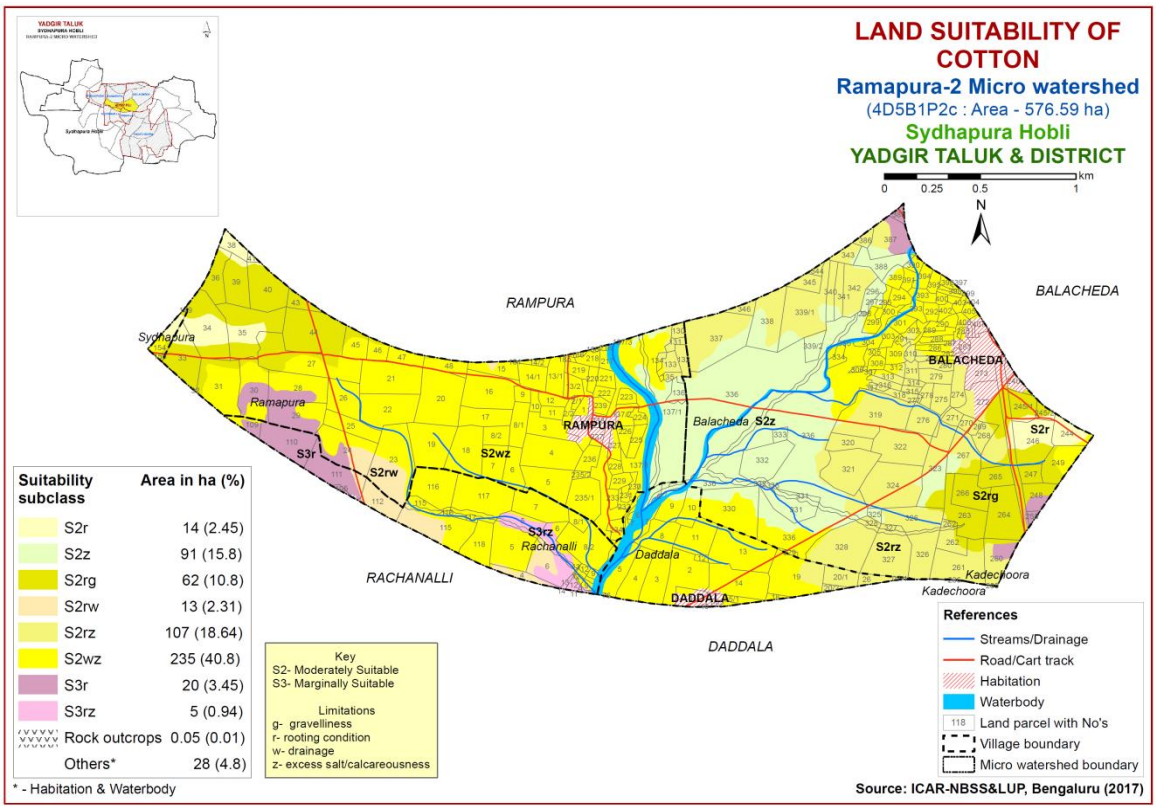



Fig. 7.8 Land Suitability map of Cotton

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

Chilli is an important spice crop grown in about 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) and a land suitability map for growing chilli was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.9.

**Table 7.10 Land suitability criteria for Chilli**

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

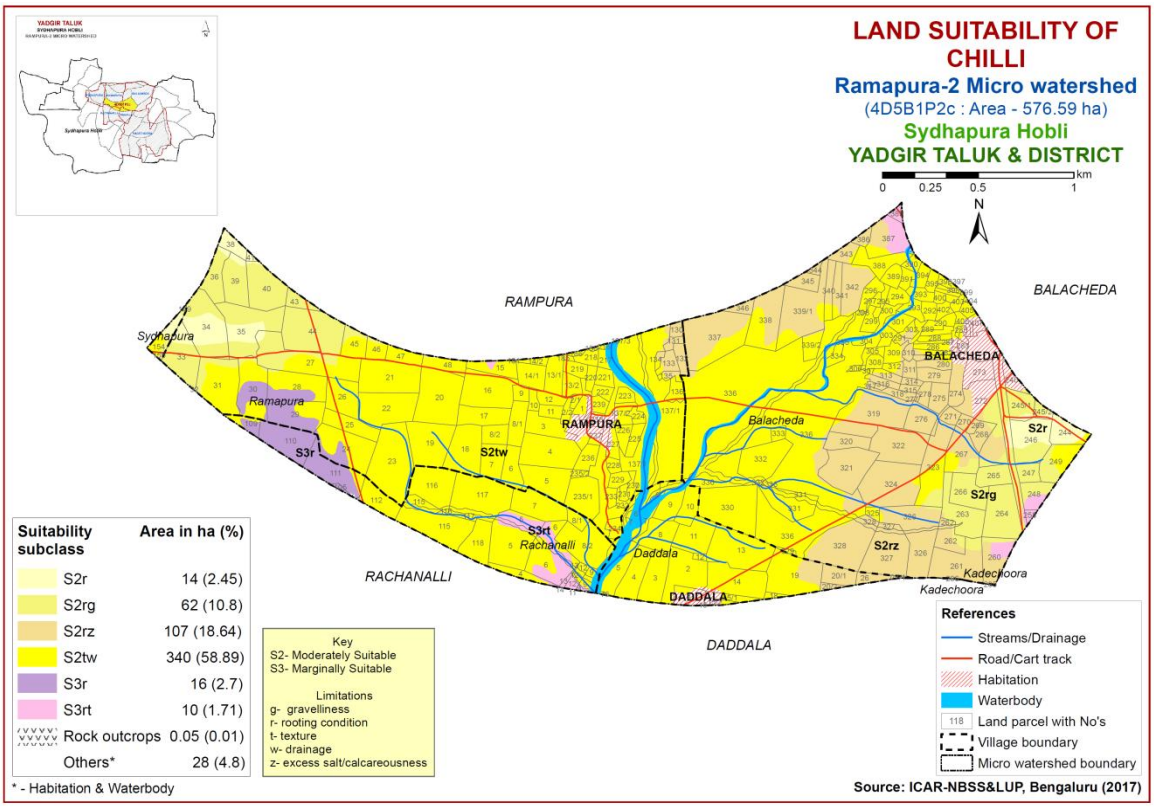



Fig 7.9 Land Suitability map of Chilli

There are no highly (Class S1) suitable lands available for growing chilli in the microwatershed. Major area of about 523 ha (91%) is moderately suitable (Class S2) for growing chilli and are distributed in the major part of the microwatershed. They have minor limitations of texture, drainage, rooting depth, gravelliness and calcareousness. Marginally suitable lands (Class S3) occupy an area of about 26 ha (4%) and are distributed in the central, southeastern, northeastern, southern and southwestern part of the microwatershed. They have moderate limitations of rooting depth and texture.

### 7.10 Land Suitability for Tomato *(Lycopersicon esculentum)*

Tomato is one of the most important commercial vegetable crop grown in about 0.61 lakh ha covering almost all the district of the state. The crop requirements for growing tomato (Table 7.11) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.10.

There are no highly (Class S1) suitable lands available for growing tomato in the microwatershed. An area of about 183 ha (32%) is moderately suitable (Class S2) for growing tomato and are distributed in all parts of the microwatershed. They have minor limitations of rooting depth, gravelliness and calcareousness. Marginally suitable lands (Class S3) occupy maximum area of 366 ha (63%) and are distributed in the major part of

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

**Table 7.11 Land suitability criteria for Tomato**

| Crop requirement | | | Rating | | | |
|---|---|---|---|---|---|---|
| **Soil –site characteristics** | | **Unit** | **Highly suitable(S1)** | **Moderately suitable(S2)** | **Marginally suitable(S3)** | **Not suitable(N)** |
| climate | Temperature in growing season | $^0$C | 25-28 | 29-32 , 20-24 | 15-19 33-36 | <15, >36 |
| Soil moisture | Growing period | Days | >150 | 120-150 | 90-120 | |
| Soil aeration | Soil drainage | class | Well drained | Moderately well drained | Poorly drained | V. poorly drained |
| Nutrient availability | Texture | Class | l, sl, cl, scl | sic,sicl,sc,c(m/k) | c (ss), ls | s |
| | pH | 1:2.5 | 6.0-7.3 | 5.5-6.0,7.3-8.4 | 8.4-9.0 | >9.0 |
| | $CaCO_3$ in root zone | % | Non calcareous | Slightly calcareous | Strongly calcareous | |
| Roting conditions | Soil depth | Cm | >75 | 50-75 | 25-50 | <25 |
| | Gravel content | %vol. | <15 | 15-35 | >35 | |
| Soil toxicity | Salinity | ds/m | Non saline | slight | strongly | |
| | Sodicity(ESP) | % | <10 | 10-15 | >15 | - |
| Erosion | Slope | % | 1-3 | 3-5 | 5-10 | >10 |

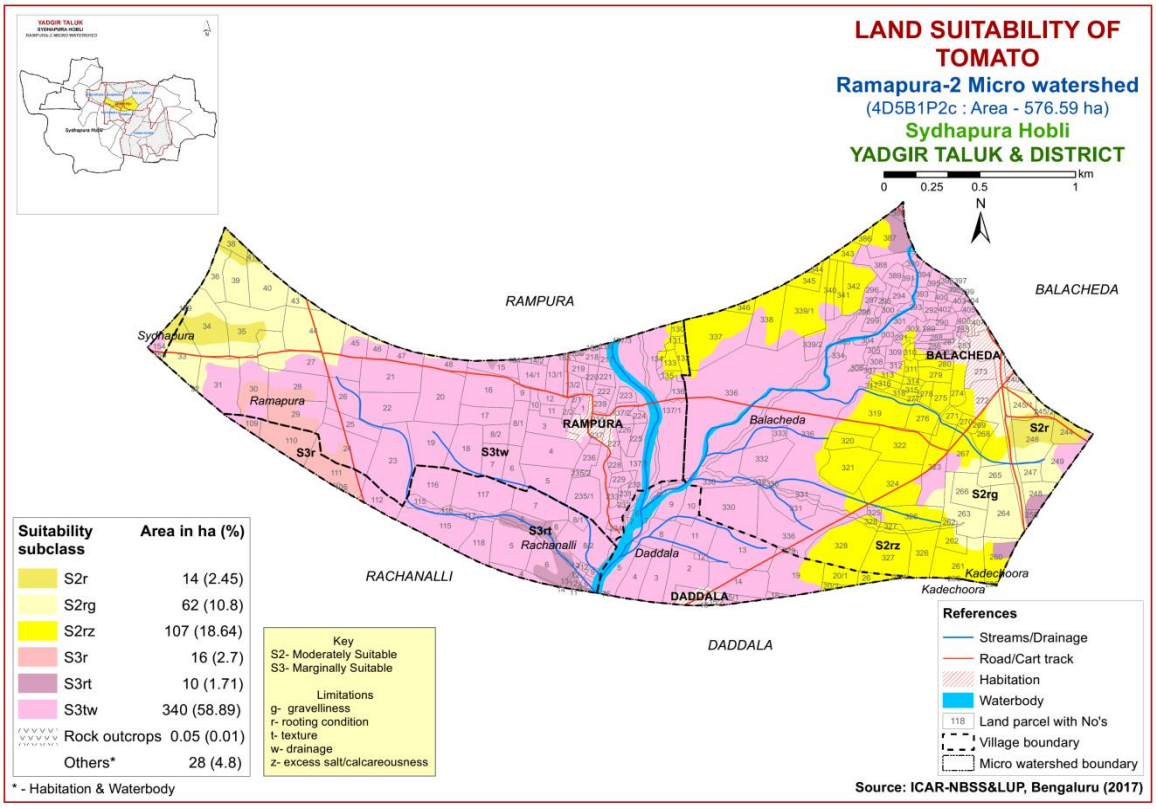



Fig 7.10 Land Suitability map of Tomato

### 7.11 Land Suitability for Drumstick (*Moringa oleifera*)

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

**Table 7.12 Land suitability criteria for Drumstick**

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

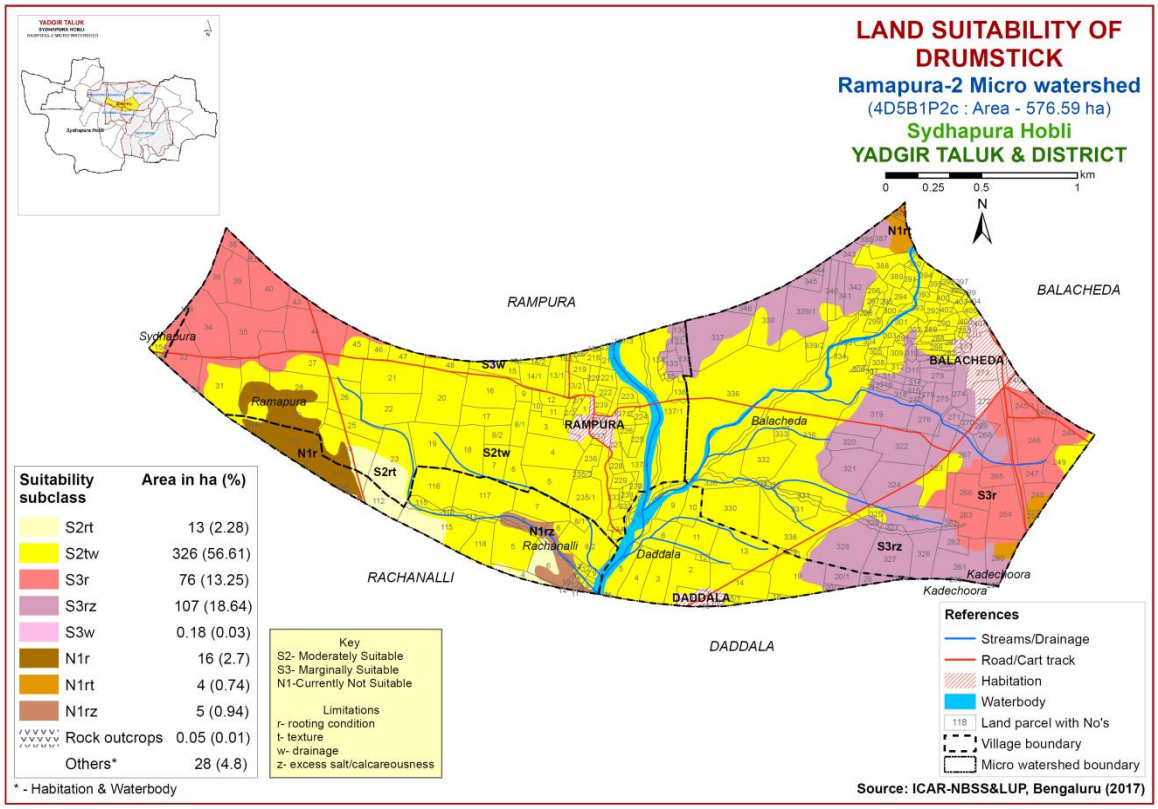



Fig 7.11 Land Suitability map of Drumstick

There are no highly (Class S1) suitable lands available for growing drumstick in the microwatershed. Maximum area of about 339 ha (59%) is moderately suitable (Class S2) for drumstick and is distributed in the major part of the microwatershed. They have

minor limitations of rooting depth, texture and drainage. An area of about 183 ha (32%) is marginally suitable (Class S3) for growing drumstick and are distributed in all parts of the microwatershed. They have moderate limitations of drainage, rooting depth and calcareousness. An area of about 25 ha (4%) is not suitable (Class N) for growing drumstick and are distributed in the southwestern, southern, central, northeastern and southeastern part of the microwatershed. They have severe limitations of rooting depth, calcareousness and texture.

### 7.12 Land suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in an area of 1.73 lakh ha in almost all the districts of the State. The crop requirements (Table 7.13) 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 is given in Figure 7.12.

There are no highly suitable (Class S1) and moderately suitable (Class S2) lands available for growing mango in the microwatershed. Maximum area of 339 ha (59%) is marginally suitable (Class S3) for growing mango with moderate limitations of drainage, texture, calcareousness and rooting depth and are distributed in all parts of the microwatershed. An area of about 209 ha (36%) is not suitable (Class N) for growing mango and are distributed in all parts of the microwatershed with severe limitations of rooting depth, calcareousness and drainage.

**Table 7.13 Land suitability criteria for Mango**

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

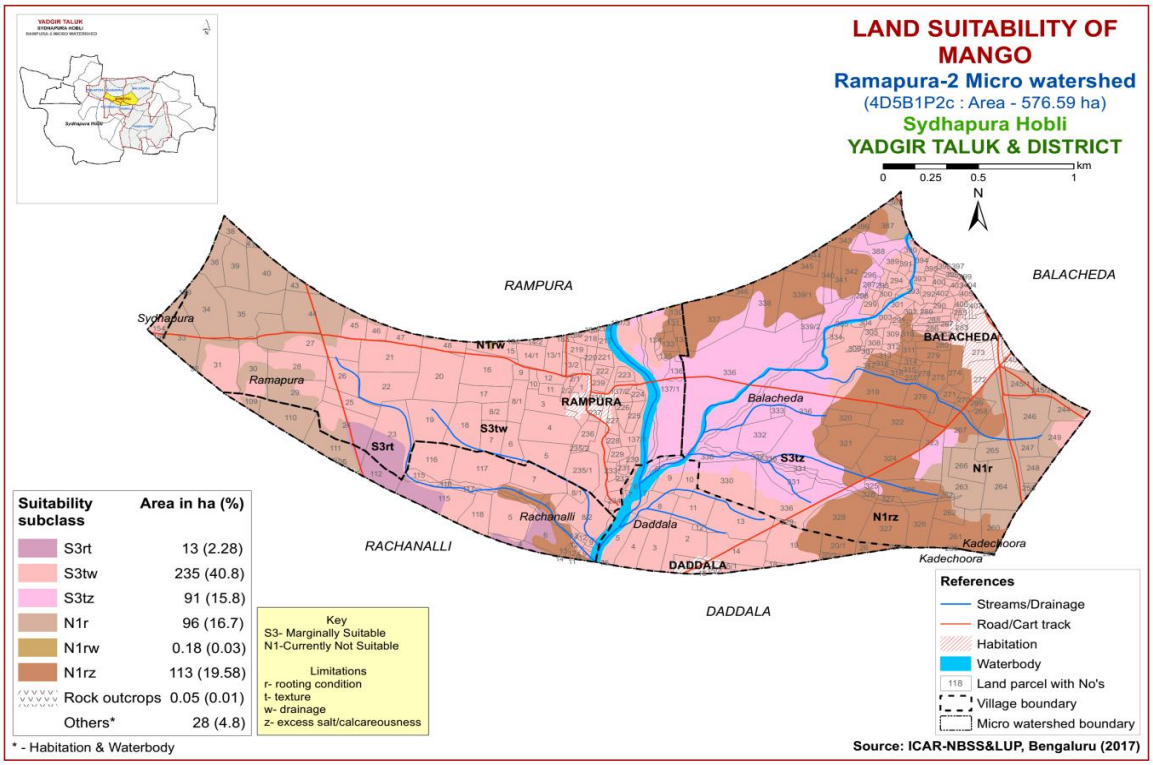



Fig. 7.12 Land Suitability map of Mango

### 7.13 Land suitability for Guava (*Psidium guajava*)

Guava is one of the most important fruit crop grown in an area of 6558 ha in almost all the districts of the State. The crop requirements (Table 7.14) for growing guava were matched with the soil-site characteristics (7.1) and a land suitability map for growing guava was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.13.

**Table 7.14 Land suitability criteria for Guava**

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

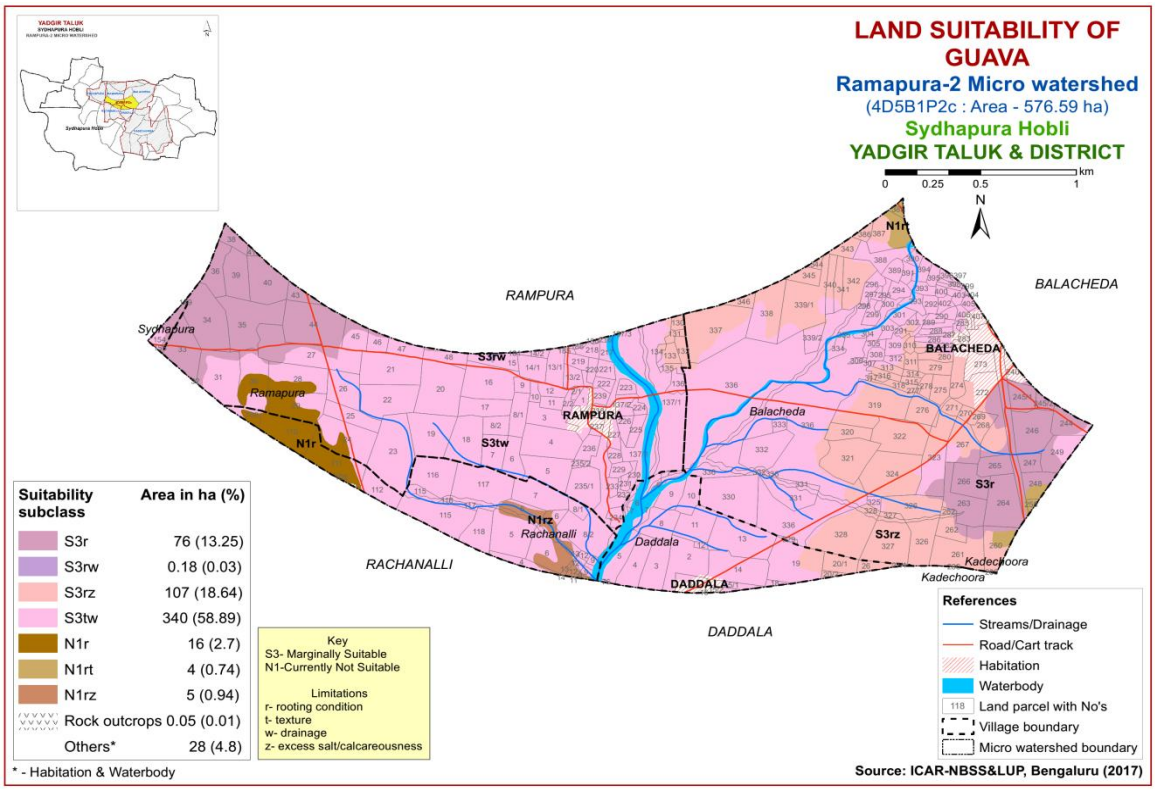



Fig. 7.13 Land Suitability map of Guava

There are no highly suitable (Class S1) and moderately suitable (Class S2) lands available for growing guava in the microwatershed. Maximum area of 523 ha (91%) is marginally suitable (Class S3) for growing guava and are distributed in the major part of the microwatershed with minor limitations of texture, rooting depth, drainage and calcareousness. Small area of about 25 ha (4%) is not suitable (N) for growing guava and occur in the southeastern, northeastern, southern and southwestern part of the microwatershed with severe limitations of rooting depth, calcareousness and texture.

### 7.14 Land suitability for Sapota (*Manilkara zapota*)

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

There are no highly suitable (Class S1) and moderately suitable (Class S2) lands available for growing Sapota in the microwatershed. Maximum area of about 523ha (91%) is marginally suitable (Class S3) for growing sapota and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness and drainage. Very small area of about 25 ha (4%) is not suitable (Class N) for growing sapota and occur in the southeastern, northeastern, southern and

southwestern part of the microwatershed with severe limitations of rooting depth and calcareousness.

**Table 7.15 Land suitability criteria for Sapota**

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

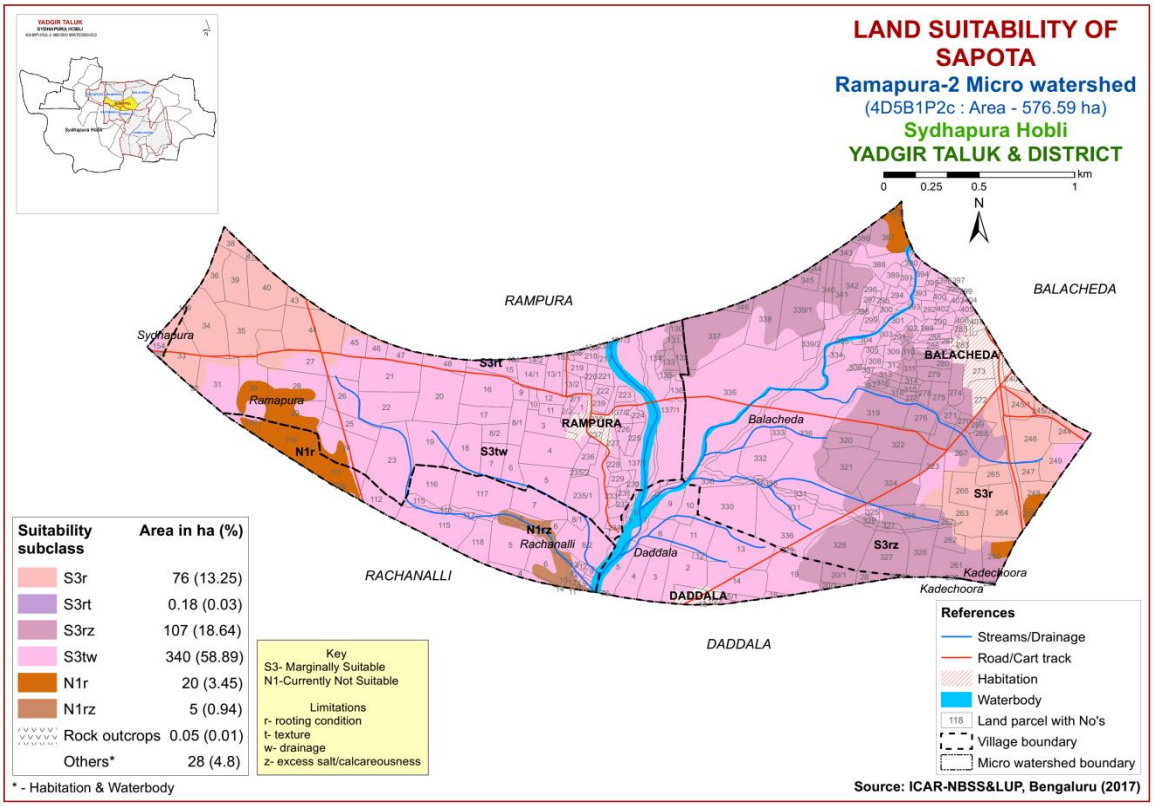



Fig. 7.14 Land Suitability map of Sapota

### 7.15 Land Suitability for pomegranate (*Punica granatum*)

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

**Table 7.16 Land suitability criteria for Pomegranate**

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

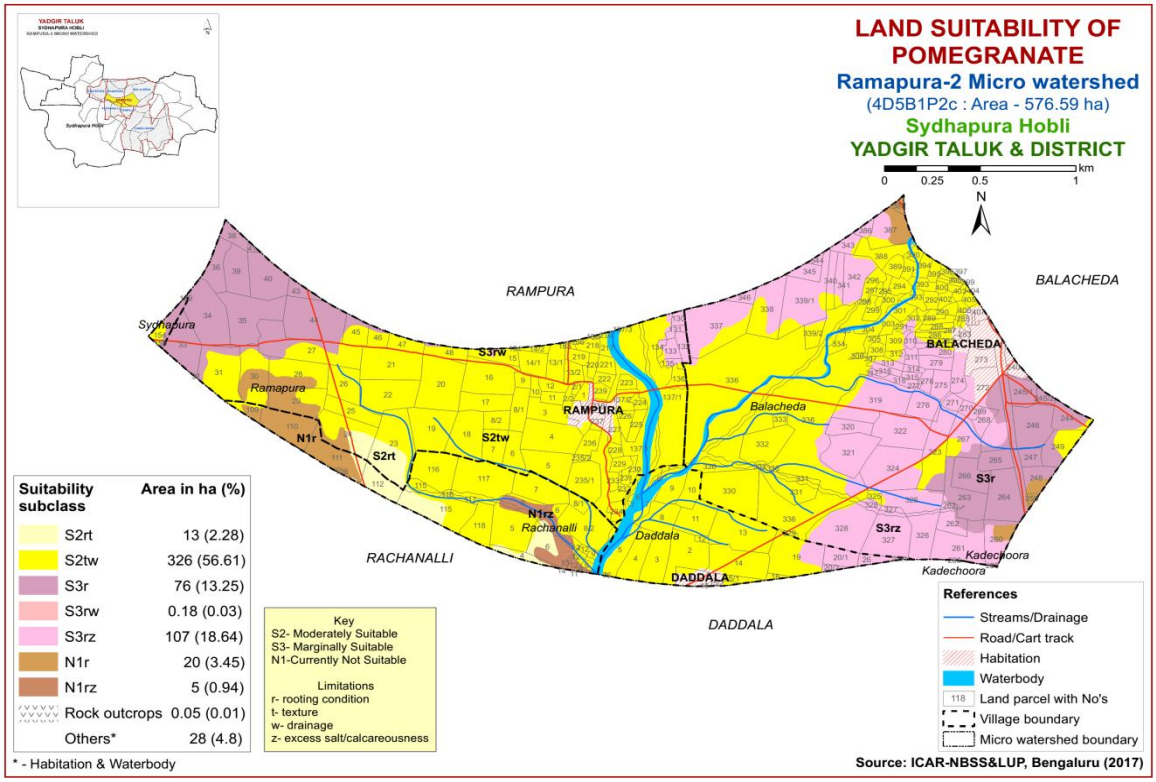



Fig 7.15 Land Suitability map of Pomegranate

There are no highly (Class S1) suitable lands available for growing pomegranate in the microwatershed. Maximum area of about 339ha (59%) is moderately suitable (Class S2) for growing pomegranate and is distributed in all parts of the microwatershed. They have minor limitations of rooting depth, texture and drainage. An area of about 183 ha (32%) is marginally suitable (Class S3) for growing pomegranate and are distributed in all parts of the microwatershed. They have moderate limitations of rooting depth, calcareousness and drainage. Small area of about 25 ha (4%) is not suitable (Class N) for growing pomegranate and is distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed with severe limitations of rooting depth and calcareousness.

### 7.16 Land Suitability for Musambi (*Citrus limetta*)

Musambi is one of the important fruit crop grown in an area of 3446 ha in almost all the districts of the State. The crop requirements for growing musambi (Table 7.17) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.16.

There are no highly suitable (Class S1) lands available for growing Musambi in the microwatershed. Maximum area of about339 ha (59%) is moderately suitable (Class S2) for growing Musambi and are distributed in the major part of the microwatershed. They have minor limitations of drainage, calcareousness and rooting depth. Marginally suitable (Class S3) lands occupy an area of about 183 ha (32%) and are distributed in all parts of the microwatershed. They have moderate limitations of rooting depth, calcareousness and drainage. Small area of about 25 ha (4%) is not suitable (Class N) and is distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed with severe limitations of rooting depth and calcareousness.

**Table 7.17 Land suitability criteria for Musambi**

| **Crop requirement** | | | **Rating** | | | |
|---|---|---|---|---|---|---|
| **Soil –site characteristics** | | **Unit** | **Highly suitable(S1)** | **Moderately suitable (S2)** | **Marginally suitable(S3)** | **Not suitable(N)** |
| Soil aeration | Soil drainage | Class | Well drained | Mod. to imperfectly drained | poorly | Very poorly |
| Nutrient availability | Texture | Class | scl, l, sicl, cl,s | sc, sc, c | c(>70%) | s, ls |
| | pH | 1:2.5 | 6.0-7.5 | 5.5-6.47.6-8.0 | 4.0-5.4,8.1-8.5 | <4.0,>8.5 |
| Rooting conditions | Soil depth | Cm | >150 | 100-150 | 50-100 | <50 |
| | Gravel content | % vol. | Non gravelly | 15-35 | 35-55 | >55 |
| Erosion | Slope | % | <3 | 3-5 | 5-10 | |

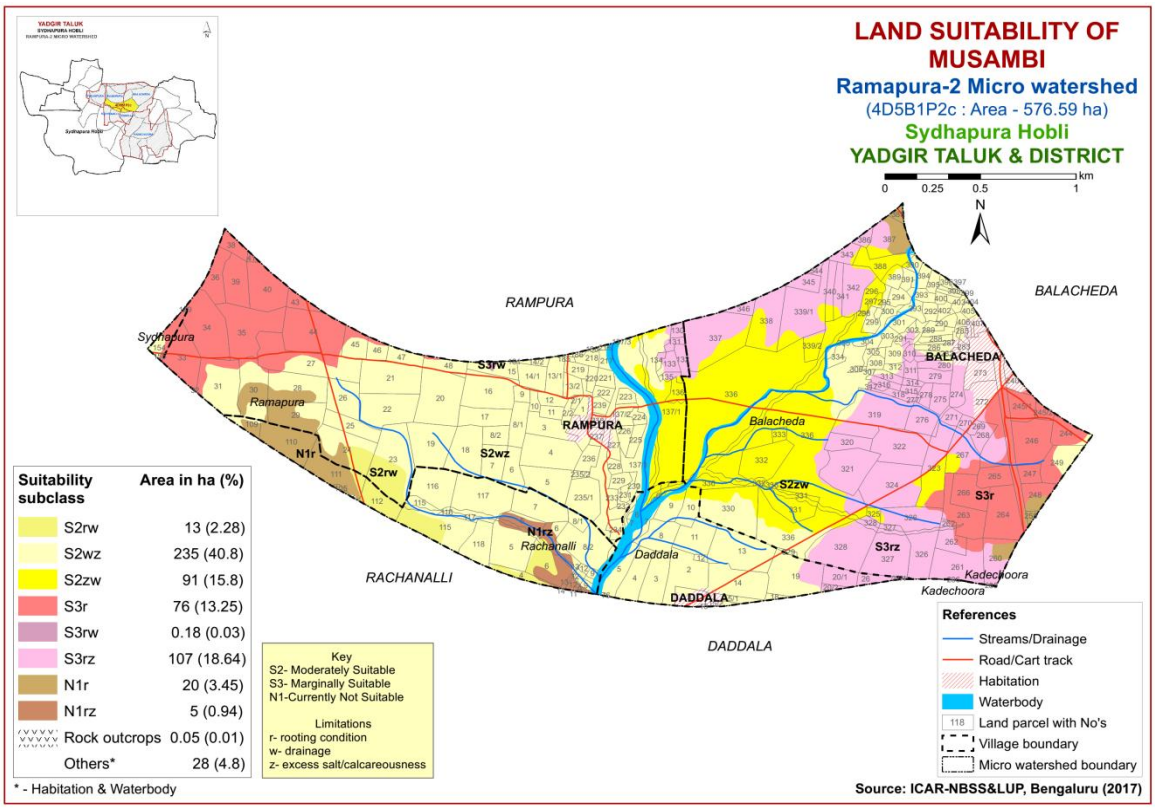



Fig. 7.16 Land Suitability map of Musambi

### 7.17 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 0.11 lakh ha in almost all the districts of the State. The crop requirements for growing lime (Table 7.18) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7. 17.

**Table 7.18 Land suitability criteria for Lime**

| Crop requirement | | | Rating | | | |
|---|---|---|---|---|---|---|
| Soil –site characteristics | | Unit | Highly suitable(S1) | Moderately suitable(S2) | Marginally suitable(S3) | Not suitable(N) |
| Climate | Temperature in growing season | $^0$C | 28-30 | 31-35<br>24-27 | 36-40<br>20-23 | >40<br><20 |
| Soil moisture | Growing period | Days | 240-265 | 180-240 | 150-180 | <150 |
| Soil aeration | Soil drainage | Class | Well drained | Mod. to imper.drained | poorly | Very poorly |
| Nutrient availability | Texture | Class | scl, l, sicl, cl, s | sc, sc, c | c(>70%) | s, ls |
| | pH | 1:2.5 | 6.0-7.5 | 5.5-6.47.6-8.0 | 4.0-5.4,8.1-8.5 | <4.0,>8.5 |
| | $CaCO_3$ in root zone | % | Non 34calcareous | Upto 5 | 5-10 | >10 |
| Rooting conditions | Soil depth | Cm | >150 | 100-150 | 50-100 | <50 |
| | Gravel content | % vol. | Non gravelly | 15-35 | 35-55 | >55 |
| Soil toxicity | Salinity | dS/m | Non saline | Upto 1.0 | 1.0-2.5 | >2.5 |
| | Sodicity | % | Non sodic | 5-10 | 10-15 | >15 |
| Erosion | Slope | % | <3 | 3-5 | 5-10 | |

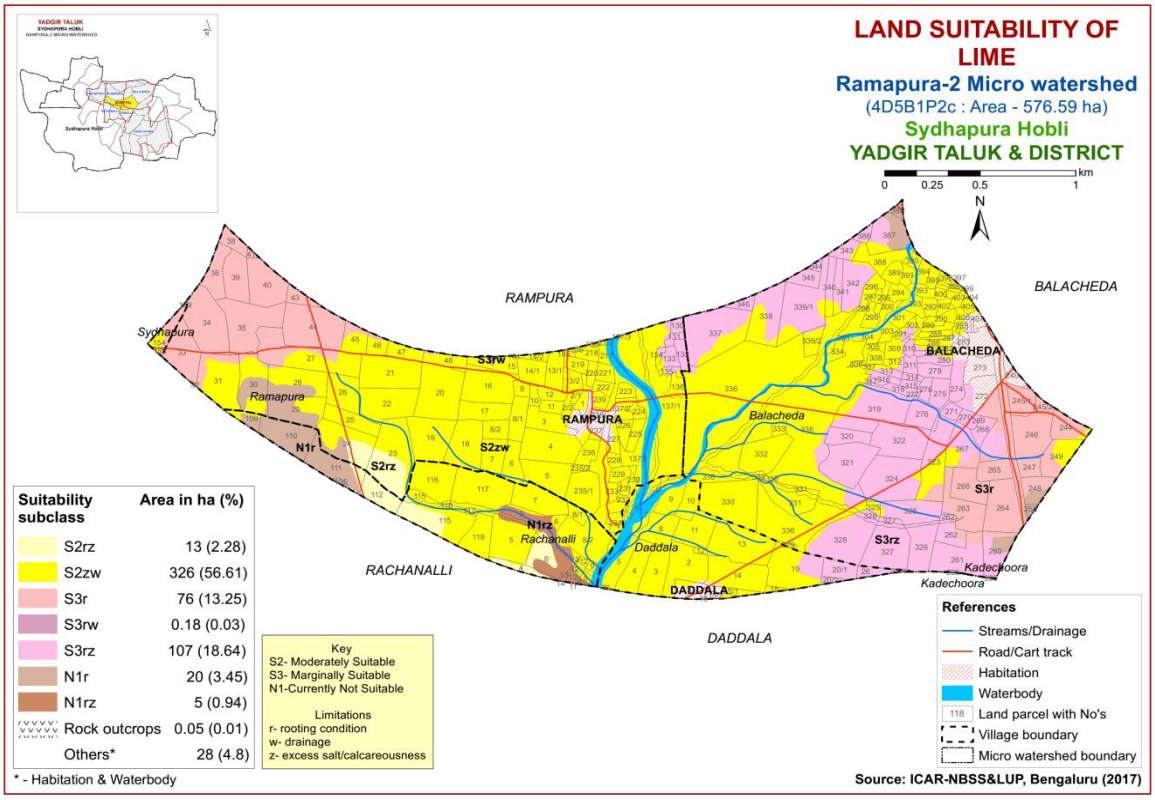



Fig. 7.17 Land Suitability map of Lime

There are no highly suitable (Class S1) lands available for growing Lime in the microwatershed. Maximum area of about 339 ha (59%) is moderately suitable (Class S2) for growing lime and are distributed in the major part of the microwatershed. They have minor limitations of drainage, calcareousness and rooting depth. Marginally suitable (Class S3) lands occupy an area of about 183 ha (32%) and are distributed in all parts of the microwatershed. They have moderate limitations of rooting depth, calcareousness and drainage. Small area of about 25 ha (4%) is not suitable (Class N) and is distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed with severe limitations of rooting depth and calcareousness.

### 7.18 Land Suitability for Amla (*Phyllanthus emblica*)

Amla is one of the medicinal fruit crop grown in almost all the districts of the State. The crop requirements for growing amla (Table 7.19) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.18.

There are no highly suitable (Class S1) lands available for growing Amla in the microwatershed. Maximum area of about 522 ha (91%) has soils that are moderately suitable (Class S2) for growing Amla with minor limitations of drainage, texture, calcareousness and rooting depth and are distributed in the major part of the microwatershed. Small area of 25 ha (4%) is marginally suitable (Class S3) lands for growing amla with moderate limitations of rooting depth, calcareousness and texture and

are distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed.

**Table 7.19 Land suitability criteria for Amla**

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

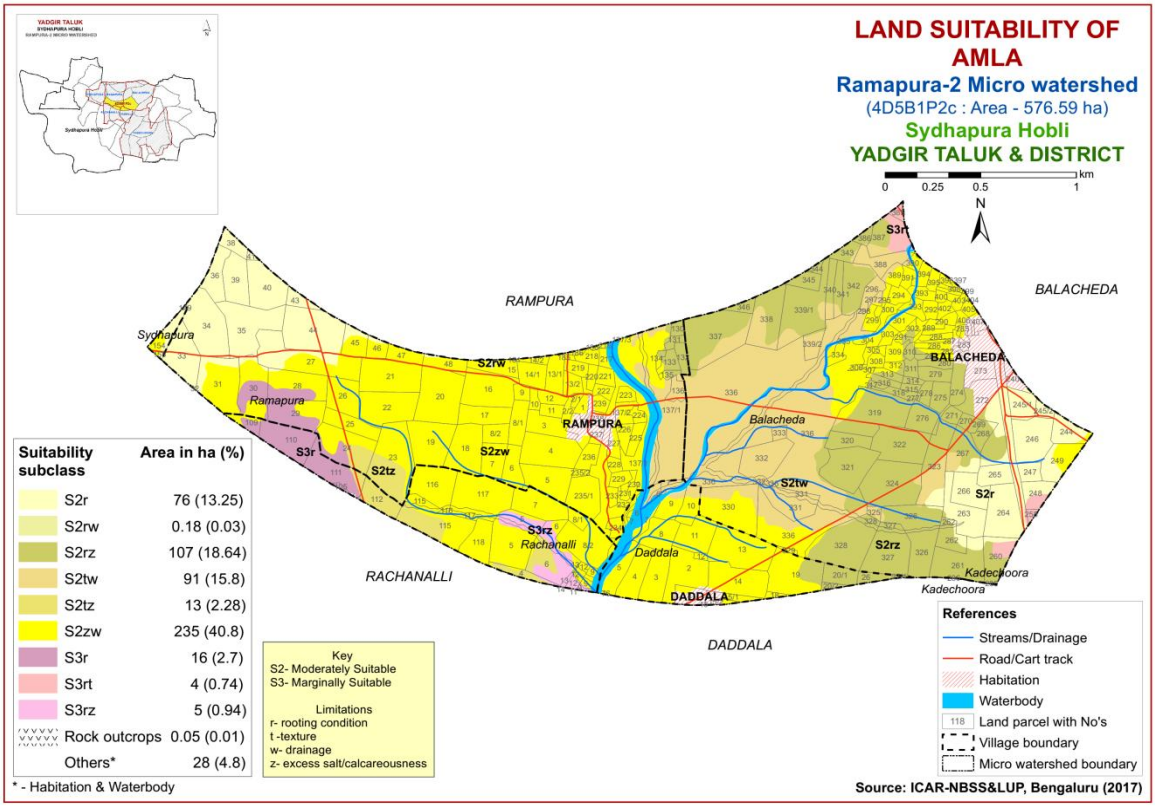



Fig. 7.18 Land Suitability map of Amla

## 7.19 Land Suitability for Cashew (*Anacardium occidentale)*

Cashew is one of the most important plantation nut crop grown in an area of 0.7 lakh ha in almost all the districts of the State. The crop requirements for growing cashew (Table 7.20) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.19.

**Table 7.20 Land suitability criteria for Cashew**

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

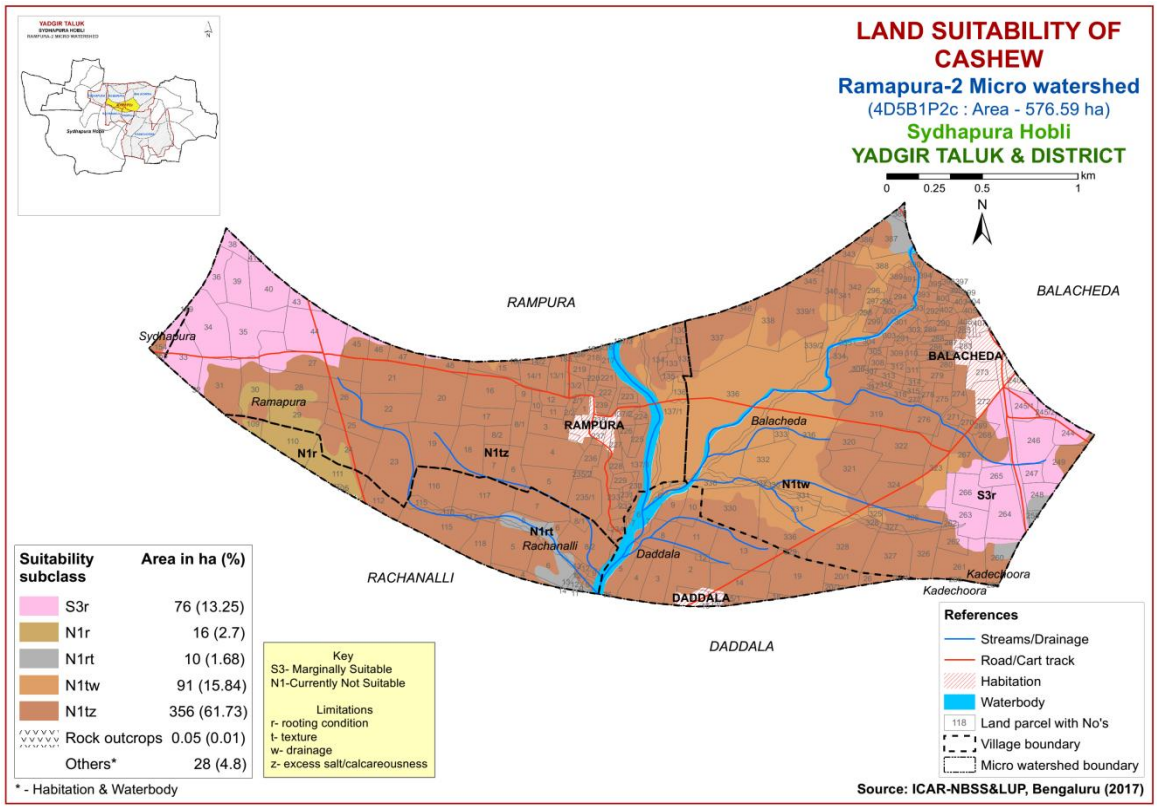



Fig. 7.19 Land Suitability map of Cashew

There are no highly suitable (Class S1) and moderately suitable (Class S2) lands available for growing cashew. Marginally suitable (Class S3) lands occupy an area of 76 (13%) ha and are distributed in the northwestern and southeastern part of the microwatershed with moderate limitation of rooting depth. Not suitable (Class N) lands for cultivation of cashew cover major area of 473 ha (82%) and are distributed in the major part of the microwatershed with severe limitations of rooting depth, texture, drainage and calcareousness

### 7. 20 Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

Jackfruit is one of the most important fruit crop grown in an area of 5368 ha in almost all the districts of the State. The crop requirements for growing jackfruit (Table

7.21) 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 geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.20.

**Table 7.21 Land suitability criteria for Jackfruit**

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

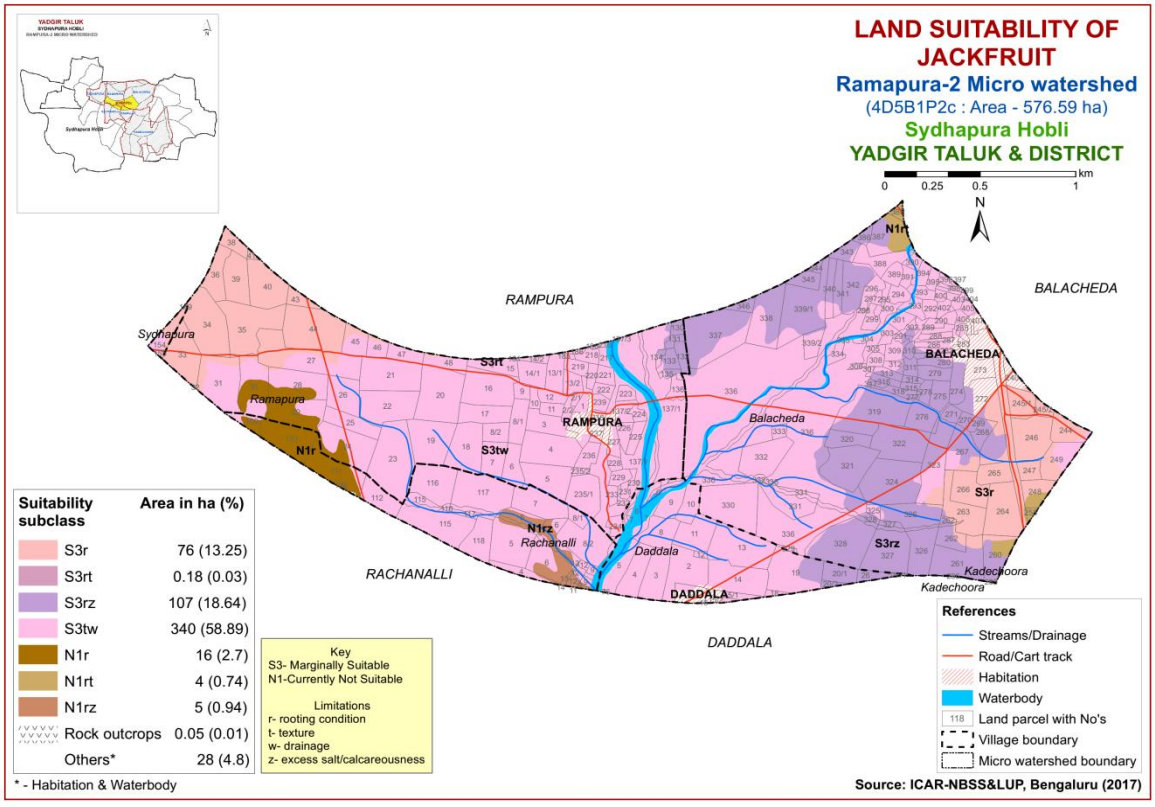



Fig. 7.20 Land Suitability map of Jackfruit

There are no highly suitable (Class S1) and moderately suitable (Class S2) lands available for growing Jackfruit in the microwatershed. Marginally suitable (Class S3) lands for growing Jackfruit occupy maximum area of about523 ha (91%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, drainage, texture and calcareousness. Small area of about 25 ha (4%) is not suitable (Class N) and is distributed in the southeastern, northeastern, central,

southwestern and southern part of the microwatershed with severe limitations of rooting depth, calcareousness and texture.

### 7.21 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the State. The crop requirements for growing jamun (Table 22) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.21.

**Table 7.22 Land suitability criteria for Jamun**

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

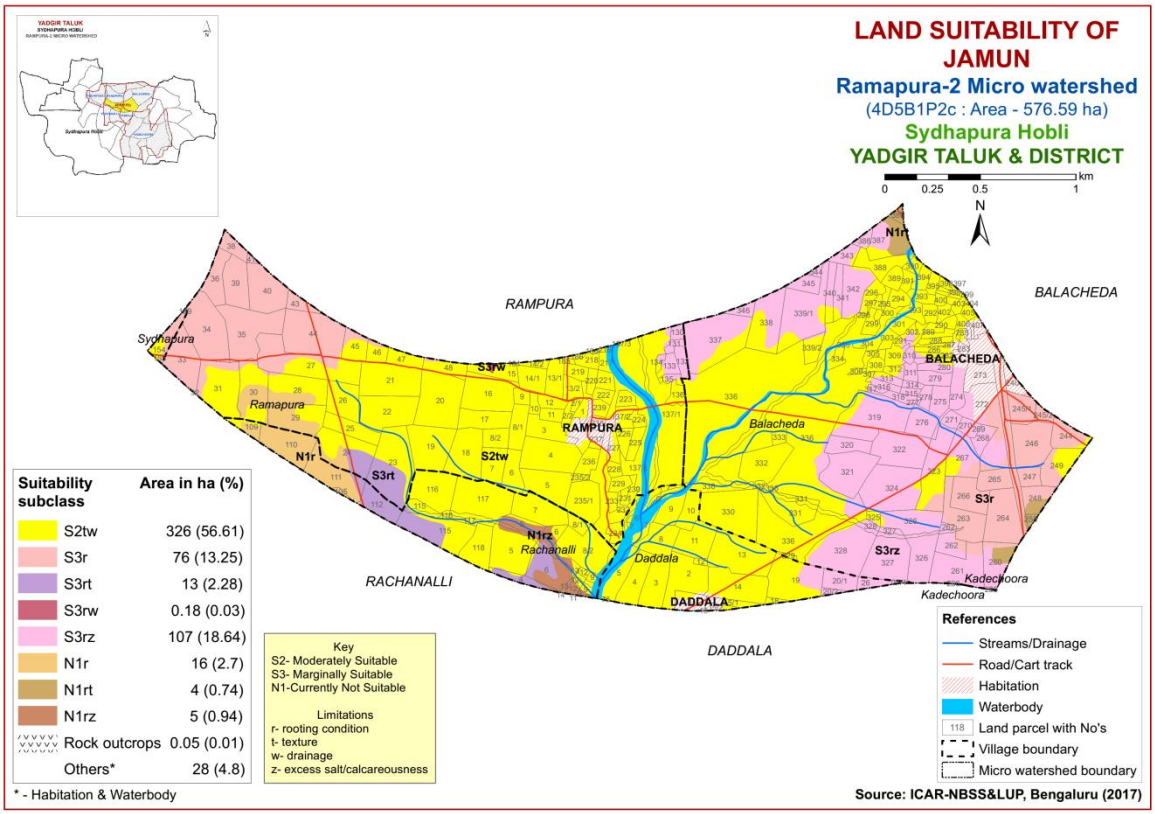



Fig. 7.21 Land Suitability map of Jamun

There are no highly suitable (Class S1) lands available for growing Jamun in the microwatershed. Maximum area of about 326 ha (56.61%) is moderately suitable (Class S2) for growing Jamun and are distributed in all parts of the microwatershed. They have minor limitations of texture and drainage. An area of about 196 ha (34%) is marginally suitable (Class S3) for growing Jamun and are distributed in all parts of the microwatershed. They have moderate limitations of drainage, texture, calcareousness and rooting depth. Very small area of about 25 ha (4%) is not suitable (N) and is distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed with severe limitations of rooting depth, calcareousness and texture.

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

Custard apple is one of the most important fruit crop grown in almost all the districts of the State. The crop requirements for growing custard apple (Table7.23) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.22.

There are no highly suitable (Class S1) lands available for growing custard apple in the microwatershed. Maximum area of about 523 ha (91%) has soils that are moderately suitable (Class S2) for growing custard apple with minor limitations of drainage, calcareousness and rooting depth and are distributed in the major part of the microwatershed. Small area of about 25 ha (4%) is marginally suitable (Class S3) for growing custard apple and is distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed with moderate limitation of rooting depth and calcareousness.

**Table 7.23 Land suitability criteria for Custard apple**

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

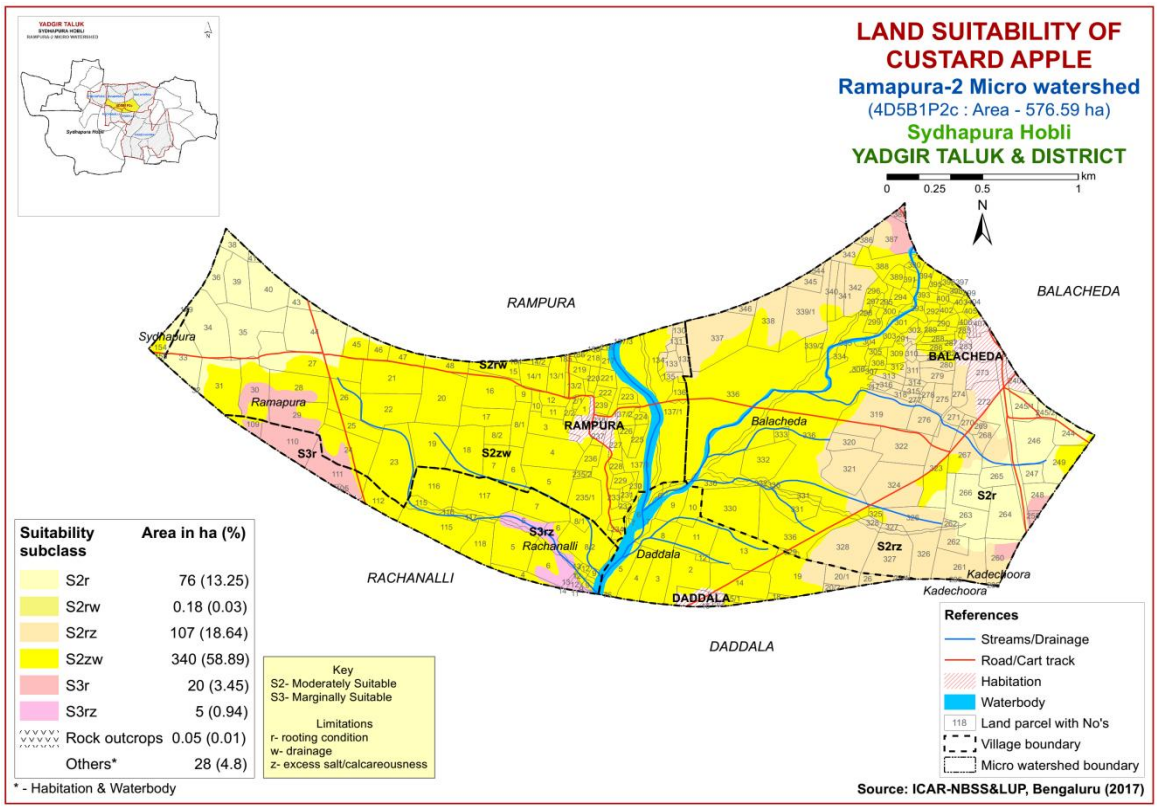



Fig. 7.22 Land Suitability map of Custard Apple

### 7.23 Land Suitability for Tamarind (*Tamarindus indica*)

Tamarind is one of the most important spice crop grown in almost all the districts of the state. The crop requirements for growing tamarind (Table 7.24) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tamarind was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Fig. 7.23.

**Table 7.24 Land suitability criteria for Tamarind**

| Crop requirement | | | Rating | | | |
|---|---|---|---|---|---|---|
| Soil –site characteristics | | Unit | Highly suitable(S1) | Moderately suitable(S2) | Marginally suitable(S3) | Not suitable(N) |
| Soil aeration | Soil drainage | Class | Well drained | Mod.well drained | Poorly drained | V.Poorly drained |
| Nutrient availability | Texture | Class | scl, cl,sc, c (red) | sl, c (black) | ls | - |
| | pH | 1:2.5 | 6.0-7.3 | 5.0-6.0,7.3-7.8 | 7.8-8.4 | >8.4 |
| Rooting conditions | Soil depth | Cm | >150 | 100-150 | 75-100 | <50 |
| | Gravel content | % vol. | <15 | 15-35 | 35-60 | 60-80 |
| Erosion | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

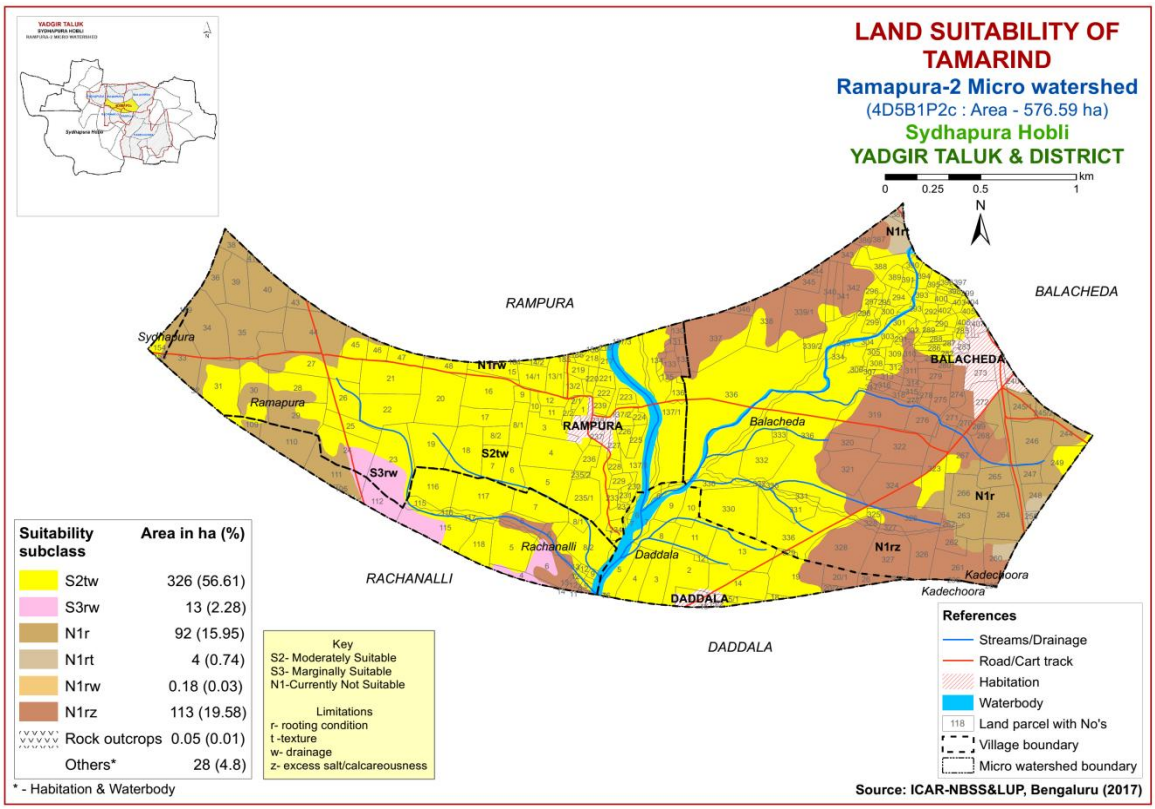



Fig. 7.23 Land Suitability map of Tamarind

There are no highly suitable (Class S1) lands available for growing Tamarind in the microwatershed. Maximum area of about 326 ha (57%) is moderately suitable (Class S2) for growing Tamarind and are distributed in the major part of the microwatershed. They have minor limitations of texture and drainage. Marginally suitable (Class S3) lands for growing Tamarind occupy small area of about 13 ha (2%) and are distributed in the central and southern part of the microwatershed. They have moderate limitations of rooting depth and drainage. An area of about 209 ha (36%) is not suitable (Class N) for growing Tamarind and occur in all parts of the microwatershed with severe limitations of rooting depth, texture, calcareousness and drainage.

### 7.24 Land Suitability for Mulberry (*Morus nigra*)

Mulberry is the important leaf crop grown for rearing silkworm in about 1.6 lakh ha area in all the districts of the state. The crop requirements for growing mulberry (Table 7.25)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 7.24.

There are no highly (Class S1) and moderately (Class S2) suitable lands available for growing mulberry in the microwatershed. Major area of about 523 ha (91%) is marginally suitable (Class S3) for growing mulberry and are distributed in the major part of the microwatershed. They have moderate limitations of texture, drainage, calcareousness and rooting depth. Not suitable lands (Class N) occupy small area of

about 25 ha (4%) and distributed in the southeastern, northeastern, southern and southwestern part of the microwatershed. They have severe limitations of rooting depth, calcareousness and texture.

**Table 7.25 Land suitability criteria for Mulberry**

| Crop requirement | | | Rating | | | |
|---|---|---|---|---|---|---|
| **Soil –site characteristics** | | **Unit** | **Highly suitable(S1)** | **Moderately Suitable(S2)** | **Marginally suitable(S3)** | **Not suitable(N)** |
| Soil aeration | Soil drainage | Class | Well drained | Moderately well drained | Poorly drained | V. Poorly drained |
| Nutrient availability | Texture | Class | sc, cl, scl | c (red) | c(black), sl, ls | - |
| | pH | 1:2.5 | 5.5-7.3 | 5.0-5.5,7.8-8.4 | 8.4-9.0 | >9.0 |
| Rooting conditions | Soil depth | Cm | >100 | 75-100 | 50-75 | <50 |
| | Gravel content | % vol. | 0-35 | 35-60 | 60-80 | >80 |
| Erosion | Slope | % | 0-3 | 3-5 | 5-10 | >10 |

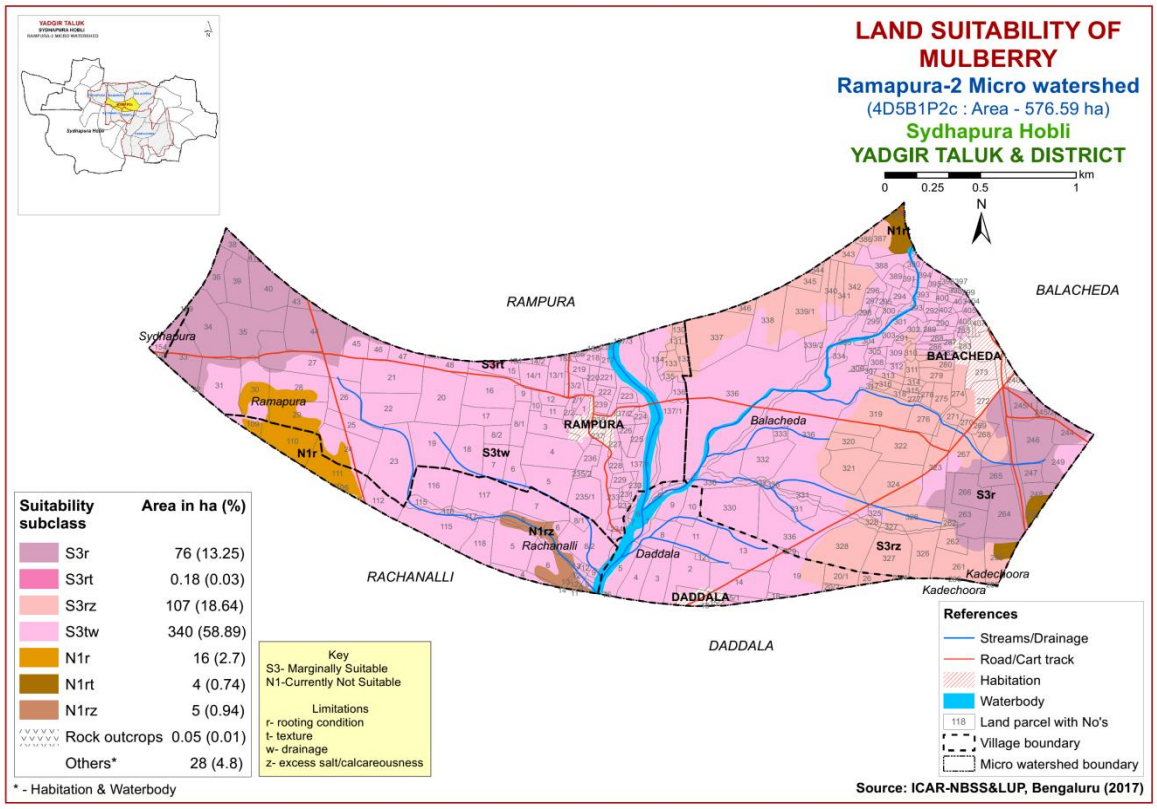



Fig 7.24 Land Suitability map of Mulberry

## 7.25 Land suitability for Marigold (*Tagetes sps*.)

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

**Table 7.26 Land suitability criteria for Marigold**

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

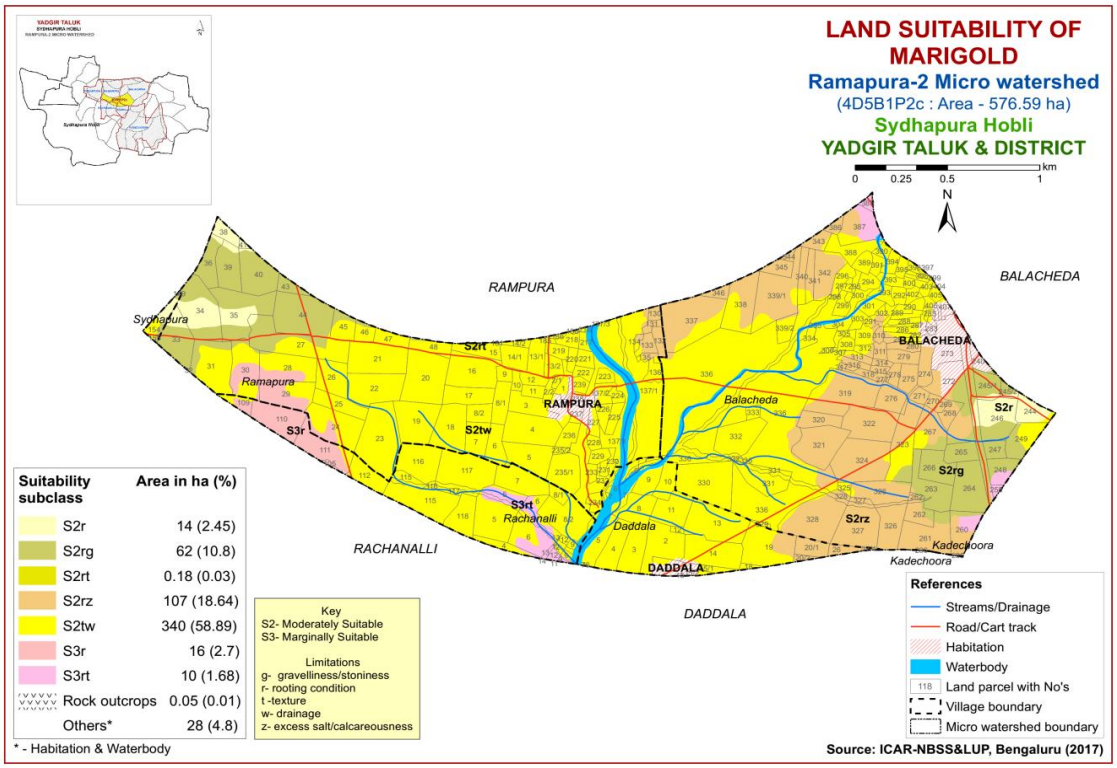



Fig. 7.25 Land Suitability map of Marigold

There are no highly suitable (Class S1) lands available for growing Marigold in the microwatershed. Maximum area of about 523 ha (91%) is moderately suitable (Class S2) for growing Marigold and are distributed in the major part of the microwatershed. They have minor limitations of texture, drainage, gravelliness, rooting depth and calcareousness. Marginally suitable (Class S3) lands for growing Marigold occupy small area of about 26 ha (4%) and are distributed in the southeastern, northeastern, central, southern and southwestern part of the microwatershed. They have moderate limitations of texture and rooting depth.

## 7.26 Land Suitability for Chrysanthemum (*Dendranthema grandiflora*)

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

**Table 7.27 Land suitability criteria for Chrysanthemum**

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

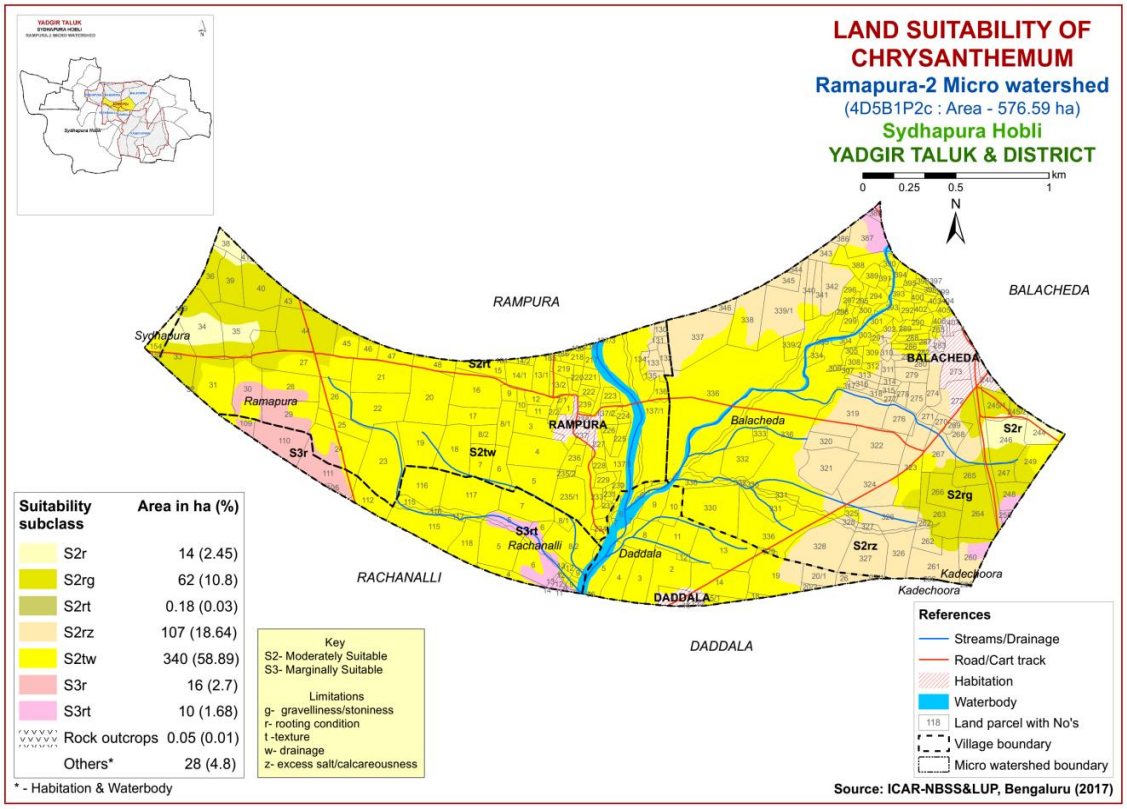



Fig. 7.26 Land Suitability map of Chrysanthemum

There are no highly suitable (Class S1) lands available for growing Chrysanthemum in the microwatershed. Maximum area of about 523 ha (96%) is moderately suitable (Class S2) for growing Chrysanthemum and are distributed in the major part of the microwatershed. They have minor limitations of texture, rooting depth, gravelliness, calcareousness and drainage. Marginally suitable (Class S3) lands for growing Chrysanthemum occupy very small area of about 26 ha (4%) and are distributed in the southeastern, northeastern, central, southern and southwestern part of the microwatershed. They have moderate limitations of rooting depth and texture.

### 7.27 Land Management Units (LMUs)

The 26 soil map units identified in Ramapura-2 microwatershed have been grouped into 6 Land Management Units (LMU's) 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. 7.28) has been generated. These Land Management Units are expected to behave similarly for a given level of management.

The 26 soil map units that have been grouped into 6 Land Management Units along with brief description of soil and site characteristics are given below.

| LMU NO. | Soil map units | Soil and site characteristics |
|---|---|---|
| 1 | 104. TMKiB2 | Very deep soils (>150 cm), 1-3% slopes, non gravelly (<15%), moderate erosion. |
| 2 | 77.RHNcB2, 79. RHNmB2<br>83. KDRbB2g1, 84. KDRcB2<br>87. KDRiB2, 88. KDRiB3<br>89. KDRmB2, 91. SWRmB2<br>92. HGNcB2, 93. HGNiB2<br>95. HGNmB2, 55. ANRiB2<br>56. ANRiB3g1 | Moderately deep to very deep soils (75 to >150 cm), 1-3% slopes, non gravelly to gravelly (<15 – 35%), moderate to severe erosion. |
| 3 | 70. RMPcB2<br>15. HLGbB3<br>16. HLGcB2<br>17. HLGiB2<br>18. HLGiB2g1<br>19. HLGiB3g1 | Moderately shallow soils (50-75 cm), 1-3% slopes, non gravelly to gravelly (<15 – 35%), moderate to severe erosion. |
| 4 | 27. YLRbB2<br>29. YLRcB2g1<br>31. YLRiB2 | Moderately shallow soils (50-75 cm), 1-3% slopes, non gravelly to gravelly (<15 - 35%), moderate erosion. |
| 5 | 5. BDLiB2<br>67. GDLcB3 | Shallow soils (25-50 cm), 1-3% slopes, moderate to severe erosion. |
| 6 | 68. KYTcB2 | Shallow soils (25-50 cm), 1-3% slopes, non gravelly (<15%), moderate erosion. |

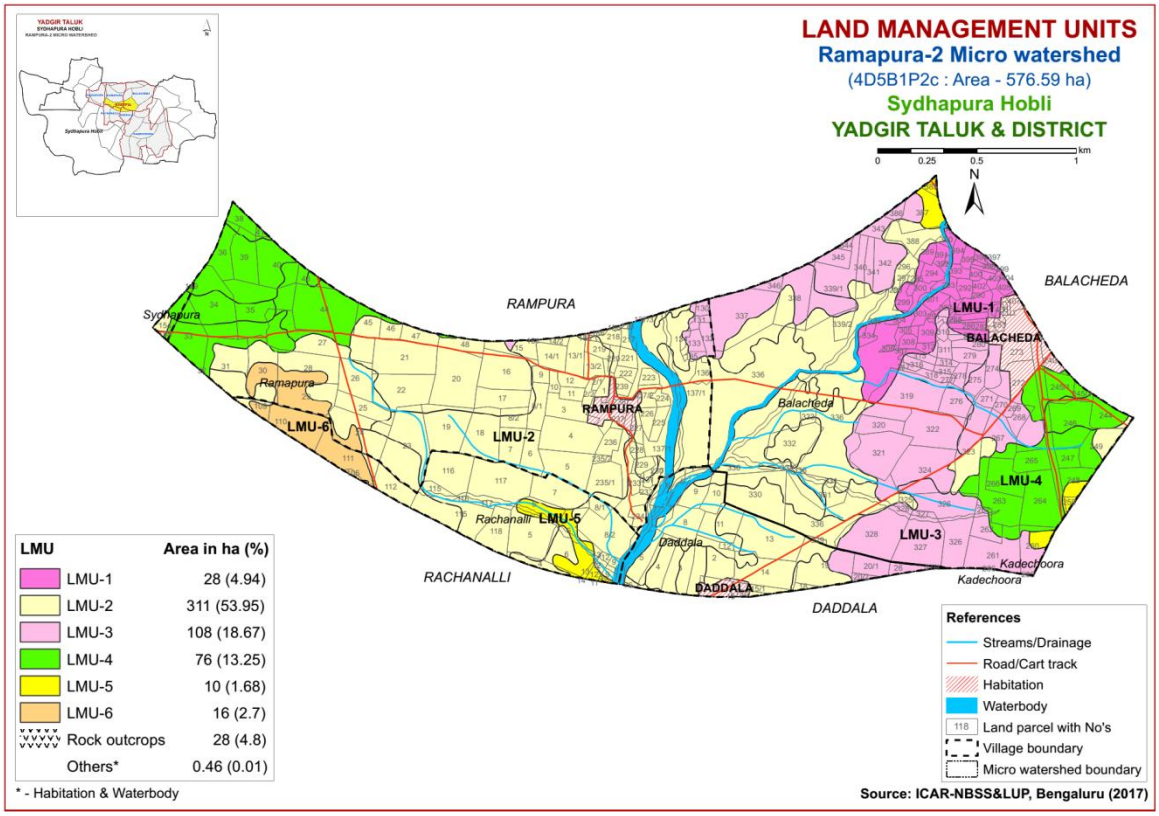



Fig. 7.27 Land Management Units Map of Ramapura-2 Microwatershed

## 7.28 Proposed Crop Plan for Ramapura-2 Microwatershed

After assessing the land suitability for the 26 crops, the Proposed Crop Plan has been prepared for the 6 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 26 crops. The resultant proposed crop plan is presented below in Table 7.29.

**Table 7.28 Proposed Crop Plan for Ramapura-2 Microwatershed**

| LMU No | Mapping Units | Survey Number | Soil Characteristics | Field Crops | Horticulture Crops | Suitable Interventions |
|---|---|---|---|---|---|---|
| LMU 1 | 104. TMKiB2 | **Balacheda:**282,285,286,287,288,289,290,291,292,293,294,295,299,300,301,302,303,304,305,306,307,308,309,312,334,389,390, 391,392,393,394,395,396,397,398,399,400, 401,402, 403,404,405,406 | Very deep soils (>150 cm), 1-3% slopes, non gravelly (<15%), moderate erosion | Sunflower, Cotton, Bengal gram, Bajra | **Fruit crops:** Pomegranate, Lime, Musambi, Amla, Jamun **Vegetables:** Drumstick, Chilli, Coriander **Flowers:** Marigold, Chrysanthemum | Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices |
| LMU 2 | 77.RHNcB2 79. RHNmB2 83. KDRbB2g1 84. KDRcB2 87. KDRiB2 88. KDRiB3 89. KDRmB2 91. SWRmB2 92. HGNcB2 93. HGNiB2 95. HGNmB2 55. ANRiB2 56. ANRiB3g1 | **Balacheda:** 249,296,297,298,325,329, 330,331,332,333,336,339/2,388 **Daddala:**2,3,4,5,8,9,10,11,12,13,14,15/1,18,19,76, **Rachanalli:**4,5,7,8/1,8/2,9,12,112,115,116,117,118 **Ramapura:**1,2/1,2/2,3,4,5,6,7,8/1,8/2,9,10, 11,12,13/1,13/2,14/1,14/2,15,16,17,18,19,20,21,22,23,24,25,26,27,28,31,45,46,47,48,134,136,137/1,137/2,137/3,181,182/2,184,185, 186,216,217,218,219,220,221,222,223,224, 225,226,227,228,229,230,231,232,233,234, 235/1,235/2,236,239 | Moderately deep to very deep soils (75 to >150 cm), 1-3% slopes, non gravelly to gravelly (<15 – 35%), moderate to severe erosion | Sunflower, Sorghum, Cotton, Bengal gram, Safflower, Linseed, Bajra | **Fruit crops:** Pomegranate, Lime, Musambi, Amla, Custard apple, Tamarind, Jamun, **Vegetables:** Drumstick, Chilli, Coriander **Flowers:** Marigold, Chrysanthemum | Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices |
| LMU 3 | 70. RMPcB2 15. HLGbB3 16. HLGcB2 17. HLGiB2 18. HLGiB2g1 19. HLGiB3g1 | **Balacheda:**260,261,262,267,268,269,270,271,272,274,275,276,277,278,279,280,281,310,311,313,314,31316,317,318,319,320,321,322,323,324,326,327,328,337,338,339/1,340,341,342,343,344,345,346,386 **Daddala:** 20/1,20/2,26,27/1 **Ramapura:** 130,131,132,133,135 | Moderately shallow soils (50-75 cm), 1-3% slopes, non gravelly to gravelly (<15 – 35%), moderate | Maize, Sorghum, Groundnut, Bengal gram, Bajra | **Fruit crops:**, Amla, Custard apple, **Vegetables:** Tomato, Chilli, Coriander **Flowers:** Marigold, Chrysanthemum | Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | to severe erosion | | | |
| LMU 4 | 27. YLRbB2<br>29. YLRcB2g1<br>31. YLRiB2 | **Balacheda:**244,245/1,245/2,246,247,248,263,264,265,266<br>**Ramapura:** 32,33,34,35,36,38,39,40,41,43,44<br>**Sydhapura:** 149,154,155 | Moderately shallow soils (50-75 cm), 1-3% slopes, non gravelly to gravelly (<15 - 35%), moderate erosion | Maize, Sorghum, Groundnut, Bajra, Redgram | **Fruit crops:** Amla, Custard apple<br>**Vegetables:** Tomato, Chilli<br>**Flowers:** Marigold Chrysanthemum | Drip irrigation, mulching, suitable conservation practices (Crescent Bunding with Catch Pit etc) |
| LMU 5 | 5. BDLiB2<br>67. GDLcB3 | **Balacheda:** 258,385,387<br>**Rachanalli:** 6,10,11,13,14 | Shallow soil (25-50 cm), 1-3% slopes, moderate to severe erosion | Bengal gram,Coriander, safflower, Linseed | **Agri-Silvi-Pasture:** Custard apple, Amla**,** Hybrid Napier, *Styloxanthes hamata*, Glyricidia, *Styloxanthes scabra* | Use of short duration varieties, sowing across the slope, drip irrigation and mulching is recommended |
| LMU 6 | 68. KYTcB2 | **Rachanalli:** 105,109,110,111<br>**Ramapura:** 29,30 | Shallow soils (25-50 cm), 1-3% slopes, non gravelly (<15%), moderate erosion | Horse gram | **Agri-Silvi-Pasture:** Custard apple, Amla**,** Hybrid Napier, *Styloxanthes hamata*, Glyricidia, *Styloxanthes scabra* | Use of short duration varieties, sowing across the slope, drip irrigation and mulching is recommended |

*Chapter 8*

# SOIL HEALTH MANAGEMENT

## 8.1 Soil Health

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

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

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

**The most important characteristics of a healthy soil are**

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

**Characteristics of Ramapura-2 Microwatershed**

- The soil phases identified in the microwatershed belonged to the soil series of SWR124 ha (22%), HLG107 ha (19%), ANR91 ha (16%), YLR 76 ha (13%), KDR58 ha (10%), TMK28 ha (5%), HGN27 ha (5%), KYT16 ha (3%), RHN13 ha (2%), GDL5 ha (1%), BDL4 ha (1%) and RMP0 ha (0.03%).
- As per land capability classification entire area of 549 ha (95%) in the microwatershed falls under arable land category (Class II &III). The major limitations identified in the arable lands were soil, drainage and erosion. An area of 0.05 ha (0.01%) is occupied by rock outcrops and 28 ha (5%) by others (habitation and water body).

- On the basis of soil reaction, about 12 ha (2%) is neutral (pH 6.5 -7.3), 189 ha (33%) area is slightly to moderately alkaline (pH 7.3-8.4) and 348 ha (60%) is strongly to very strongly alkaline (pH 8.4 - >9.0).
- **Soil Health Management**

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

**Acid soils**

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

Liming materials:

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

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

**Alkaline soils**

(Slightly alkaline to moderately 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).

**Neutral soils**

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

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

**Soil Degradation**

Soil erosion is one of the major factor affecting the soil health in the microwatershed. Out of total 577 ha area in the microwatershed, an area of about 548 ha

is suffering from moderate and severe erosion. These areas need immediate soil and water conservation and other land development and land husbandry practices for restoring soil health.

**Dissemination of Information and Communication of Benefits**

Any large scale implementation of soil health management requires that supporting information is made available widely, particularly through channels familiar to farmers and extension workers. Given the very high priority attached to soil-health especially by the Central Government on issuing Soil-Health Cards to all the farmers, media outlets like Regional, State and National Newspapers, Radio and Dooradarshan programs in local languages but also modern information and communication technologies such as Cellular phones and the Internet, which can be much more effective in reaching the younger farmers.

**Inputs for Net Planning (Saturation Plan) and Interventions needed**

Net planning (Saturation Plan) in IWMP is focusing on preparation of

1. Soil and Water Conservation Plan 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 (Saturation Plan) 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 Ramapura-2 microwatershed.
- **Organic Carbon:** The OC content (an index of available Nitrogen) is high (>0.75%) in maximum area of 278ha (48%), medium (0.5-0.75%) in 252 ha (44%) area and low (<0.5%) in small area of 18 ha (3%). The areas that are medium and low in OC needs to be further improved by applying farmyard manure and crop rotation 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 270 ha area where OC is low to medium (<0.5-0.75%). For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg /ha needs to be applied for all the crops grown in these plots.
- **Available Phosphorus**: Available Phosphorus is low (<23 kg/ha) in an area of 231 ha (40%), medium (23-57 kg/ha) in 287 ha (50%) of the microwatershed and in 31 ha (5%) area, the available phosphorus is high (>57 kg/ha). For all the crops 25% additional P needs to be applied where available P is low and medium.
- **Available Potassium:** Available potassium is medium (145-337 kg/ha) in maximum area of 403 ha (70%) of the microwatershed and an area of about 146 ha (25%) is high (>337 kg/ha) in available potassium. All the plots, where available potassium is low and medium, for all the crops, additional 25 % potassium may be applied.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops, it is high in 30 ha (5%), medium in 238 ha (41%) and low in 281 ha (49%). low and medium areas need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Boron:** An area of 64 ha (11%) is high in available boron, 369 ha (64%) is medium and 116ha (20%) is low. For areas of low and medium, application of sodium tetra borate @ 10 kg/ha as soil application or 0.2 % borax as foliar spray is recommended.
- **Available Iron:** An area of about 444 ha (77%) of the microwatershed is sufficient and 105 ha (18%) is deficient in available iron. For deficient areas, application of iron sulphate @ 25 kg/ha is recommended.
- **Available Zinc:** Entire area of the microwatershed is deficient in available zinc content. Application of zinc sulphate @25 kg/ha is to be recommended for these areas.
- **Soil Alkalinity:** The microwatershed has 537 ha (93%) area with 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.

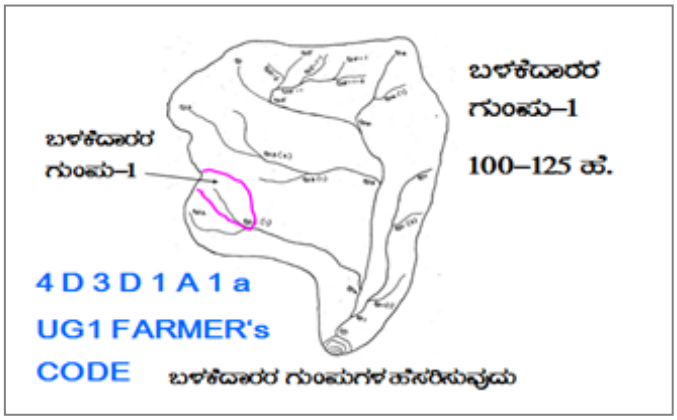
- **Land Suitability for various crops:** Areas that are highly, moderately and marginally suitable, and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel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

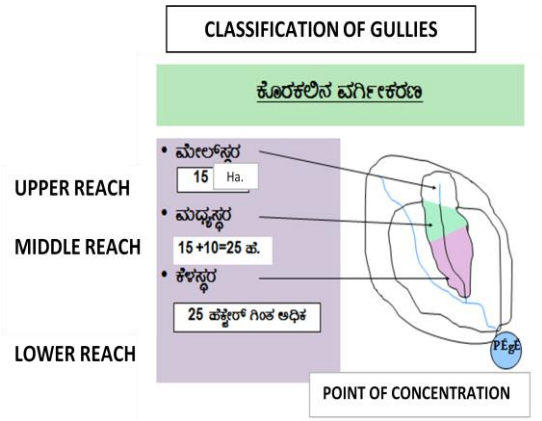
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge 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<br>• Existing network of waterways, pothissa boundaries, grass belts, natural drainage lines/ watercourse, cut ups/ terraces are marked on the cadastral map to the scale<br>• 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.

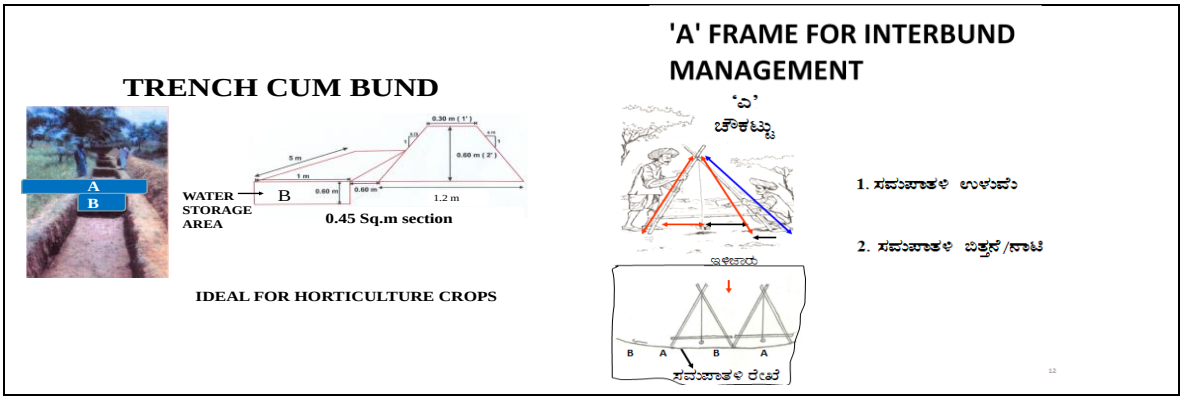
**Recommended Bund Section**

| 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 black clayey soils | |
| 0.45 | 2 | 0.75 | 01:01 | 0.92 | | |
| 0.45 | 2.4 | 0.75 | 1.3:1 | 1.07 | Shallow black clayey soils | |
| 0.6 | 3.1 | 0.7 | 1.78:1 | 1.29 | Medium black clayey soils | |
| 0.5 | 3 | 0.85 | 1.47:1 | 1.49 | | |

**Formation of Trench cum Bund**

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

Details of Borrow Pit dimensions are given below:



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

| Bund section | Bund length | Earth quantity | Pit | | | | Berm (pit to pit) | Soil depth class |
|---|---|---|---|---|---|---|---|---|
| $m^2$ | 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. Water Ways**

1. Existing waterways are marked on the cadastral map (1:7920 scale) and their dimensions are recorded.
2. Considering the contour plan of the MWS, additional waterways/ modernization of the existing ones can be thought of.
3. 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 are formed in the field.

### 9.1.3 Treatment of Natural Water Course/ Drainage Lines

a) The cadastral map has to be updated as regards the network of drainage lines (gullies/ *nalas/ hallas*) and existing structures are marked to the scale and storage capacity of the existing water bodies are documented.
b) The drainage line will be demarcated into Upper Reach, Middle Reach and Lower Reach.
c) Considering the Catchment, *Nala* bed and bank conditions, suitable structures are decided.
d) Number of storage structures (Check dam/ *Nala* bund/ Percolation tank) will be decided considering the commitments and available runoff from water budgeting and quality of water in the wells and site suitability.
e) Detailed Leveling Survey using Dumpy Level / Total Station has to be carried out to arrive at the site-specific designs as shown in the Manual.
f) The location of ground water recharge structures are decided by examining the lineaments and fracture zones from geological maps.
g) Rainfall intensity data of the nearest Rain Gauge Station is considered for Hydrologic Designs.
h) Silt load to the Storage/Recharge structures is reduced by providing vegetative, boulder and earthen 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 about472 ha (82%) needs Graded Bunding and 76 ha (13%) needs Trench Cum 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 finalised in a participatory approach.

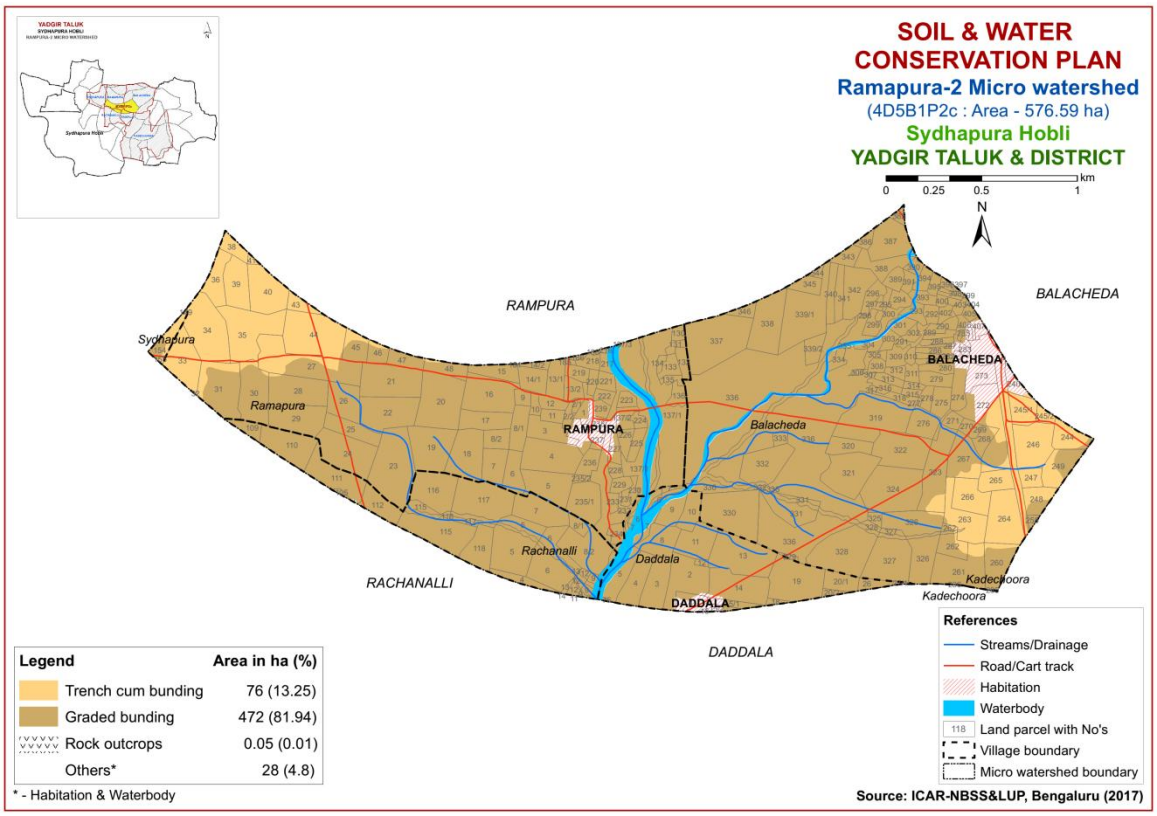



Fig. 9.1 Soil and Water Conservation Plan map of Ramapura-2 Microwatershed

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

It is recommended to open pits during the 1$^{st}$ 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 2$^{nd}$ or 3$^{rd}$ 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 Nerale (*Sizyziumcumini*) and Bamboo. Dry areas are to be planted with species like Honge, Bevu, Seetaphal*etc*.

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

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# Appendix I

## Rampura-2 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 1 | 0 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balacheda | 4 | 0 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balacheda | 240 | 1.02 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balacheda | 244 | 2.23 | YLRbB2 | LMU-4 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Balacheda | 245/1 | 2.05 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Balacheda | 245/2 | 0.67 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Balacheda | 246 | 4.42 | YLRbB2 | LMU-4 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Balacheda | 247 | 1.13 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | TCB |
| Balacheda | 248 | 1.94 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | TCB |
| Balacheda | 249 | 2.9 | HGNcB2 | LMU-2 | Very deep (>150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 258 | 0.29 | BDLiB2 | LMU-5 | Shallow (25-50 cm) | Sandy clay | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy+Redgram (Pd+Rg) | 1 Bore well | IIIes | Graded bunding |
| Balacheda | 260 | 3.07 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut+Redgram (Gn+Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 261 | 4.8 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Balacheda | 262 | 1.89 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 1 Open well,2 Bore well | IIes | Graded bunding |
| Balacheda | 263 | 3.6 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Balacheda | 264 | 4.76 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Balacheda | 265 | 1.86 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Balacheda | 266 | 3 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Balacheda | 267 | 3.32 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balacheda | 268 | 1.13 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | 1 Bore well | IIes | Graded bunding |
| Balacheda | 269 | 0.34 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | 1 Bore well | IIes | Graded bunding |
| Balacheda | 270 | 0.51 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balach | 271 | 0.71 | HLGcB2 | LMU-3 | Moderately shallow | Sandy loam | Non gravelly | Low (51-100 | Very gently | Moderate | Groundnut (Gn) | Not Available | IIes | Graded |

| Village | Survey No. | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | WELLS | Land Capability | Conservation Plan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eda | | | | | (50-75 cm) | | (<15%) | mm/m) | sloping (1-3%) | | | | | bunding |
| Balached a | 272 | 6.21 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balached a | 273 | 1.77 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balached a | 274 | 1.86 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIes | Graded bunding |
| Balached a | 275 | 1.42 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balached a | 276 | 2.1 | HLGiB3g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Redgram (Rg) | Not Available | IIIes | Graded bunding |
| Balached a | 277 | 0.09 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Balached a | 278 | 0.69 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Balached a | 279 | 1.26 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balached a | 280 | 0.88 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balached a | 281 | 0.63 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balached a | 282 | 0.61 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balached a | 283 | 0.28 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balached a | 284 | 0.18 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balached a | 285 | 0.25 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balached a | 286 | 1.16 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balached a | 287 | 0.29 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balached a | 288 | 0.54 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balached a | 289 | 0.52 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balached a | 290 | 0.92 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIws | Graded bunding |
| Balached a | 291 | 0.72 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIws | Graded bunding |
| Balached a | 292 | 0.73 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balached a | 293 | 0.98 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balached a | 294 | 0.93 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIws | Graded bunding |
| Balached a | 295 | 0.53 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIws | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 296 | 1.1 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 297 | 0.39 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balacheda | 298 | 0.05 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Balacheda | 299 | 0.88 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 300 | 0.77 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIws | Graded bunding |
| Balacheda | 301 | 1.04 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 302 | 0.51 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIws | Graded bunding |
| Balacheda | 303 | 0.75 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 304 | 0.75 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 305 | 0.58 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 306 | 0.18 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 307 | 0.05 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 308 | 0.62 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 309 | 1.05 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 310 | 0.41 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 311 | 0.68 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balacheda | 312 | 0.59 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 313 | 0.7 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 314 | 0.38 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Balacheda | 315 | 0.37 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Balacheda | 316 | 0.63 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 317 | 0.24 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Balacheda | 318 | 0.79 | HLGiB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Balacheda | 319 | 7.09 | HLGiB3g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Cotton+Jowar (Ct+Jw) | Not Available | IIIes | Graded bunding |
| Balach | 320 | 1.77 | HLGiB3g1 | LMU-3 | Moderately shallow | Sandy clay | Gravelly (15- | Low (51-100 | Very gently | Severe | Cotton (Ct) | Not Available | IIIes | Graded |

| Village | Survey No. | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | WELLS | Land Capability | Conservation Plan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eda | | | | | (50-75 cm) | | 35%) | mm/m) | sloping (1-3%) | | | | | bunding |
| Balacheda | 321 | 4.93 | HLGiB3g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Cotton (Ct) | Not Available | IIIes | Graded bunding |
| Balacheda | 322 | 4.84 | HLGiB3g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Groundnut (Gn) | 1 Bore well | IIIes | Graded bunding |
| Balacheda | 323 | 5.17 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 324 | 6.71 | HLGiB3g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Cotton+Groundnut (Ct+Gn) | Not Available | IIIes | Graded bunding |
| Balacheda | 325 | 0.44 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 326 | 6.64 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 1 Bore well | IIes | Graded bunding |
| Balacheda | 327 | 5.18 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Balacheda | 328 | 6.6 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton+Redgram (Ct+Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 329 | 0.19 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Balacheda | 330 | 6.46 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Balacheda | 331 | 2.91 | ANRiB3g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | Redgram (Rg) | 1 Check Dam | IIIes | Graded bunding |
| Balacheda | 332 | 3.99 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 333 | 0.54 | ANRiB3g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | Not Available (NA) | Not Available | IIIes | Graded bunding |
| Balacheda | 334 | 0.71 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIws | Graded bunding |
| Balacheda | 335 | 0.03 | Waterbody | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Balacheda | 336 | 63.62 | ANRiB3g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | 1 Bore well,1 Check Dam | IIIes | Graded bunding |
| Balacheda | 337 | 7.89 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut+Jowar (Gn+Jw) | Not Available | IIes | Graded bunding |
| Balacheda | 338 | 4.71 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Balacheda | 339/1 | 6.55 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Jowar (Jw) | Not Available | IIIes | Graded bunding |
| Balacheda | 339/2 | 1.26 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Balacheda | 340 | 1.27 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Redgram (Rg) | Not Available | IIIes | Graded bunding |
| Balacheda | 341 | 1.24 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Redgram (Rg) | Not Available | IIIes | Graded bunding |
| Balacheda | 342 | 3.32 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Redgram (Rg) | Not Available | IIIes | Graded bunding |
| Balacheda | 343 | 1.09 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Jowar+Redgram (Jw+Rg) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 344 | 0.3 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Cotton (Ct) | Not Available | IIIes | Graded bunding |
| Balacheda | 345 | 1.21 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Cotton (Ct) | Not Available | IIIes | Graded bunding |
| Balacheda | 346 | 0.72 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 385 | 0.39 | BDLiB2 | LMU-5 | Shallow (25-50 cm) | Sandy clay | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIIes | Graded bunding |
| Balacheda | 386 | 0.58 | HLGbB3 | LMU-3 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Severe | Redgram (Rg) | Not Available | IIIes | Graded bunding |
| Balacheda | 387 | 3.7 | BDLiB2 | LMU-5 | Shallow (25-50 cm) | Sandy clay | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIIes | Graded bunding |
| Balacheda | 388 | 2.22 | ANRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Balacheda | 389 | 0.97 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 1 Open well | IIws | Graded bunding |
| Balacheda | 390 | 0.56 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 391 | 0.68 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 392 | 0.12 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 393 | 0.83 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 394 | 0.7 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIws | Graded bunding |
| Balacheda | 395 | 0.6 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIws | Graded bunding |
| Balacheda | 396 | 0.3 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 397 | 0.1 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 398 | 0.25 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 399 | 0.25 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 400 | 0.34 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 401 | 0.22 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 402 | 0.59 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIws | Graded bunding |
| Balacheda | 403 | 0.4 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIws | Graded bunding |
| Balacheda | 404 | 0.06 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIws | Graded bunding |
| Balacheda | 405 | 0.47 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIws | Graded bunding |
| Balach | 406 | 0.47 | TMKiB2 | LMU-1 | Very deep (>150 cm) | Sandy clay | Non gravelly | Very high | Very gently | Moderate | Paddy (Pd) | Not Available | IIws | Graded |

| Village | Survey No. | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | WELLS | Land Capability | Conservation Plan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eda | | | | | | | (<15%) | (>200 mm/m) | sloping (1-3%) | | | | | bunding |
| Balacheda | 407 | 0.58 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Daddala | 1 | 1.49 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Daddala | 2 | 4.26 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 3 | 3.15 | HGNcB2 | LMU-2 | Very deep (>150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Daddala | 4 | 2.82 | KDRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Daddala | 5 | 2.65 | KDRbB2g1 | LMU-2 | Deep (100-150 cm) | Loamy sand | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 6 | 0.93 | Waterbody | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Daddala | 7 | 1.7 | Waterbody | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Daddala | 8 | 2.74 | KDRbB2g1 | LMU-2 | Deep (100-150 cm) | Loamy sand | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Daddala | 9 | 1.99 | KDRbB2g1 | LMU-2 | Deep (100-150 cm) | Loamy sand | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 10 | 1.8 | KDRbB2g1 | LMU-2 | Deep (100-150 cm) | Loamy sand | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | 1 Check Dam | IIes | Graded bunding |
| Daddala | 11 | 3.14 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Daddala | 12 | 0.24 | KDRbB2g1 | LMU-2 | Deep (100-150 cm) | Loamy sand | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 13 | 5.85 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 14 | 4.65 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 15/1 | 0.87 | KDRcB2 | LMU-2 | Deep (100-150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Daddala | 15/2 | 0.46 | Habitation | Others | Others | Others | Others | Others | Others | Others | No crop (Nc) | Not Available | Others | Others |
| Daddala | 16 | 0.01 | Habitation | Others | Others | Others | Others | Others | Others | Others | No crop (Nc) | Not Available | Others | Others |
| Daddala | 18 | 0.29 | KDRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Daddala | 19 | 5.53 | KDRiB2 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton+Redgram (Ct+Rg) | Not Available | IIes | Graded bunding |
| Daddala | 20/1 | 1.66 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Daddala | 20/2 | 0.34 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Daddala | 26 | 0.82 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Daddala | 27/1 | 0.12 | HLGiB2g1 | LMU-3 | Moderately shallow (50-75 cm) | Sandy clay | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daddala | 76 | 0.06 | HGNcB2 | LMU-2 | Very deep (>150 cm) | Sandy loam | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Rachanalli | 4 | 1.16 | RHNmB2 | LMU-2 | Moderately deep (75-100 cm) | Clay | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 5 | 5.99 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 6 | 5.06 | GDLcB3 | LMU-5 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Severe | Jowar (Jw) | Not Available | IIIes | Graded bunding |
| Rachanalli | 7 | 3.58 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 8/1 | 0.81 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Rachanalli | 8/2 | 4.46 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Rachanalli | 9 | 0.64 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | Not Available (NA) | Not Available | IIIes | Graded bunding |
| Rachanalli | 10 | 0 | GDLcB3 | LMU-5 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Severe | Paddy (Pd) | Not Available | IIIes | Graded bunding |
| Rachanalli | 11 | 0 | GDLcB3 | LMU-5 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Severe | Paddy (Pd) | Not Available | IIIes | Graded bunding |
| Rachanalli | 12 | 0.68 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | Not Available (NA) | Not Available | IIIes | Graded bunding |
| Rachanalli | 13 | 0.18 | GDLcB3 | LMU-5 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Severe | Not Available (NA) | Not Available | IIIes | Graded bunding |
| Rachanalli | 14 | 0.01 | GDLcB3 | LMU-5 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Severe | Paddy (Pd) | Not Available | IIIes | Graded bunding |
| Rachanalli | 105 | 0.18 | KYTcB2 | LMU-6 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Rachanalli | 109 | 1.08 | KYTcB2 | LMU-6 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 110 | 4.1 | KYTcB2 | LMU-6 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 111 | 3.87 | KYTcB2 | LMU-6 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 112 | 2.31 | RHNcB2 | LMU-2 | Moderately deep (75-100 cm) | Sandy loam | Non gravelly (<15%) | Medium (101-150 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 115 | 5.79 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Rachanalli | 116 | 4.2 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 117 | 6.02 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Rachanalli | 118 | 2.73 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 1 | 0.63 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 2/1 | 0.29 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramap | 2/2 | 0.6 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly | Very high | Very gently | Moderate | Not Available (NA) | Not Available | IIes | Graded |

| Village | Survey No. | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | WELLS | Land Capability | Conservation Plan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ura | | | | | | | (<15%) | (>200 mm/m) | sloping (1-3%) | | | | | bunding |
| Ramapura | 3 | 2.33 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 4 | 4.8 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 5 | 3.77 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 6 | 1.98 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 7 | 2.21 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 8/1 | 1.98 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 8/2 | 1.38 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 9 | 0.7 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | 1 Bore well | IIes | Graded bunding |
| Ramapura | 10 | 0.57 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 11 | 0.8 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 12 | 0.96 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 13/1 | 1.79 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 13/2 | 1.1 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 14/1 | 1.82 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 14/2 | 0.49 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 15 | 1.78 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 16 | 4.87 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 17 | 2.56 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 18 | 4.29 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 19 | 4.81 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 20 | 6.24 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 21 | 5.33 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 22 | 4.92 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 23 | 7.42 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 24 | 5.17 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 25 | 2.35 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 26 | 3.04 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | 1 Check Dam | IIes | Graded bunding |
| Ramapura | 27 | 7.53 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar+Redgram (Jw+Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 28 | 4.69 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 29 | 4.05 | KYTcB2 | LMU-6 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 30 | 4.6 | KYTcB2 | LMU-6 | Shallow (25-50 cm) | Sandy loam | Non gravelly (<15%) | Very low (<50 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 31 | 5.57 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 32 | 0.02 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Ramapura | 33 | 3.96 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Ramapura | 34 | 6.07 | YLRiB2 | LMU-4 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Ramapura | 35 | 6.2 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Ramapura | 36 | 2.44 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Ramapura | 38 | 1.16 | YLRbB2 | LMU-4 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | TCB |
| Ramapura | 39 | 3.17 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Ramapura | 40 | 4.15 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | TCB |
| Ramapura | 41 | 0.2 | YLRbB2 | LMU-4 | Moderately shallow (50-75 cm) | Loamy sand | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | TCB |
| Ramapura | 43 | 1.02 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton+Jowar (Ct+Jw) | Not Available | IIes | TCB |
| Ramapura | 44 | 6.73 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton+Jowar (Ct+Jw) | Not Available | IIes | TCB |
| Ramapura | 45 | 1.85 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramapura | 46 | 1.1 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 47 | 1.34 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 48 | 1.6 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Redgram (Rg) | Not Available | IIes | Graded bunding |
| Ramapura | 130 | 0.51 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | Graded bunding |
| Ramap | 131 | 0.46 | HLGcB2 | LMU-3 | Moderately shallow | Sandy loam | Non gravelly | Low (51-100 | Very gently | Moderate | Cotton (Ct) | 1 Open well | IIes | Graded |

| Village | Survey No. | Area (ha) | Soil Phase | LMU | Soil Depth | Surface Soil Texture | Soil Gravelliness | Available Water Capacity | Slope | Soil Erosion | Current Land Use | WELLS | Land Capability | Conservation Plan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ura | | | | | (50-75 cm) | | (<15%) | mm/m) | sloping (1-3%) | | | | | bunding |
| Ramapura | 132 | 0.88 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 133 | 0.95 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Jowar (Jw) | Not Available | IIes | Graded bunding |
| Ramapura | 134 | 0.31 | HGNmB2 | LMU-2 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 135 | 0.5 | HLGcB2 | LMU-3 | Moderately shallow (50-75 cm) | Sandy loam | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Ramapura | 136 | 0.93 | ANRiB3g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Ramapura | 137/1 | 22.56 | ANRiB3g1 | LMU-2 | Deep (100-150 cm) | Sandy clay | Gravelly (15-35%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Ramapura | 137/2 | 1.03 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 137/3 | 0.01 | HGNmB2 | LMU-2 | Very deep (>150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 181 | 0.02 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Ramapura | 182/2 | 0 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | No crop (Nc) | Not Available | IIes | Graded bunding |
| Ramapura | 184 | 0 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 185 | 0.14 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 186 | 0.29 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIes | Graded bunding |
| Ramapura | 216 | 0.15 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 217 | 0.67 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 218 | 0.79 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIes | Graded bunding |
| Ramapura | 219 | 0.9 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Paddy (Pd) | Not Available | IIes | Graded bunding |
| Ramapura | 220 | 0.62 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 221 | 0.88 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 222 | 0.67 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 223 | 0.73 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | 1 Bore well | IIes | Graded bunding |
| Ramapura | 224 | 0.59 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 225 | 0.96 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 226 | 0.9 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 227 | 0.91 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 228 | 0.55 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 229 | 0.79 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 230 | 0.5 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Ramapura | 231 | 0.35 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Ramapura | 232 | 0.37 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | Not Available (NA) | Not Available | IIIes | Graded bunding |
| Ramapura | 233 | 0.54 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | Groundnut (Gn) | Not Available | IIIes | Graded bunding |
| Ramapura | 234 | 0.78 | KDRiB3 | LMU-2 | Deep (100-150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Severe | No crop (Nc) | Not Available | IIIes | Graded bunding |
| Ramapura | 235/1 | 3.25 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Ramapura | 235/2 | 0.33 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 236 | 1.22 | SWRmB2 | LMU-2 | Deep (100-150 cm) | Clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Not Available (NA) | Not Available | IIes | Graded bunding |
| Ramapura | 237 | 0.67 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Ramapura | 238 | 0.62 | Habitation | Others | Others | Others | Others | Others | Others | Others | Not Available (NA) | Not Available | Others | Others |
| Ramapura | 239 | 0.67 | HGNiB2 | LMU-2 | Very deep (>150 cm) | Sandy clay | Non gravelly (<15%) | Very high (>200 mm/m) | Very gently sloping (1-3%) | Moderate | Groundnut (Gn) | Not Available | IIes | Graded bunding |
| Sydhapura | 149 | 0.05 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | TCB |
| Sydhapura | 154 | 1.48 | YLRiB2 | LMU-4 | Moderately shallow (50-75 cm) | Sandy clay | Non gravelly (<15%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | TCB |
| Sydhapura | 155 | 0.17 | YLRcB2g1 | LMU-4 | Moderately shallow (50-75 cm) | Sandy loam | Gravelly (15-35%) | Low (51-100 mm/m) | Very gently sloping (1-3%) | Moderate | Cotton (Ct) | Not Available | IIes | TCB |

# Appendix II

## Rampura-2 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 1 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 4 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 240 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 244 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 245/1 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 245/2 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 246 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 247 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 248 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 249 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 258 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 260 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 261 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 262 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 263 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 264 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 265 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 266 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 267 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 268 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 269 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 270 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 271 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 272 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 273 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 274 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 275 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 276 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 277 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 278 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 279 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 280 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 281 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 282 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 283 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 284 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 285 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 286 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 287 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 288 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 289 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 290 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 291 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 292 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 293 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 294 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 295 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 296 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 297 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 298 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 299 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 300 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 301 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 302 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 303 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 304 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 305 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 306 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 307 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 308 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 309 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 310 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 311 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 312 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 313 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 314 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 315 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 316 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 317 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 318 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 319 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 320 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 321 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 322 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 323 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 324 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 325 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 326 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 327 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 328 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 329 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 330 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 331 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 332 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 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) |
| Balacheda | 333 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 334 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Balacheda | 335 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 336 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 337 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 338 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 339/1 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Balacheda | 339/2 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 340 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 341 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 342 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 343 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 344 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 345 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 346 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |

| Village | Survey No. | Soil Reaction | Salinity | Organic Carbon | Available Phosphorus | Available Potassium | Available Sulphur | Available Boron | Available Iron | Available Manganese | Available Copper | Available Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 385 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | High (> 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 386 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Balacheda | 387 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 388 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 389 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 390 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 391 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 392 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 393 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 394 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 395 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 396 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | High (> 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 397 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 398 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 399 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 400 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 401 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 402 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 403 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 404 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 405 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Balacheda | 406 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Balacheda | 407 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 1 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 2 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | High (> 20 ppm) | High (> 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daddala | 3 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 4 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 5 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 6 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 7 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 8 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | High (> 20 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 9 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | High (> 20 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 10 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | High (> 20 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 11 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | High (> 20 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 12 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | High (> 20 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 13 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Daddala | 14 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Daddala | 15/1 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Daddala | 15/2 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 16 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 18 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Daddala | 19 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Daddala | 20/1 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 20/2 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 26 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 27/1 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Daddala | 76 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 4 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 5 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 6 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 7 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |

| Village | Survey No. | Soil Reaction | Salinity | Organic Carbon | Available Phosphorus | Available Potassium | Available Sulphur | Available Boron | Available Iron | Available Manganese | Available Copper | Available Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rachanalli | 8/1 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 8/2 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 9 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 10 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 11 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 12 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 13 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 14 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 105 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 109 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 110 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 111 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Rachanalli | 112 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Rachanalli | 115 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Rachanalli | 116 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Rachanalli | 117 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Rachanalli | 118 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Medium (23 - 57 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 1 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 2/1 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 2/2 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 3 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 4 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 5 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 6 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 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) |

| Village | Survey No. | Soil Reaction | Salinity | Organic Carbon | Available Phosphorus | Available Potassium | Available Sulphur | Available Boron | Available Iron | Available Manganese | Available Copper | Available Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 7 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 8/1 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 8/2 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 9 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Ramapura | 10 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 11 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 12 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 13/1 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 13/2 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 14/1 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 14/2 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 15 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 16 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 17 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 18 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 19 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 20 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 21 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Low (< 0.5 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 22 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 23 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Ramapura | 24 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Ramapura | 25 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | High (> 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) |
| Ramapura | 26 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 27 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |

| Village | Survey No. | Soil Reaction | Salinity | Organic Carbon | Available Phosphorus | Available Potassium | Available Sulphur | Available Boron | Available Iron | Available Manganese | Available Copper | Available Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 28 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 29 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 30 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 31 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 32 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 33 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |
| Ramapura | 34 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | Low (< 0.5 %) | 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) |
| Ramapura | 35 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 36 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 38 | Neutral (pH 6.5 – 7.3) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 39 | Neutral (pH 6.5 – 7.3) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 40 | Neutral (pH 6.5 – 7.3) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 41 | Neutral (pH 6.5 – 7.3) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 43 | Slightly alkaline (pH 7.3 – 7.8) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 44 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 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) |
| Ramapura | 45 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Low (< 0.5 %) | Low (< 23 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) |
| Ramapura | 46 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Low (< 0.5 %) | Low (< 23 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) |
| Ramapura | 47 | 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) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 48 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | Low (< 10 ppm) | Low (< 0.5 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 130 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 131 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 132 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | Deficient (< 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 133 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 134 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |

| Village | Survey No. | Soil Reaction | Salinity | Organic Carbon | Available Phosphorus | Available Potassium | Available Sulphur | Available Boron | Available Iron | Available Manganese | Available Copper | Available Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 135 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 136 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 137/1 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 137/2 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | High (> 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 137/3 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 181 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 182/2 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 184 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 185 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Low (< 10 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 186 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 216 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 217 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 218 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 219 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 220 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 221 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 222 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 223 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 224 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | High (> 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 225 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | High (> 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 226 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | High (> 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 227 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Ramapura | 228 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 229 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 230 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 231 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 232 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 233 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 234 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 235/1 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | High (> 1.0 %) | 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) |
| Ramapura | 235/2 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 236 | Strongly alkaline (pH 8.4 – 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | 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) |
| Ramapura | 237 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Ramapura | 238 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Ramapura | 239 | Very strongly alkaline (pH > 9.0) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Medium (23 - 57 kg/ha) | Medium (145 - 337 kg/ha) | Medium (10 - 20 ppm) | High (> 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Sydhapura | 149 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Low (< 0.5 %) | Low (< 23 kg/ha) | High (> 337 kg/ha) | Medium (10 - 20 ppm) | Medium (0.5 - 1.0 ppm) | sufficient (> 4.5 ppm) | Sufficient (> 1.0 ppm) | Sufficient (> 0.2 ppm) | Deficient (< 0.6 ppm) |
| Sydhapura | 154 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Low (< 0.5 %) | Low (< 23 kg/ha) | High (> 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) |
| Sydhapura | 155 | Moderately alkaline (pH 7.8 – 8.4) | Non saline (<2 dsm ) | Medium (0.5 - 1.0 %) | Low (< 23 kg/ha) | High (> 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) |

# Appendix III

## Rampura-2 Microwatershed

## Soil Suitability Information

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 1 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 4 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 240 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 244 | N1r | S2r | S3r | S2r | S3r | S2r | N1r | S3r | S2r | S3r | S3r | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2r | S2r | S2r | S2r | S3r | S2r | S3r | S3r |
| Balacheda | 245/1 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 245/2 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 246 | N1r | S2r | S3r | S2r | S3r | S2r | N1r | S3r | S2r | S3r | S3r | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2r | S2r | S2r | S2r | S3r | S2r | S3r | S3r |
| Balacheda | 247 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 248 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 249 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 258 | N1r | S3rt | N1r | S3r | N1rt | S3r | N1rt | N1r | S3r | N1r | S3rt | S3rt | N1rt | S3rt | N1rt | N1rt | N1r | S3rt | S3rt | S3rt | S3rt | S3rt | N1r | S3rt | N1rt | N1rt |
| Balacheda | 260 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 261 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 262 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 263 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 264 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 265 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 266 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Balacheda | 267 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 268 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 269 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 270 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 271 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 272 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 273 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 274 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 275 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 276 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 277 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 278 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 279 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 280 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 281 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 282 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 283 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 284 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 285 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 286 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 287 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 288 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 289 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 290 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 291 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 292 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 293 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 294 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 295 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 296 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 297 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 298 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 299 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 300 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 301 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 302 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 303 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 304 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 305 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 306 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 307 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 308 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 309 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 310 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 311 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 312 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 313 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 314 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 315 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 316 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 317 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 318 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 319 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 320 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 321 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 322 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 323 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 324 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 325 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 326 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 327 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 328 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 329 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 330 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balacheda | 331 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 332 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 333 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 334 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 335 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Balacheda | 336 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 337 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 338 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 339/1 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 339/2 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 340 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 341 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 342 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 343 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 344 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 345 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 346 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 385 | N1r | S3rt | N1r | S3r | N1rt | S3r | N1rt | N1r | S3r | N1r | S3rt | S3rt | N1rt | S3rt | N1rt | N1rt | N1r | S3rt | S3rt | S3rt | S3rt | S3rt | N1r | S3rt | N1rt | N1rt |
| Balacheda | 386 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Balacheda | 387 | N1r | S3rt | N1r | S3r | N1rt | S3r | N1rt | N1r | S3r | N1r | S3rt | S3rt | N1rt | S3rt | N1rt | N1rt | N1r | S3rt | S3rt | S3rt | S3rt | S3rt | N1r | S3rt | N1rt | N1rt |
| Balacheda | 388 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Balacheda | 389 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 390 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 391 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 392 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 393 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 394 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 395 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 396 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 397 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 398 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 399 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 400 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 401 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 402 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 403 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 404 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 405 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 406 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Balacheda | 407 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 1 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 3 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daddala | 4 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 5 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 6 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 7 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 8 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 9 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 10 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 11 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 12 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 13 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 14 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 15/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 15/2 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 16 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Daddala | 18 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 19 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Daddala | 20/1 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Daddala | 20/2 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Daddala | 26 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Daddala | 27/1 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Daddala | 76 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 4 | S3rt | S3tw | S3tw | S2wz | S3tw | S2rw | S3rw | S2rz | S2wz | S2rw | S2rt | S2tz | S3tw | S2tw | N1tz | S3rt | S2rw | S3tw | S2tw | S3tw | S2tw | S2tw | S2rt | S2tw | S2rt | S3tw |
| Rachanalli | 5 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 6 | N1rz | S3rt | N1rz | S3rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | S3rt | N1rt | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | N1rz | S3rz | N1rz | N1rz |
| Rachanalli | 7 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 8/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 8/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 9 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 10 | N1rz | S3rt | N1rz | S3rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | S3rt | N1rt | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | N1rz | S3rz | N1rz | N1rz |
| Rachanalli | 11 | N1rz | S3rt | N1rz | S3rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | S3rt | N1rt | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | N1rz | S3rz | N1rz | N1rz |
| Rachanalli | 12 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 13 | N1rz | S3rt | N1rz | S3rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | S3rt | N1rt | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | N1rz | S3rz | N1rz | N1rz |
| Rachanalli | 14 | N1rz | S3rt | N1rz | S3rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | N1rz | S3rz | N1rz | S3rt | N1rt | N1rz | N1rz | S3rt | S3rt | S3rt | S3rt | S3rt | N1rz | S3rz | N1rz | N1rz |
| Rachanalli | 105 | N1r | S3r | N1r | S3r | N1r | S3r | N1r | N1r | S3r | N1r | N1r | S3r | N1r | S3r | N1r | N1r | N1r | S3r | S3r | S3r | S3r | S3r | N1r | S3r | N1r | N1r |
| Rachanalli | 109 | N1r | S3r | N1r | S3r | N1r | S3r | N1r | N1r | S3r | N1r | N1r | S3r | N1r | S3r | N1r | N1r | N1r | S3r | S3r | S3r | S3r | S3r | N1r | S3r | N1r | N1r |
| Rachanalli | 110 | N1r | S3r | N1r | S3r | N1r | S3r | N1r | N1r | S3r | N1r | N1r | S3r | N1r | S3r | N1r | N1r | N1r | S3r | S3r | S3r | S3r | S3r | N1r | S3r | N1r | N1r |
| Rachanalli | 111 | N1r | S3r | N1r | S3r | N1r | S3r | N1r | N1r | S3r | N1r | N1r | S3r | N1r | S3r | N1r | N1r | N1r | S3r | S3r | S3r | S3r | S3r | N1r | S3r | N1r | N1r |
| Rachanalli | 112 | S3rt | S3tw | S3tw | S2wz | S3tw | S2rw | S3rw | S2rz | S2wz | S2rw | S2rt | S2tz | S3tw | S2tw | N1tz | S3rt | S2rw | S3tw | S2tw | S3tw | S2tw | S2tw | S2rt | S2tw | S2rt | S3tw |
| Rachanalli | 115 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 116 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 117 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Rachanalli | 118 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 2/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 2/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 3 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 4 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 5 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 6 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 7 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 8/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 8/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 9 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 10 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 11 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 12 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 13/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 13/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 14/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 14/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 15 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 16 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 17 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 18 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 19 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 20 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 21 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 22 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 23 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 24 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 25 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 26 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 27 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 28 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 29 | N1r | S3r | N1r | S3r | N1r | S3r | N1r | N1r | S3r | N1r | N1r | S3r | N1r | S3r | N1r | N1r | N1r | S3r | S3r | S3r | S3r | S3r | N1r | S3r | N1r | N1r |
| Ramapura | 30 | N1r | S3r | N1r | S3r | N1r | S3r | N1r | N1r | S3r | N1r | N1r | S3r | N1r | S3r | N1r | N1r | N1r | S3r | S3r | S3r | S3r | S3r | N1r | S3r | N1r | N1r |
| Ramapura | 31 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 32 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 33 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 34 | N1r | S2r | S3r | S2r | S3r | S2r | N1r | S3r | S2r | S3r | S3r | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2r | S2r | S2r | S2r | S3r | S2r | S3r | S3r |
| Ramapura | 35 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 36 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 38 | N1r | S2r | S3r | S2r | S3r | S2r | N1r | S3r | S2r | S3r | S3r | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2r | S2r | S2r | S2r | S3r | S2r | S3r | S3r |
| Ramapura | 39 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 40 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 41 | N1r | S2r | S3r | S2r | S3r | S2r | N1r | S3r | S2r | S3r | S3r | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2r | S2r | S2r | S2r | S3r | S2r | S3r | S3r |

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 43 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 44 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Ramapura | 45 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 46 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 47 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 48 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 130 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Ramapura | 131 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Ramapura | 132 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Ramapura | 133 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Ramapura | 134 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 135 | N1rz | S2rz | S3rz | S2rz | S3rz | S2rz | N1rz | S3rz | S2rz | S3rz | S3rz | S2rz | S3rz | S2rz | N1tz | S3rz | S3rz | S2rz | S2rz | S2rz | S2rz | S2rz | S3rz | S2rz | S3rz | S3rz |
| Ramapura | 136 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Ramapura | 137/1 | S3tz | S3tw | S3tw | S2zw | S3tw | S2z | S2tw | S2zw | S2z | S2zw | S2tw | S2tw | S3tw | S2tw | N1tw | S2tw | S2zw | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tz | S2tw | S3tw |
| Ramapura | 137/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 137/3 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 181 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 182/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 184 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 185 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 186 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 216 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 217 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 218 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 219 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 220 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 221 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 222 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 223 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 224 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 225 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 226 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 227 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 228 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 229 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 230 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 231 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 232 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 233 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 234 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 235/1 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 235/2 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Ramapura | 236 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |

| Village | Survey Number | Mango | Maize | Sapota | Sorgham | Guava | Cotton | Tamarind | Lime | Bengalgram | Sunflower | Redgram | Amla | Jackfruit | Custard apple | Cashew | Jamun | Musambi | Groundnut | Chilly | Tomato | Marigold | Chrysanthemum | Pomegranate | Bajra | Drumstick | Mulbery |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ramapura | 237 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Ramapura | 238 | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others | Others |
| Ramapura | 239 | S3tw | S3tw | S3tw | S2wz | S3tw | S2wz | S2tw | S2zw | S2wz | S2rw | S2tw | S2zw | S3tw | S2tw | N1tz | S2tw | S2wz | S3tw | S2tw | S3tw | S2tw | S2tw | S2tw | S2tw | S2tw | S3tw |
| Sydhapura | 149 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |
| Sydhapura | 154 | N1r | S2r | S3r | S2r | S3r | S2r | N1r | S3r | S2r | S3r | S3r | S2r | S3r | S2r | S3r | S3r | S3r | S2r | S2r | S2r | S2r | S2r | S3r | S2r | S3r | S3r |
| Sydhapura | 155 | N1r | S2rg | S3r | S2rg | S3r | S2rg | N1r | S3r | S2rg | S3rg | S3rg | S2r | S3r | S2rg | S3r | S3r | S3r | S2r | S2rg | S2rg | S2rg | S2rg | S3r | S2r | S3r | S3r |

# PART-B

## SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

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***Chapter 1***

## *EXECUTIVE SUMMARY*

*Baseline socioeconomic characterisation is prerequisite to prepare action plan for program implementation and to assess the project performance before making any changes in the watershed development program. The baseline provides appropriate policy direction for enhancing productivity and sustainability in agriculture.*

***Methodology:*** *Ramapura-2 micro-watershed (Yadgir taluk and district) is located in between $16^0$33' – $16^0$34'23.736" North latitudes and $77^0$16' – $77^0$19' East longitudes, covering an area of about 576.6 ha, bounded by Ramapura, Balacheda, Rachanalli and Daddala Villages with length of growing period (LGP) 120-150 days. We used soil resource map as basis for sampling farm households to test the hypothesis that soil quality influence crop selection, and conservation investment of farm households. The level of technology adoption and productivity gaps and livelihood patterns were analyses. The cost of soil degradation and ecosystem services were quantified.*

***Results:*** *The socio-economic outputs for the Ramapura-2 micro-watershed in Yadgir taluk and district are presented here.*

***Social Indicators;***

- *Male and female ratio is 55.4 to 44.6 per cent to the total sample population.*
- *Younger age group 18 to 50 of population is around 57.7 per cent to the total population.*
- *Literacy population is around 48.8 per cent.*
- *Social groups belong to scheduled caste / scheduled tribes are around 36.8 per cent.*
- *Fire wood is the source of energy for a cooking among 100 per cent.*
- *About 23.7 per cent of households have a yashaswini health card.*
- *About 15.8 per cent farm households having MGNREGA card for rural employment.*
- *Dependence on ration cards for food grains through public distribution system is around 94.7 per cent.*
- *Swach bharath program providing closed toilet facilities around 36.8 per cent of sample households.*
- *Women participation in decisions making are around 94.7 per cent of households were found.*

***Economic Indicators;***

- *The average land holding is 1.7 ha indicates that majority of farm households are belong to marginal and small farmers.*

- *Agriculture is the main occupation among 44.7 per cent and agriculture is the main and non agriculture labour is predominant subsidiary occupation for 30.2 per cent of sample households.*
- *The average value of domestic assets is around Rs.12212 per household. Mobile and television are popular media mass communication.*
- *The average value of farm assets is around Rs.1944.8 per household, about 38.4 per cent of sample farmers are owing plough.*
- *The average value of livestock is around Rs.38265 per household; about 82.7 per cent of household are having livestock.*
- *The average per capita food consumption is around 1207.5 grams (3010.2 kilo calories) against national institute of nutrition recommendation at 827 gram. Around 30.7 per cent of sample households are consuming more than the NIN recommendation.*
- *The annual average income is around Rs. 63498 per household. About 7.6 per cent of farm households are below poverty line.*
- *The per capita monthly average expenditure is around Rs.3279.*

***Environmental Indicators-Ecosystem Services;***

- *The value of ecosystem service helps to support investment to decision on soil and water conservation and in promoting sustainable land use.*
- *The onsite cost of different soil nutrients lost due to soil erosion is around Rs 2236 per ha/year. The total cost of annual soil nutrients is around Rs 1115717 per year for the total area of 576.6 ha.*
- *The average value of ecosystem service for food grain production is around Rs. 5610/ ha/year. Per hectare food grains production services is maximum in greengram (Rs.8370) followed by redgram (Rs.7306), cotton (Rs.3491) and groundnut is negative return.*
- *The average value of ecosystem service for fodder production is around Rs.3775/ ha/year. Per hectare fodder production services is maximum in groundnut (Rs.2400) followed by paddy (Rs.1500), cotton (Rs.1406) and redgram (Rs.270 /ha).*
- *The data on water requirement for producing one quintal of grain is considered for estimating the total value of water required for crop production. The value of per hectare water used and value of water was maximum in greengram (Rs. 75812) followed by redgram (Rs. 47218), cotton (Rs. 39009) and groundnut (Rs. 22905).*

***Economic Land Evaluation;***

- *The major cropping pattern is redgram (58.8 %) followed by cotton (26.8 %), bengalgram (3.9 %), groundnut (3.9 %), greengram (3.5 %) and paddy (3.1 %).*

- *In Ramapura-2 micro watershed, major soils are soil of alluvial landscape of Yalleri (YLR) series are having moderately shallow soil deep cover around 25.57 % of area. On this soil farmers are presently growing cotton (53.2 %) and redgram (46.8 %). Soil of granite and granite gneiss landscape of Anur (ANR) are also having deep soil deep cover around 0.97 % of area, the crops are cotton (44.4 %) and redgram was 55.6 % each. Hegganakera (HGN) soil series having very deep soil depth cover around 23.42 % of areas, crops are cotton (19.4 %), greengram (18.6 %) and redgram (62.0 %). Halagera (HLG) soil series are having moderately deep soil depth cover around 15.53 per cent of area, respectively. The major crops grown are cotton (46.3%), greengram (4.5 %), groundnut (22.7 %) and redgram (26.5 %). Kudlura (KDR) soil series are having deep soil depth covers around 3.31 % of area, the major crop grown is paddy (70.6 %) and redgram (29.4 %). Kyathanala (KYT) soil series are having shallow soil depth covers around 3.31 % of area, the major crop grown is redgram (100 %). Sowrashtrahalli (SWR) and Tumkur (TMK) soil series having deep and very deep soil depth cover 1.54 % and 0.41 % of areas respectively; crops are cotton, redgram and greengram.*
- *The total cost of cultivation and benefit cost ratio (BCR) in study area for red gram ranges between Rs. 43158/ha in YLR soil (with BCR of 1.25) and Rs. 15877/ha in KYT soil (with BCR of 1.95).*
- *In cotton the cost of cultivation range between Rs. 43132/ha in HGN soil (with BCR of 1.1) and Rs. 32505/ha in YLR soil (with BCR of 1.12).*
- *In greengram the cost of cultivation range between Rs. 40480/ha in HLG soil (with BCR of 1.22) and Rs. 31151/ha in SWR soil (with BCR of 1.19).*
- *In groundnut the cost of cultivation in HLG soil is Rs. 33168/ha (with BCR of 1.04) and paddy cultivation in KDR soil is Rs. 28742/ha (with BCR of 1.7).*
- *The land management practices reported by the farmers are crop rotation, tillage practices, fertilizer application and use of farm yard manure (FYM). Due to higher wages farmer are following labour saving strategies is not prating soil and water conservation measures. Less ownership of livestock limiting application of FYM.*
- *It was observed soil quality influences on the type and intensity of land use. More fertilizer applications in deeper soils to maximize returns.*

***Suggestions;***

- *Involving farmers is watershed planning helps in strengthing institutional participation.*
- *The per capita food consumption and monthly income is very low. Diversifying income generation activities from crop and livestock production in order to reduce risk related to drought and market prices.*

- *Majority of farmers reported that they are not getting timely support/extension services from the concerned development departments.*
- *By strengthing agricultural extension for providing timely advice improved technology there is scope to increase in net income of farm households.*
- *By adopting recommended package of practices by following the soil test fertiliser recommendation, there is scope to increase yield in redgram (9.1 to 61 %), cotton (35.2 % to 50.5 %), paddy (9.1 %) and groundnut (7.4 %).*

*Chapter 2*

# INTRODUCTION

Watershed Development program aim to restore degraded watersheds in rainfed regions to increase their capacity to capture and store rain water, reduce soil erosion, and improved soil nutrients and carbon contents so they can produce greater agricultural yields and other benefits. As majority of rural poor live in these regions and dependent on natural resources for their livelihood and sustenance, improvements in agricultural yields improve human welfare and simultaneously improve national food security.

Sujala–III watershed development project conceptualised and implemented by the Watershed Development Department of Government of Karnataka with tripartite cost-sharing arrangements. The World Bank through International Development Association provided major portion of plan outlay as a loan to Government of India and in turn loan to Government of Karnataka.

The objectives of Sujala-III is to demonstrate more effective watershed management through greater integration of programs related to rain fed agriculture, innovative and science based approaches and strengthened institutions and capacities. The project is implemented in 11 districts of Bidar, Vijayapura, Gulbarga, Yadgir, Koppal, Gadag, Raichur, Davanagere, Tumkur, Chikkamangalur and Chamarajanagar which have been identified by the Watershed Development Department based on rainfall and socio-economic conditions. The project will be implemented over six years and linked with the centrally financed integrated watershed management programme.

Economic evaluations can better guide in watershed planning and implementation, as well as raise awareness of benefits of ecosystem restoration for food security and poverty alleviation program. The present study aims to characterize socio-economic status of farm households, assess the land and water use status, evaluate the economic viability of land use, prioritize farming constraints and suggest the measures for soil and water conservation for sustainable agriculture.

## Objectives of the study

1. To characterize socio-economic status of farm households
2. To evaluate the economic viability of land use and land related constraints
3. To estimate the ecosystem service provided by the watershed and
4. To suggest alternatives for sustainable agriculture production.

*Chapter 3*

# METHODOLOGY

## *Study area*

Ramapura-2 micro-watershed is located in North-eastern Dry Zone of Karnataka (Figure 1): The total geographic area of this zone is about 1.76 M ha covering 8 taluks of Gulbarga district and 3 taluks of Raichur. Net cultivated area in the zone is about 1.31 M ha of which about 0.09 M ha are irrigated. The mean elevation of the zone is 300-450 m MSL. The main soil type is deep to very deep soils with small pockets of shallow to medium black soils. The zone is cropped predominantly during Rabi due to insufficient rainfall (465-785 mm). The principal crops of the zone are jowar, bajra, oilseeds, pulses, cotton and sugarcane. It's represented Agro Ecological Sub Region (AESR) 6.2 with LGP 120-150 days.

Ramapura-2 micro-watershed (Yadgir taluk and district) is located in between $16^0$33' – $16^0$34'23.736" North latitudes and $77^0$16' – $77^0$19' East longitudes, covering an area of about 576.59ha, bounded by Ramapura, Balacheda, Rachanalli and Daddala Villages.

## Sampling Procedure:

In this study we have followed soil variability as criterion for sampling the farm households. In each micro-watershed the survey numbers and associated soil series are listed. Minimum three farm households for each soil series were taken and summed up to arrive at total sample for analysis.

## Sources of data and analysis:

For evaluating the specific objectives of the study, primary data was collected from the sample respondents by personal interview method with the help of pre-tested questionnaire. The data on socio-economic characteristics of respondents such as family size and composition, land holdings, asset position, occupational pattern and education level was collected. The present cropping pattern and the level of input use and yields collected during survry. The data collected from the representative farm households were analysed using Automated Land Potential Evalution System (Figure 2).

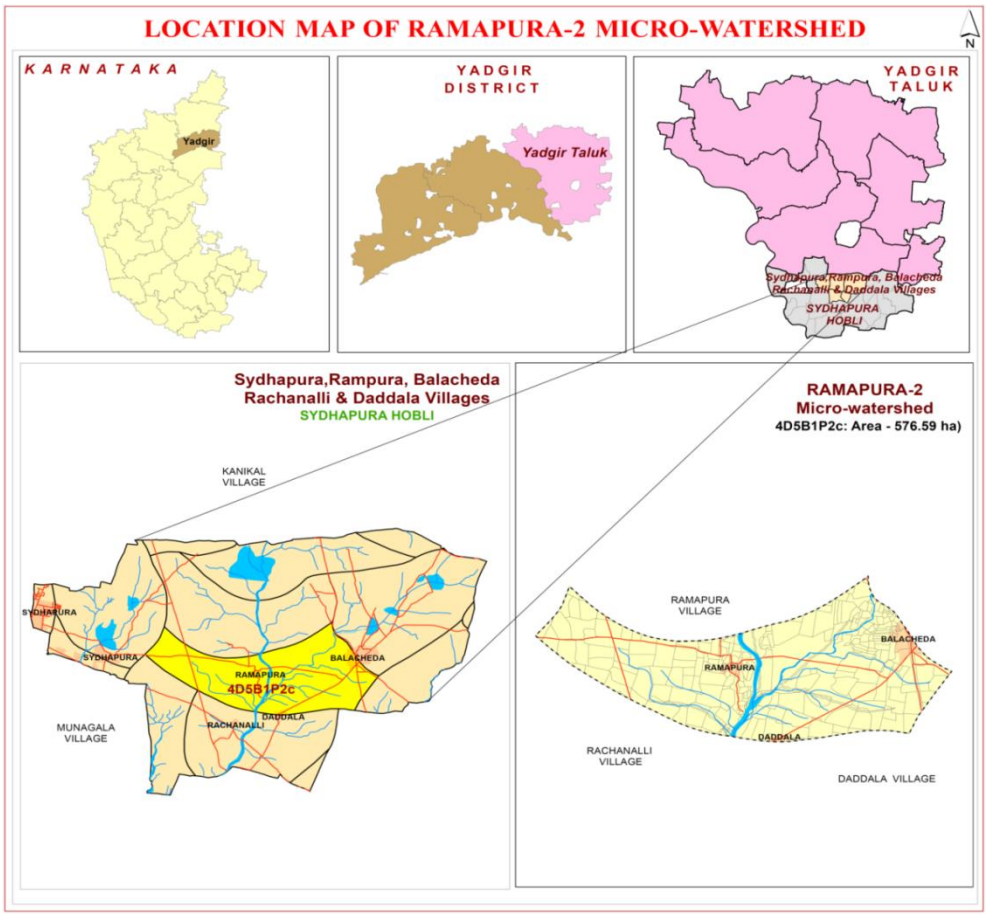
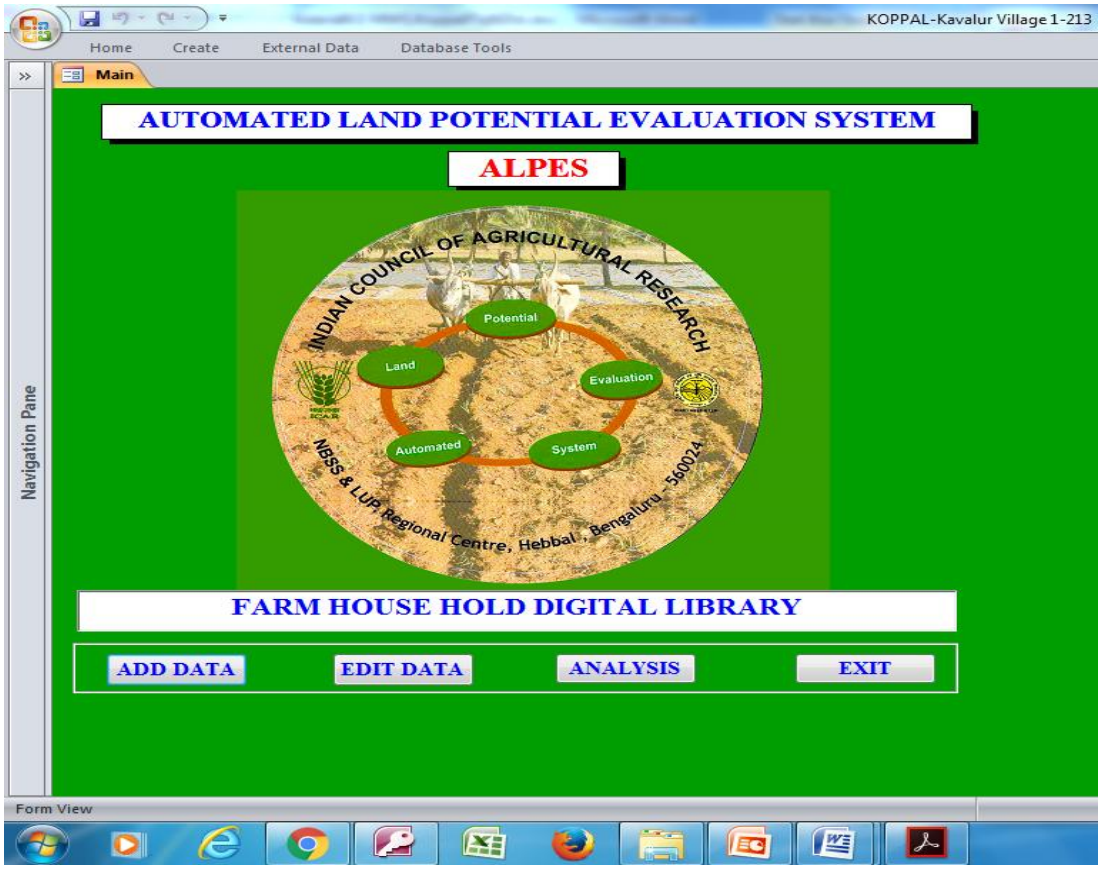



Figure 1: Location of study area

**Steps followed in socio-economic assessment**

1. •After the completion of soil profile study link the cadastral number to the soil profile in the micro watershed.
2. • Download the names of the farmers who are owning the land for each cadastral number in the Karnataka BHOOMI Website.
3. • Compiling the names of the farmers representing for all the soil profiles studied in the micro watershed for socio-economic Survey.
4. • Conducting the socioeconomic survey of selected farm households in the micro watershed .
5. • Farm households database created using the Automated Land Potential Evaluation System (ALPES) for analysis of socio economic status for each micro watershed .
6. • Synthesis of tables and preparation of report for each micro watershed .



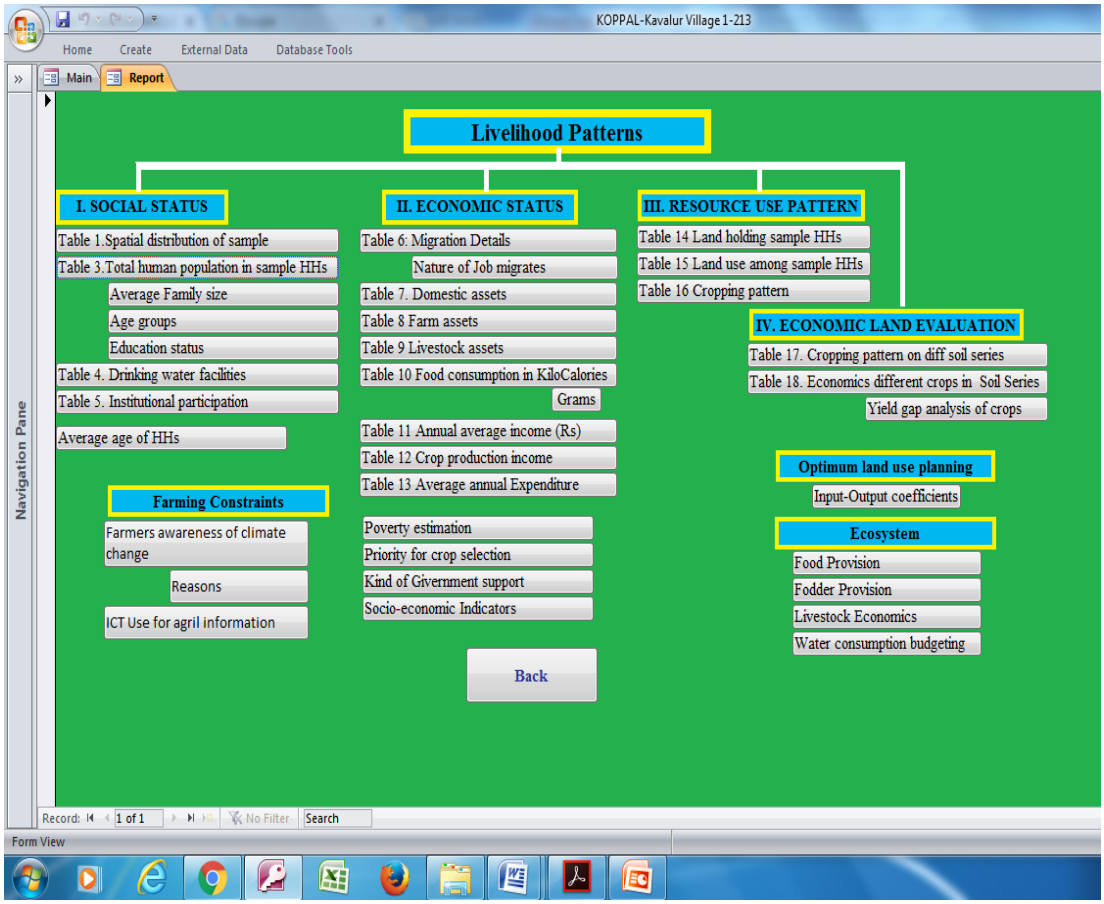




Figure 2: ALPES FRAMEWORK

The sample farmers were post classified in to marginal and small (0.0 to <=2 acres), medium and semi medium (>2 to <=10 acres) and large (>10 acres). The steps involved in estimation of soil potential involve estimation of total cost of cultivation, the yield/gross returns and net income per hectare. The cost of inputs such seed, manure and fertilizer, plant protection chemicals, payment towards human and bullock labour and interest on working capita are included under operational costs. In the case of perennial crops, the cost of establishment was estimated by using actual physical requirements and prevailing market prices. Estimation cost included maintenance cost up to bearing period. The value of main product and by product from the crop enterprise at the market rates were the gross returns of the crop. Net returns were worked out by deducting establishment and maintained cost from gross returns.

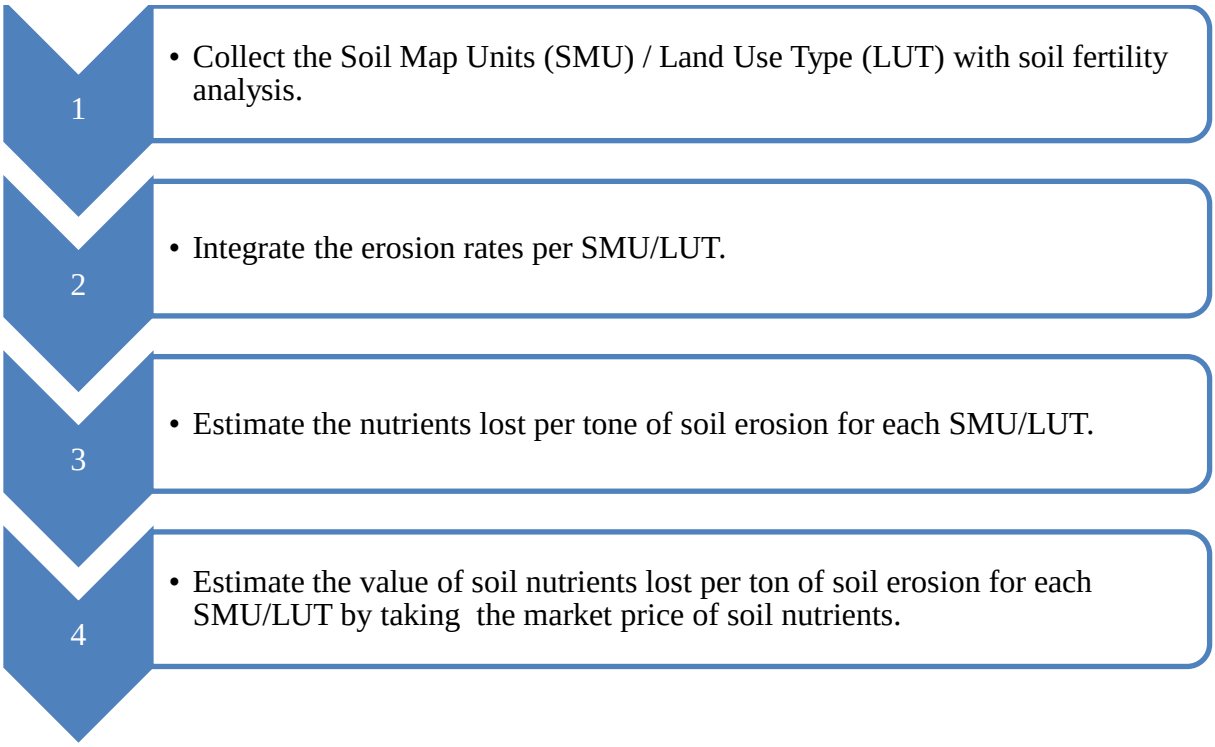
Operational Cost = cost of seeds, fertilizers, pesticides. Cost of human and bullock labour, cost of machinery, cost of irrigation water + interest on working capital.
Gross returns = Yield (Quintals/hectare)*Price (Rs/Quintal)
Net returns = Gross returns-Operational cost.
Benefit Cost Ratio = Net returns/Total cost.

Economic suitability classes: once each land use –land area combination has been assigned an economic value by the land evaluation, the question arises as to its 'suitability', that is, the degree to which it satisfies the land user. The FAO framework defines two suitability orders: 'S'(suitable if benefit cost ratio (BCR)>1) and 'N'(not suitable if (BCR<1), which are dived into five economic suitability classes:'S1'(highly suitable if BCR>3), 'S2'(suitable if BCR>2 and <3),'S3'(Marginally suitable if BCR >1 and <2), 'N1'(Not suitable for economic reasons but physically suitable) and 'N2'(not suitable for physical reasons). The limit between 'S3' and 'N1'must be at least at the point of financial feasibility (i.e. net returns, NPV, or IRR>0 and BCR>1). The other limits depend on social factors such as farm size, family size, alternative employment or investment possibilities and wealth expectations; these need to be specified for the Soil series.

**Economic Valuation of Soil ecosystem services:**

The replacement cost approach was followed for estimating the onsite cost of soil erosion, Market price method was followed for estimating the value of food and fodder production. Value transfer menthods was followed for estimating the value of water demand by different crops in the micro watershed.

**Steps followed in Replacement cost methods for estimation of onsite cost of soil erosion**



*Chapter 4*

## RESULTS AND DISCUSSIONS

The demographic information shows that the household population dynamics encompasses the socioeconomic status of the farmer. For a rural family, the household size should be optimal to earn a comfortable livelihood through farm and non-farm wage earning. The total number of population in watershed area was 168, out of which 55.4 per cent were males and 44.6 per cent females. Average family size of the households is 4.4 among the sample population.

**Table 1: Human population among sample households in Ramapura-2 Microwatershed**

| Particulars | MF (71) | | SF(45) | | SMF (42) | | MDF (10) | | All (168) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Male | 33 | 46.5 | 30 | 66.7 | 24 | 57.1 | 6 | 60.0 | 93 | 55.4 |
| Female | 38 | 53.5 | 15 | 33.3 | 18 | 42.9 | 4 | 40.0 | 75 | 44.6 |
| **Total human population** | **71** | **100** | **45** | **100** | **42** | **100** | **10** | **100** | **168** | **100** |
| Average family size | 4.7 | | 4.0 | | 4.2 | | 5.0 | | 4.4 | |

Age is an important factor, which affects the potential employment and mobility status of respondents. The data on age wise distribution of farmers in the sample households indicated that majority of the farmers are coming under the age group of 30 to 50 years (31.5 %) followed by 0 to18 years (25.6 %), 18 to 30 years (26.2%) and more than 50 years (16.7 %). Hence, in the study area in general, the respondents were of young and middle age, indicating there by that the households had almost settled with whatever livelihood options they were practicing and sample respondents were young by age who could venture into various options of livelihood sources (Table 2).

**Table 2: Age groups among the sample population in Ramapura-2 micro-watershed**

| Age groups | MF (71) | | SF(45) | | SMF (42) | | MDF (10) | | All (168) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| 0 to 18 year | 15 | 21.1 | 9 | 20.0 | 13 | 31.0 | 6 | 60.0 | 43 | 25.6 |
| 18 to 30 year | 17 | 23.9 | 16 | 35.6 | 8 | 19.0 | 3 | 30.0 | 44 | 26.2 |
| 30 to 50 years | 27 | 38.0 | 14 | 31.1 | 11 | 26.2 | 1 | 10.0 | 53 | 31.5 |
| >50 years | 12 | 16.9 | 6 | 13.3 | 10 | 23.8 | | 0.0 | 28 | 16.7 |
| **Total** | **71** | **100** | **45** | **100** | **42** | **100** | **10** | **100** | **168** | **100** |
| Average of Age | 34.2 | | 32.6 | | 33.5 | | 16.4 | | 32.6 | |

Data on literacy (Table 3) indicated that 51.2 per cent of respondents were illiterate and 48.8 per cent literate with highest of primary school education (19 %) followed by the graduates and post graduates (11.9%), high school education (10.1 %) and middle school education (7.7 %).

The ethnic groups among the sample farm households found to be 57.9 per cent belonging to other backward castes (OBC) followed by 26.3 per cent belong to scheduled caste (SC), 10.5 per cent belonging to scheduled tribes (ST) and 5.3 per cent belong to general castes among the sample population (Table 4 and Figure 3).

**Table 3: Education status among the sample population in Ramapur-2 micro-watershed**

| Age groups | MF (71) | | SF(45) | | SMF (42) | | MDF (10) | | All (168) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Illiterates | 44 | 62.0 | 20 | 44.4 | 19 | 45.2 | 3 | 30.0 | 86 | 51.2 |
| Literates | 27 | 38.1 | 25 | 55.6 | 23 | 54.7 | 7 | 70 | 82 | 48.7 |
| Primary School (<5 class) | 9 | 12.7 | 8 | 17.8 | 9 | 21.4 | 6 | 60.0 | 32 | 19.0 |
| Middle School (6- 8 class) | 4 | 5.6 | 4 | 8.9 | 4 | 9.5 | 1 | 10.0 | 13 | 7.7 |
| High School (9- 10 class) | 8 | 11.3 | 3 | 6.7 | 6 | 14.3 | | 0.0 | 17 | 10.1 |
| Others | 6 | 8.5 | 10 | 22.2 | 4 | 9.5 | | 0.0 | 20 | 11.9 |
| Total | 71 | 100 | 45 | 100 | 42 | 100 | 10 | 100 | 168 | 100 |

**Table 4: Social groups among sample households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| SC | 5 | 33.3 | 3 | 27.3 | 2 | 20.0 | | 0.0 | 10 | 26.3 |
| ST | 1 | 6.7 | | 0.0 | 3 | 30.0 | | 0.0 | 4 | 10.5 |
| OBC | 7 | 46.7 | 8 | 72.7 | 5 | 50.0 | 2 | 100.0 | 22 | 57.9 |
| General | 2 | 13.3 | | 0.0 | | 0.0 | | 0.0 | 2 | 5.3 |
| Total | 15 | 100 | 11 | 100 | 10 | 100 | 2 | 100 | 38 | 100 |

Among the entire sample households are using fire wood as source of fuel for cooking. All the sample farmers are having electricity connection. About 23.7 per cent are sample households having health cards. Only 15.8 per cent of having MNREGA job cards for employment generation. About 94.7 per cent of farm households are having ration cards for taking food grains from public distribution system. About 36.8 per cent of farm households are having toilet facilities (Table 5).

**Table 5: Basic needs of sample households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| **Types of fuel use for cooking** | | | | | | | | | | |
| Fire wood | 15 | 100 | 11 | 100 | 10 | 100 | 2 | 100 | 38 | 100 |
| **Energy supply for home** | | | | | | | | | | |
| Electricity | 15 | 100 | 10 | 90.9 | 10 | 100.0 | 2 | 100.0 | 37 | 97.4 |
| Solar Lamp | 0 | 0 | 1 | 9.1 | 0 | 0.0 | 0 | 0.0 | 1 | 2.6 |
| Grand Total | 15 | 100 | 11 | 100.0 | 10 | 100.0 | 2 | 100.0 | 38 | 100.0 |
| **Health Card** | | | | | | | | | | |
| Yes | 5 | 33.3 | 3 | 27.3 | 1 | 10.0 | | 0.0 | 9 | 23.7 |
| No | 10 | 66.7 | 8 | 72.7 | 9 | 90.0 | 2 | 100.0 | 29 | 76.3 |
| **NREGA** | | | | | | | | | | |
| Yes | 1 | 6.7 | 3 | 27.3 | 2 | 20.0 | | 0.0 | 6 | 15.8 |
| No | 14 | 93.3 | 8 | 72.7 | 8 | 80.0 | 2 | 100.0 | 32 | 84.2 |
| **Ration Card** | | | | | | | | | | |
| Yes | 14 | 93.3 | 11 | 100.0 | 9 | 90.0 | 2 | 100.0 | 36 | 94.7 |
| No | 1 | 6.7 | | 0.0 | 1 | 10.0 | | 0.0 | 2 | 5.3 |
| **Household with toilet** | | | | | | | | | | |
| Yes | 4 | 26.7 | 4 | 36.4 | 6 | 60.0 | | 0.0 | 14 | 36.8 |
| No | 11 | 73.3 | 7 | 63.6 | 4 | 40.0 | 2 | 100.0 | 24 | 63.2 |
| **Drinking Water** | | | | | | | | | | |
| Tank | 1 | 6.7 | | 0.0 | | 0.0 | 1 | 50.0 | 2 | 5.3 |
| Tube Well | 14 | 93.3 | 11 | 100.0 | 10 | 100.0 | 1 | 50.0 | 36 | 94.7 |

The data collected on the source of drinking water in the study area is presented in Table 5. Majority of the sample respondents are having tube well source for water supply for domestic purpose (94.7 %) and tank (5.3 %).

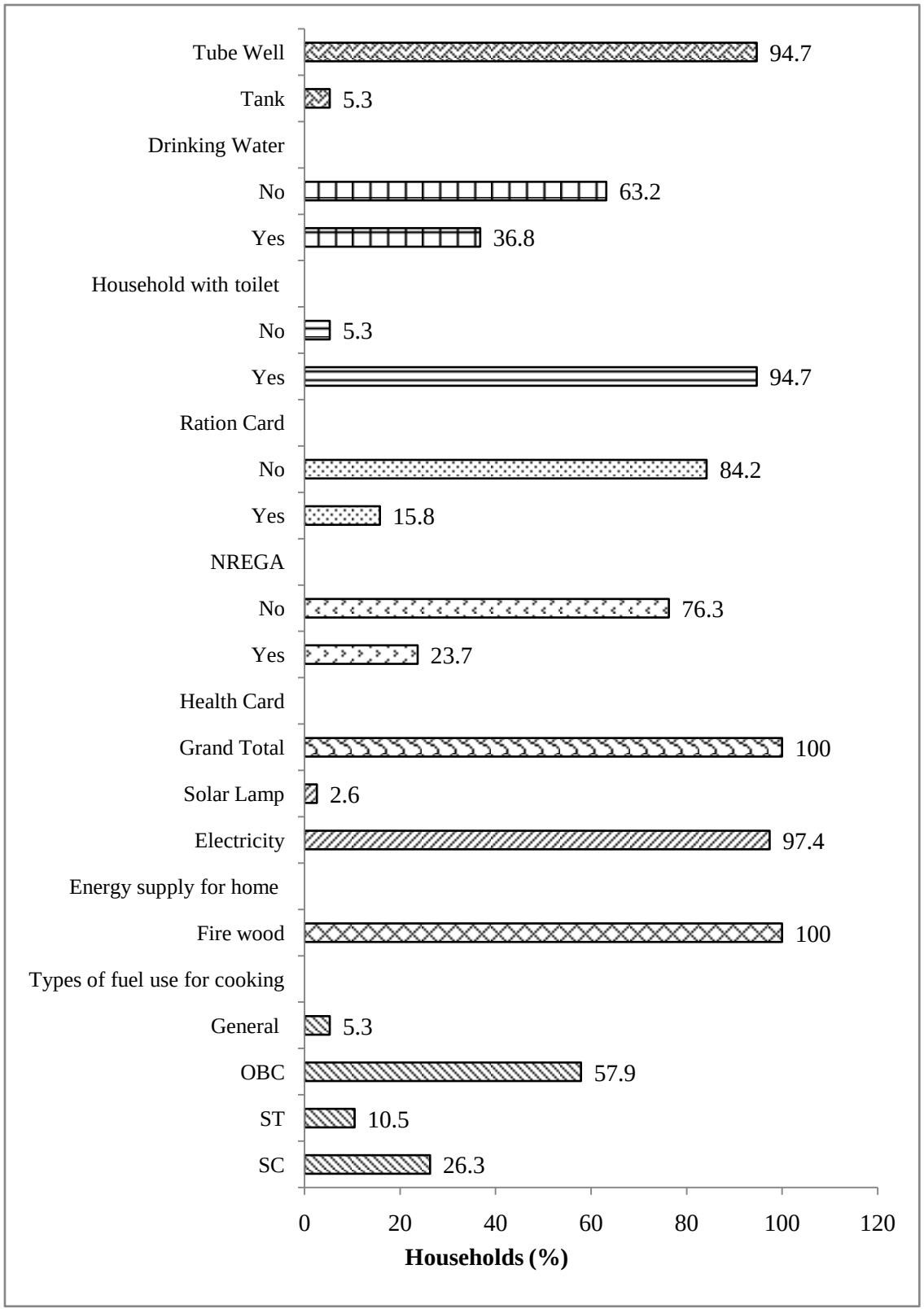



Figure 3: Basic needs of sample households in Ramapura-2 Microwatershed

The occupational pattern (Table 6) among sample households shows that agriculture is the main occupation and non agriculture labour is subsidiary occupations around 42.3 per cent of population. Non agriculture labour is main occupation and private service as a subsidiary occupation of 30.4 per cent.

**Table 6: Occupational pattern in sample population in Ramapura-2 Microwatershed**

| **Particulars** | | **MF (71)** | | **SF(45)** | | **SMF (42)** | | **MDF (10)** | | **All (168)** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Main** | **Subsidiary** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | % |
| Agriculture | Non Agriculture Labour | 28 | 22.2 | 23 | 51.1 | 18 | 42.9 | 2 | 20.0 | 71 | 42.3 |
| Non Agriculture Labour | Private service | 27 | 21.4 | 12 | 26.6 | 11 | 26.2 | 2 | 20 | 51 | 30.4 |
| Studying | | 71 | 56.3 | 10 | 22.2 | 13 | 31.0 | 6 | 60.0 | 46 | 27.4 |
| Grand Total | | 126 | 100 | 45 | 100 | 42 | 100 | 10 | 100 | 168 | 100 |
| **Family labour availability** | | **Man days/month** | | | | | | | | | |
| Male | | 34.9 | 48.4 | 60.1 | 67.7 | 42.0 | 63.3 | 25.0 | 55.6 | 42.4 | 57.3 |
| Female | | 37.2 | 51.6 | 28.6 | 32.3 | 24.4 | 36.7 | 20.0 | 44.4 | 31.6 | 42.7 |
| **Total** | | 72.0 | 100 | 88.7 | 100 | 66.4 | 100 | 45.0 | 100 | 74.0 | 100 |

The important assets especially with reference to domestic assets were analyzed and are given in Table 7 and Figure 4. The important domestic assets possessed by all categories of farmers are mobile phones (97.4 %) followed by television (97.4 %), motorcycle (13.2 %), mixer/grinder (10.5 %), bicycle (7.9 %) and landline phone (2.6 %). The average value of domestic assets is around Rs.12212 per households.

**Table 7: Domestic assets among the sample households in Ramapura-2 Microwatershed**

| **Particulars** | **MF (15)** | | **SF (11)** | | **SMF (10)** | | **MDF (2)** | | **All (38)** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | % |
| Television | 14 | 93.3 | 11 | 100.0 | 10 | 100.0 | 2 | 100.0 | 37 | 97.4 |
| Bicycle | 2 | 13.3 | 1 | 9.1 | 0 | 0.0 | 0 | 0.0 | 3 | 7.9 |
| Motorcycle | 2 | 13.3 | 2 | 18.2 | 1 | 10.0 | 0 | 0.0 | 5 | 13.2 |
| Mixer/grinder | 2 | 13.3 | 0 | 0.0 | 2 | 20.0 | 0 | 0.0 | 4 | 10.5 |
| Landline Phone | 0 | 0.0 | 1 | 9.1 | 0 | 0.0 | 0 | 0.0 | 1 | 2.6 |
| Mobile Phone | 15 | 100.0 | 10 | 90.9 | 10 | 100.0 | 2 | 100.0 | 37 | 97.4 |
| ***Average value (Rs)*** | ***13851*** | | ***14080*** | | ***10750*** | | ***12500*** | | ***12212*** | |

The most popularly owned farm equipments were sickles, plough, cattle shed; pump sets, chaff cutter, bullock cart, sprayer and thresher. Plough and sickle were commonly present in all the sampled farmers; these were primary implements in agriculture. The per cent of households owned bullock cart (31.6 %), plough (28.9 %) and sprayer (2.6 %) was found highest among the sample farmers. the average value of farm assets is around Rs.7001 per households (Table 8 and Figure 5).

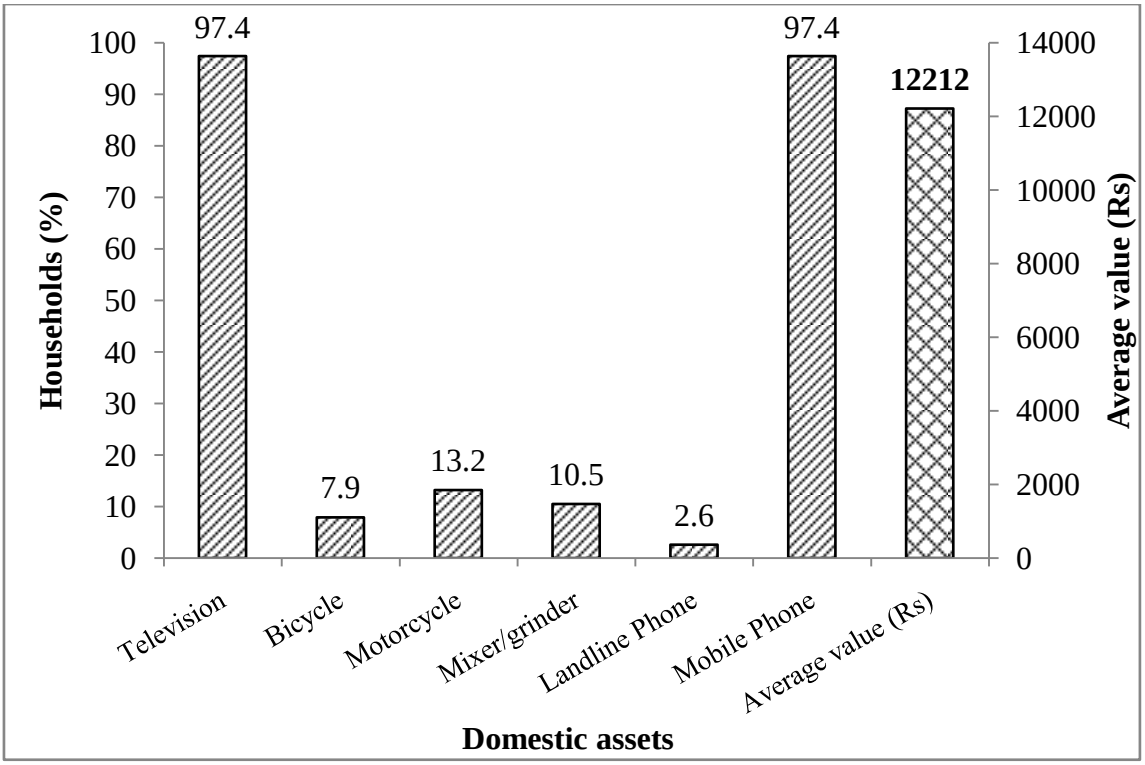



Figure 4: Domestic assets among the sample households in Ramapura-2 Microwatershed

**Table 8: Farm assets among samples households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Bullock cart | 4 | 26.7 | 3 | 27.3 | 4 | 40.0 | 1 | 50.0 | 12 | 31.6 |
| Plough | 3 | 20.0 | 3 | 27.3 | 4 | 40.0 | 1 | 50.0 | 11 | 28.9 |
| Sprayer | 0 | 0.0 | 0 | 0.0 | 1 | 10.0 | 0 | 0.0 | 1 | 2.6 |
| Weeder | 0 | 0.0 | 2 | 18.2 | 0 | 0.0 | 0 | 0.0 | 2 | 5.3 |
| ***Average value (Rs)*** | ***6100*** | | ***5183*** | | ***8470*** | | ***7764*** | | ***7001*** | |

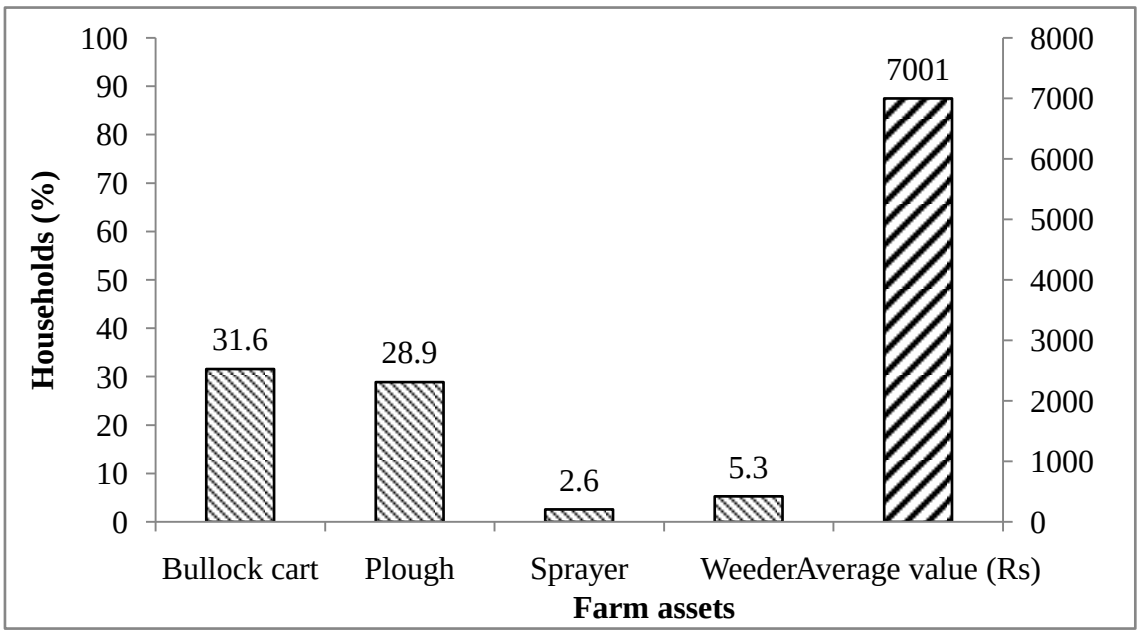



Figure 5: Farm assets among samples households in Ramapura-2 Microwatershed

Livestock is an integral component of the conventional farming systems (Table 6 and Figure 6). The highest livestock population is bullocks were around 55.3 per cent followed by local dry cow (44.7 %), poultry (18.4 %), local milching cow (15.8 %), milching buffalos (10.5 %), dry buffalos (7.9 %), goats (5.3 %) and sheep's (5.3 %). The average livestock value was Rs. 31712 per households.

**Table 9: Livestock assets among sample households in Ramapura-2 micro-watershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Local Dry Cow | 10 | 66.7 | 4 | 36.4 | 3 | 30.0 | | 0.0 | 17 | 44.7 |
| Local Milching Cow | | 0.0 | 3 | 27.3 | 3 | 30.0 | | 0.0 | 6 | 15.8 |
| Dry Buffalos | | 0.0 | | 0.0 | 2 | 20.0 | 1 | 50.0 | 3 | 7.9 |
| Milching Buffalos | | 0.0 | 2 | 18.2 | | 0.0 | 2 | 100.0 | 4 | 10.5 |
| Bullocks | 9 | 60.0 | 4 | 36.4 | 7 | 70.0 | 1 | 50.0 | 21 | 55.3 |
| Goats | 2 | 13.3 | | 0.0 | | 0.0 | | 0.0 | 2 | 5.3 |
| Sheeps | 2 | 13.3 | | 0.0 | | 0.0 | | 0.0 | 2 | 5.3 |
| Poultry | | 0.0 | 6 | 54.5 | | 0.0 | 1 | 50.0 | 7 | 18.4 |
| ***Average value (Rs)*** | ***34677*** | | ***24880*** | | ***36666*** | | ***30625*** | | ***31712*** | |

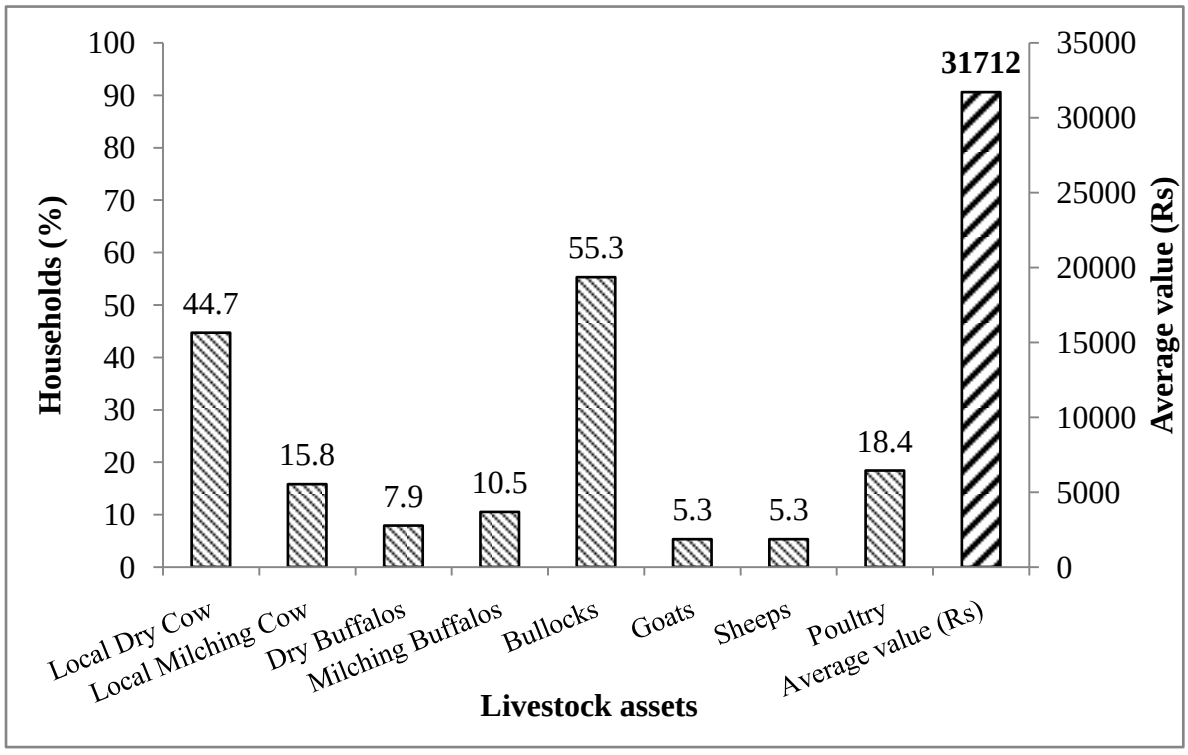



Figure 6: Livestock assets among sample households in Ramapura-2 micro-watershed

Average milk produced in sample households is 438 litters/ annum. Among the farm households, sorghum, bajra and maize are the main crops for domestic food and fodder for animals. About 1562 kg /ha of average fodder is available per season for the livestock feeding (Table 10).

**Table 10: Milk produced and fodder availability of sample households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | SF (11) | SMF (10) | MDF (2) | All (38) |
|---|---|---|---|---|---|
| **Name of the livestock** | | | | | **Ltr./Lactation/animal** |
| Local Milching Cow | 0 | 500 | 500 | 0 | 500 |
| Milching Buffalos | 0 | 540 | 0 | 210 | 375 |
| ***Average value (Rs).*** | ***0*** | 520 | 500 | 210 | 438 |
| **Fodder produces** | | | | | **Fodder yield (kg/ha)** |
| Groundnut | 0 | 0 | 625 | 0 | 625 |
| Paddy | 2500 | 0 | 0 | 0 | 2500 |
| ***Average fodder availability*** | ***2500*** | ***0*** | ***625*** | ***0*** | ***1562*** |
| Livestock having households (%) | 82.1 | 86.4 | 75.0 | 100.0 | 82.7 |
| Livestock population (Numbers) | 44 | 70 | 26 | 16 | 156 |

A woman participation in decision making is in this micro-watershed is presented in Table 11. About 94.7 per cent women earning for her family requirement and 94.7 per cent of women taking decision in her family and agriculture related activities.

**Table 11: Women empowerment of sample households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Women participation in local organization activities | | | | | | | | | | |
| Yes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No | 15 | 100 | 11 | 100 | 10 | 100 | 2 | 100 | 38 | 100 |
| Women participation in Elected Panchayth | | | | | | | | | | |
| Yes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No | 15 | 100 | 11 | 100 | 10 | 100 | 2 | 100 | 38 | 100 |
| Women earning for her family requirement | | | | | | | | | | |
| Yes | 14 | 93.3 | 10 | 90.9 | 10 | 100.0 | 2 | 100.0 | 36 | 94.7 |
| No | 1 | 6.7 | 1 | 9.1 | | 0.0 | | 0.0 | 2 | 5.3 |
| Women taking decision in her family and agriculture related activities | | | | | | | | | | |
| Yes | 14 | 93.3 | 10 | 90.9 | 10 | 100.0 | 2 | 100.0 | 36 | 94.7 |
| No | 1 | 6.7 | 1 | 9.1 | | 0.0 | | 0.0 | 2 | 5.3 |
| Grand Total | 15 | 100 | 11 | 100.0 | 10 | 100.0 | 2 | 100.0 | 38 | 100.0 |

The food intake in terms of kilo calorie (kcal) per person per day was calculated and presented in the Table 12 and Figure 7. More quantity of cereals is consumed by sample farmers which accounted for 1623.6 kcal per person. The other important food items consumed was pulses 232.6 kcal followed by cooking oil 326.1 kcal, milk 78.8 kcal, vegetables 35.7 kcal, egg 273.2 kcal and meat 62.7 kcal. In the sampled households farmers were consuming more (2632.7 kcal) than NIN- recommended food requirement (2250 kcal).

**Table 12: Per capita daily consumption of food among the sample households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Kcal | % | Kcal | % | Kcal | % | Kcal | % | Kcal | % |
| Cereals | 1294.8 | 54.7 | 2001.4 | 64.3 | 1803.9 | 68.3 | 1110.7 | 56.3 | 1623.6 | 61.7 |
| Pulses | 180.3 | 7.6 | 284.8 | 9.2 | 243.2 | 9.2 | 285.8 | 14.5 | 232.6 | 8.8 |
| Milk | 88.1 | 3.7 | 84.7 | 2.7 | 74.0 | 2.8 | 0.0 | 0.0 | 78.8 | 3.0 |
| Vegetables | 28.4 | 1.2 | 42.7 | 1.4 | 40.5 | 1.5 | 28.0 | 1.4 | 35.7 | 1.4 |
| Cooking Oil | 436.2 | 18.4 | 297.1 | 9.5 | 208.6 | 7.9 | 247.0 | 12.5 | 326.1 | 12.4 |
| Egg | 289.2 | 12.2 | 324.2 | 10.4 | 217.7 | 8.2 | 150.0 | 7.6 | 273.2 | 10.4 |
| Meat | 48.8 | 2.1 | 76.1 | 2.4 | 51.4 | 1.9 | 150.0 | 7.6 | 62.7 | 2.4 |
| Total Calories | 2365.7 | 100.0 | 3111.1 | 100.0 | 2639.4 | 100.0 | 1971.5 | 100.0 | 2632.7 | 100.0 |
| **Threshold of NIN recommendation 2250 kcal*** | | | | | | | | | | |
| Below NIN | 8 | 53.3 | 2 | 18.2 | 2 | 20 | | 0 | 12 | 31.6 |
| Above NIN | 7 | 46.7 | 9 | 81.8 | 8 | 80 | 2 | 100 | 26 | 68.4 |
| Grand Total | 15 | 100.0 | 11 | 100.0 | 10 | 100 | 2 | 100 | 38 | 100.0 |

Note: * day/person

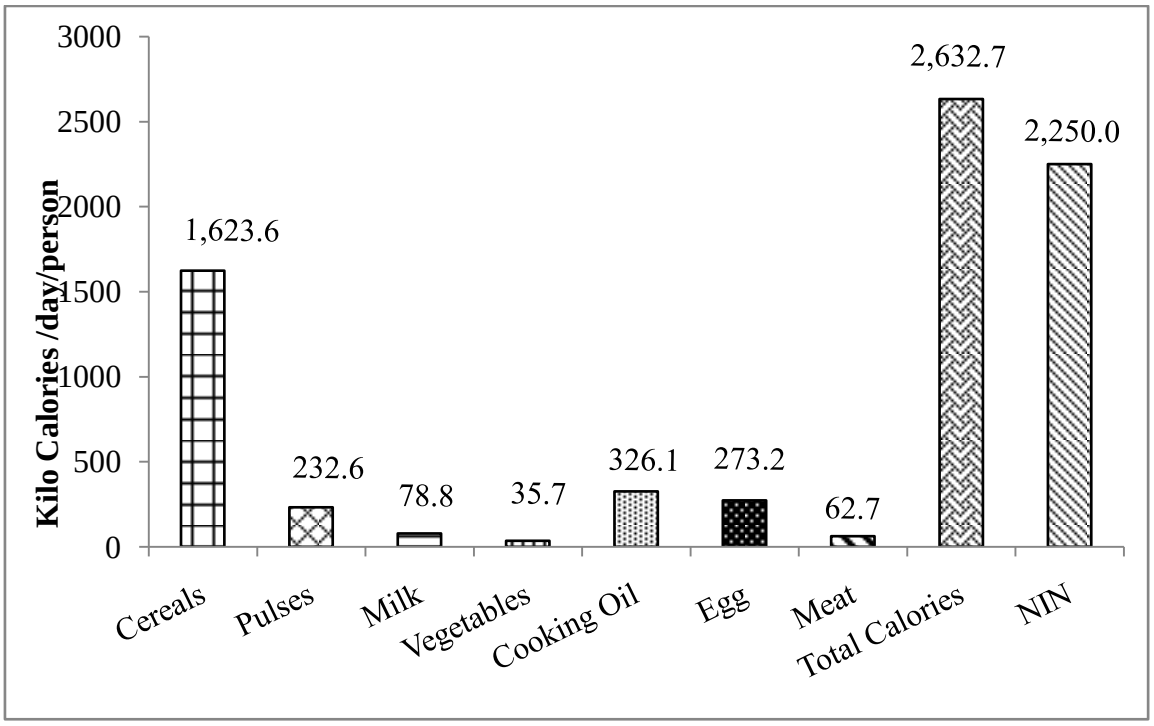



Figure 7: Per capita daily consumption of food among the sample households in Ramapura-2 Microwatershed

**Annual income of the sample HHs:** The average annual household income is around Rs. 63498. Major source of income to the farmers in the study area is from crop production (Rs. 10090) followed by livestock (Rs.53408). The monthly per capita income is Rs.1196, which is less than the threshold monthly income of Rs.975 for considering above poverty line. Due to the fact that erratic rainfall and shortage of water, farmers are diverting from crop production activities to enable the household for a comfortable livelihood. The incomes from the other aforesaid sources are very meagre (Table 13).

**Table 13: Annual average income of HHs from various sources in Ramapura-2 Microwatershed**

| Particulars | MF (15)* | SF (11)* | SMF (10)* | MDF (2)* | All (38)* |
|---|---|---|---|---|---|
| Nonfarm income | 0 ( 0) | 0 ( 0) | 0 ( 0) | 0 ( 0) | 0 ( 0) |
| Livestock income | 237240 (6.7) | 22673 (27.3) | 26830 (20) | 14940 (50) | 53408 (18.4) |
| Crop Production | 7618 (100) | 8556 (100) | 14028 (100) | 17377 (100) | 10089 (100) |
| ***Total Income (Rs)*** | 244858 | 31228 | 40858 | 32317 | 63498 |
| Average monthly per capita income (Rs) | 4310 | 636 | 810 | 537 | 1196 |
| **Thresholds for poverty level (Rs 975 per month/person)** | | | | | |
| % of households Above poverty line | 6.7 | 18.2 | 50 | 50 | 23.7 |
| % of households below poverty line | 93.3 | 81.8 | 50 | 50 | 76.3 |
| ***Grand Total*** | ***100.0*** | ***100.0*** | ***100*** | ***100*** | ***100.0*** |

* Figure in the parenthesis indicates %of households

The average annual expenditure of farm households indicated that farmers in the study area spend highest on food (Rs.56716) followed by education, clothing, social function and health. Now a day's education is most important among all of us. In today's competitive world, education is a necessity for man after food, clothing, and shelter. It is the only fundamental way by which a desired change in the society can happen. The average per capita monthly expenditure is around Rs.3193 and about 76.3 per cent of farm households are below poverty line and 23.7 per of farm households are above poverty line (Table 14 and Figure 8).

**Table 14: Average annual expenditure of sample HHs in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Food | 55196 | 37.9 | 61505 | 32.6 | 50538 | 29.0 | 72660 | 33.2 | 56716 | 33.5 |
| Education | 6733 | 4.6 | 13182 | 7.0 | 2300 | 1.3 | 20000 | 9.1 | 8132 | 4.8 |
| Clothing | 9000 | 6.2 | 9727 | 5.2 | 6900 | 4.0 | 6000 | 2.7 | 8500 | 5.0 |
| Social functions | 63333 | 43.5 | 80636 | 42.8 | 100000 | 57.4 | 100000 | 45.7 | 79921 | 47.2 |
| Health | 11267 | 7.7 | 23545 | 12.5 | 14500 | 8.3 | 20000 | 9.1 | 16132 | 9.5 |
| **Total Expenditure** | 145529 | 100.0 | 188596 | 100.0 | 174238 | 100.0 | 218660 | 100.0 | 169400 | 100.0 |
| ***Monthly per capita expenditure (Rs)*** | 2562 | | 3842 | | 3457 | | 3644 | | 3193 | |

**Land holding:** Total sample households are 38 and total area cultivated by them is 64.3 ha. The average land holding of sample HHs is 0.7 ha. small number of sample HHs (26) belong to small size group with an average holding size of 1.4 ha followed by medium farmers (10) with an average holding size of 5.2 ha and a large farmer (2) with a average land holding size of 5.3 ha (Table 15).

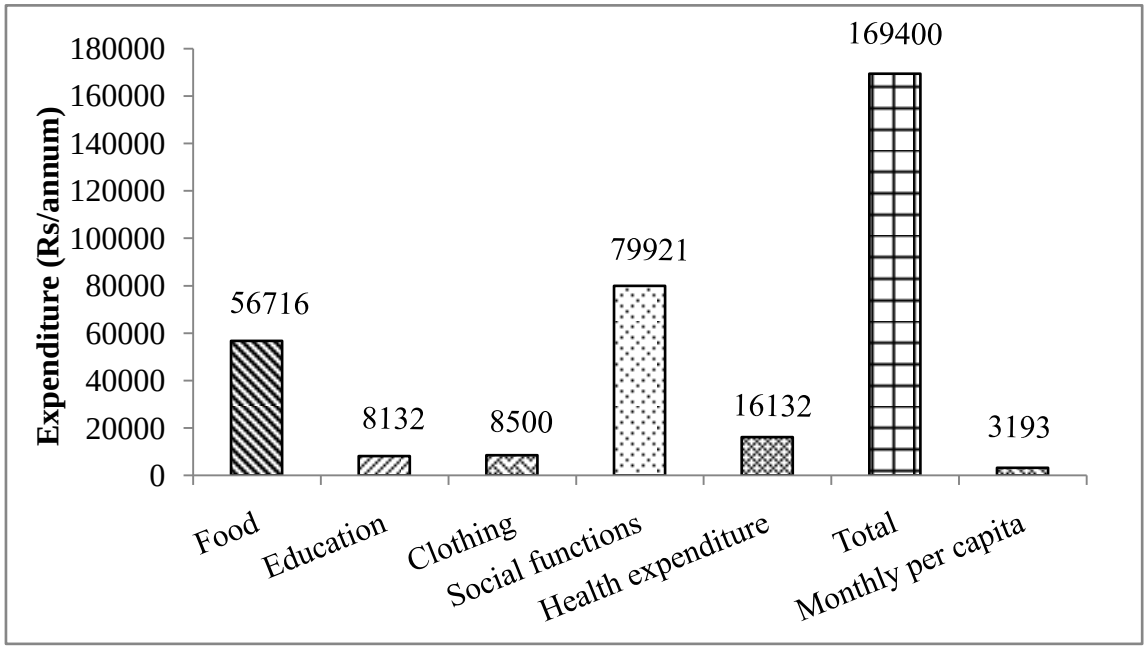



Figure 8: Average annual expenditure of sample HHs in Ramapura-2 Microwatershed

**Table 15: Distribution of land holding among the sample households in Ramapura-2 micro-watershed**

| Size groups | Particulars | value |
|---|---|---|
| Marginal farmers (15) | Total sample HHs in number | 15 |
| | Total land holding (ha) | 11.8 |
| | Average of Total land holding (ha) | 0.7 |
| Small Farmers (11) | Total sample HHs in number | 11 |
| | Total land holding (ha) | 15.7 |
| | Average of Total land holding (ha) | 1.4 |
| Semi-Medium Farmers (10) | Total sample HHs in number | 10 |
| | Total land holding (ha) | 26.2 |
| | Average of Total land holding (ha) | 2.6 |
| Medium Farmers (2) | Total sample HHs in number | 2 |
| | Total land holding (ha) | 10.5 |
| | Average of Total land holding (ha) | 5.2 |
| Total households (38) | Total sample HHs in number | 38 |
| | Total land holding (ha) | 64.3 |
| | Average of Total land holding (ha) | 1.69 |

**Land use**: The total land holding in the Ramapura-2 micro-watershed is 64.3 ha is dry land (Table 16). The average land holding per household is worked out to be 1.7 ha.

**Table 16: Land use among samples households in Ramapura-2 Microwatershed**

| Particulars | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Area in ha | % | Area in ha | % | Area in ha | % | Area in ha | % | Area in ha | % |
| Irrigated land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dry land | 11.9 | 100 | 15.7 | 100 | 26.2 | 100 | 10.5 | 100 | 64.3 | 100 |
| Fallow land | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total land | 11.9 | 100 | 15.7 | 100 | 26.2 | 100 | 10.5 | 100 | 64.3 | 100 |
| Average of land area | 0.8 | | 1.4 | | 2.6 | | 5.3 | | 1.7 | |

In the micro-watershed, the prevalent present land uses under perennial plants are neem trees (90.9 %) followed by tamarind (4.5 %), mango (3.8 %) and banyan tree (Table 17).

**Table 17: Number of trees/plants covered in sample farm households in Ramapura-2 Microwatershed**

| Plants | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Banyan tree(Alada) | | 0 | | 0 | 1 | 2.0 | | 0.0 | 1 | 0.8 |
| Mango | 3 | 10 | 2 | 5.1 | | 0.0 | | 0.0 | 5 | 3.8 |
| Neem trees | 26 | 86.7 | 33 | 84.6 | 47 | 95.9 | 14 | 100.0 | 120 | 90.9 |
| Tamarind | 1 | 3.3 | 4 | 10.3 | 1 | 2.0 | | 0.0 | 6 | 4.5 |
| ***Grand Total*** | ***30*** | ***100*** | ***39*** | ***100*** | ***49*** | ***100.0*** | ***14*** | ***100.0*** | ***132*** | ***100.0*** |

The land use decisions are usually based on experience of farmers, tradition, expected profit, personal preferences, resources and social requirements. The present dominant crops grown in dry lands in the study area were by redgram (58.8 %) followed by cotton (26.8 %), groundnut (3.9 %), bengalgram (3.9 %), paddy (3.1 %) and greengram (3.5%) which are taken during Kharif season respectively. The cropping intensity was 100 per cent (Table 18 and Figure 9).

**Table 18: Present cropping pattern and cropping intensity in Ramapura-2 Microwatershed**

| Season / Crops | MF (15) | | SF (11) | | SMF (10) | | MDF (2) | | All (38) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ha | % | ha | % | ha | % | ha | % | ha | % |
| ***Kharif*** | ***11.5*** | ***100*** | ***14.9*** | ***97.4*** | ***24.7*** | ***100*** | ***10.5*** | ***100*** | ***61.6*** | ***99.3*** |
| Red gram | 2.6 | 22.9 | 6.3 | 40.9 | 16.6 | 67.2 | 10.5 | 100 | 36.0 | 58.1 |
| Cotton | 6.0 | 51.8 | 7.4 | 48.5 | 3.2 | 13.1 | | 0.0 | 16.6 | 26.8 |
| Bengal gram | | 0.0 | | 0.0 | 2.4 | 9.8 | | 0.0 | 2.4 | 3.9 |
| Groundnut | | 0.0 | | 0.0 | 2.4 | 9.8 | | 0.0 | 2.4 | 3.9 |
| Green gram | 1.0 | 8.5 | 1.2 | 7.9 | | 0.0 | | 0.0 | 2.2 | 3.5 |
| Paddy | 1.9 | 16.9 | | 0.0 | | 0.0 | | 0.0 | 1.9 | 3.1 |
| ***Rabi*** | | ***0.0*** | ***0.4*** | ***2.6*** | | ***0.0*** | | ***0.0*** | ***0.4*** | ***0.7*** |
| Red gram | | 0.0 | 0.4 | 2.6 | | 0.0 | | 0.0 | 0.4 | 0.7 |
| ***Grand Total*** | ***11.5*** | ***100*** | ***15.3*** | ***100*** | ***24.7*** | ***100*** | ***10.5*** | ***100*** | ***62.0*** | ***100*** |

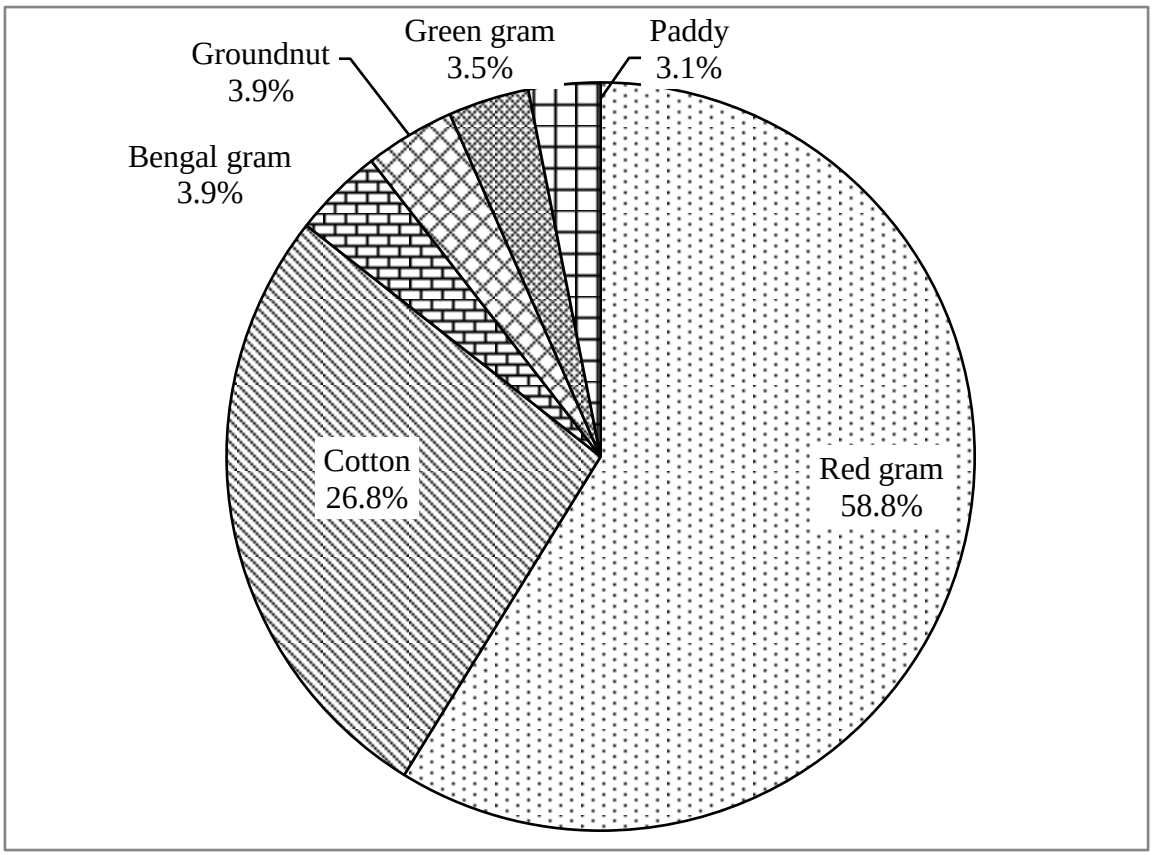



Figure 9: Present cropping pattern in Ramapura-2 Microwatershed

**Economic land evaluation**

The main purpose to characterise the socio-economic systems in the watershed is to identify the existing production constraints and propose the potential/alternate options for agro-technology transfer and for bridging the adoption and yield gap.

In Ramapura-2 micro-watershed, 13 soil series are identified and mapped (Table 19). The distribution of major soil series are Sowrashtrahalli covering an area around 124 ha (21.%) followed by Halagera 127 ha (18.6 %), Yalleri 76 ha (13.2 %), Anur 91 ha (15.8 %), Kudlura 58 ha (9.7 %), Tumkur 28 (4.9 %), Hegganakera 27 ha (4.6 %), Rachanalli 13 ha (2.3 %), Gudalagunta 5 ha (0.9 %), Kyathanala 16 ha (2.7 %), Badiyala 4 ha (0.7 %) and Rampur 0 ha (0.03 %).

**Table 19: Distribution of soil series in Ramapura-2 Microwatershed**

| Soil No | Soil Series | Mapping Unit Description | Area in ha (%) |
|---|---|---|---|
| Soil of Granite and Granite Gneiss Landscape | | | |
| 1 | BDL | Badiyala soils are shallow (25-50 cm), well drained, have dark brown to very dark brown and dark yellowish brown, sandy clay soils occurring on very gently to gently sloping uplands under cultivation | 4 (0.7) |
| 2 | HLG | Halagera soils are moderately shallow (50-75 cm), moderately well drained, have dark brown to dark yellowish brown and dark | 127 (18.6) |

| | | | |
|---|---|---|---|
| | | grayish brown, calcareous sandy clay loam to sandy clay alluvial soils occurring on very gently sloping uplands under cultivation | |
| 3 | YLR | Yalleri soils are moderately shallow (50-75 cm), well drained, have brown to reddish brown and dark reddish brown, gravelly sandy clay red soils occurring on very gently to gently sloping uplands under cultivation | 76 (13.2) |
| 4 | ANR | Anur soils are deep (100-150 cm), moderately well drained, have dark gray to brown, calcareous sandy clay alluvial soils occurring on very gently sloping uplands under cultivation | 91 (15.8) |
| 5 | GDL | Gudalagunta soils are shallow (25-50 cm), well drained, have very dark gray, calcareous sandy clay to clay alluvial soils occurring on very gently sloping uplands under cultivation | 5 (0.9) |
| 6 | KYT | Kyathanala soils are shallow (25-50 cm), well drained, have brown to strong brown and reddish to dark reddish brown, sandy clay loam to sandy clay alluvial soils occurring on very gently sloping uplands under cultivation | 16 (2.7) |
| 7 | RMP | Rampur soils are moderately shallow (50-75 cm), moderately well drained, have yellowish brown to very dark gray, sandy clay to clay alluvial soils occurring on very gently sloping uplands under cultivation | 0.2 (0.03) |
| 8 | RHN | Rachanalli soils are moderately deep (75-100 cm), moderately well drained, have brown to very dark grayish brown, sandy clay to calcareous alluvial clay soils occurring on very gently sloping uplands under cultivation | 13 (2.3) |
| 9 | KDR | Kudlura soils are deep (100-150 cm), moderately well drained, have dark gray to very dark grayish brown, calcareous sandy clay to clay alluvial soils occurring on nearly level to very gently sloping uplands under cultivation | 58 (9.7) |
| 10 | SWR | Sowrashtrahalli soils are deep (100-150 cm), moderately well drained, have dark gray to very dark grayish brown, calcareous black cracking clay soils occurring on very gently sloping uplands under cultivation | 124 (21.5) |
| 11 | HGN | Hegganakera soils are very deep (>150 cm), moderately well drained, have dark gray to very dark grayish brown and brown, calcareous black cracking clay soils occurring on very gently sloping uplands under cultivation | 27 (4.6) |
| Lowland Soils | | | |
| 12 | TMK | Tumkur soils are very deep (>150 cm), moderately well drained, have brown to very dark grayish brown, calcareous sandy clay to clay black soils occurring on nearly level to very gently sloping lowlands under cultivation | 28 (4.9) |

Present cropping pattern on different soil series are given in Table 20. Crops grown on Yalleri soils are cotton and redgram. Cotton and Redgram on Anur soils are grown. Cotton, greengram and redgram are grown on Hegganakera soils. Cotton, greengram, groundnut and redgram on Halagera soils are grow. Cotton, greengram and redgram on Sowrashtrahalli soils are grow. Paddy and redgram on Kudlura soils can grow and redgram on Tumkur soil can grow.

**Table 20: Cropping pattern on major soil series in Ramapura-2 micro-watershed**

(Area in per cent)

| Soil Series | Soil Depth | Crops | Dry Kharif | Irrigated Kharif | Grand Total |
|---|---|---|---|---|---|
| KYT | Shallow (25-50 cm) | Redgram | 100 | 0 | 100.0 |
| YLR | Moderately shallow (50-75 cm) | Cotton | 53.2 | 0 | 53.2 |
| | | Redgram | 46.8 | 0 | 46.8 |
| HLG | Moderately shallow (50-75 cm) | Cotton | 46.3 | 0 | 46.3 |
| | | Greengram | 4.5 | 0 | 4.5 |
| | | Groundnut | 22.7 | 0 | 22.7 |
| | | Redgram | 26.5 | 0 | 26.5 |
| ANR | Deep (100-150 cm) | Cotton | 44.4 | 0 | 44.4 |
| | | Redgram | 55.6 | 0 | 55.6 |
| KDR | Deep (100-150 cm) | Paddy | 0 | 70.6 | 70.6 |
| | | Redgram | 29.4 | 0 | 29.4 |
| SWR | Deep (100-150 cm) | Cotton | 23.9 | 0 | 23.9 |
| | | Greengram | 5.4 | 0 | 5.4 |
| | | Redgram | 70.7 | 0 | 70.7 |
| HGN | Very deep (>150 cm) | Cotton | 19.4 | 0 | 19.4 |
| | | Greengram | 18.6 | 0 | 18.6 |
| | | Redgram | 62.0 | 0 | 62.0 |
| TMK | Very deep (>150 cm) | Redgram | 100 | 0 | 100.0 |

Land is used for agricultural use for growing cereals, pulse, oilseeds and commercial crops. The soil/ land potential are measures in terms of physical yield and net income. The alternative land use options for each micro-watershed are given below (Table 21).

**Table 21: Alternative land use options for different size group of farmers (Benefit Cost Ratio) in Ramapura-2 Microwatershed.**

| Soil Series | Small Farmers | Medium Farmers | Large Farmers |
|---|---|---|---|
| YLR | cotton (1.12),Redgram(1.25) | | |
| ANR | Cotton (1.07),Redgram (1.05) | | |
| HGN | Cotton (1.10),Greengram (1.22) Redgram (1.42) | | |
| HLG | Cotton (1.08), Greengram( 1.22) | Cotton(1.05), Groundnut(1.02) Redgram (1.03) | |
| KDR | Paddy (1.70),Redgram( 1.72) | | |
| KYT | Cotton (1.81) | Redgram (1.95) | |
| SWR | Cotton (1.08), Greengram (1.19) Redgram (1.35) | Redgram( 1.08) | Redgram (1.54) |
| TMK | | Redgram (1.46) | Redgram (1.10) |

The productivity of different crops grown in Ramapura-2 micro-watershed under potential yield of the crops is given in Table 22 and 22a.

The data on cost of cultivation and benefit cost ratio (BCR) of different crops is given in Tables 22 and 22a. The total cost of cultivation in study area for cotton ranges between Rs.43132/ha in HGN soil (with BCR of 1.10) and Rs.32505/ha in YLR soil (with BCR of 1.12).

**Table 22: Economic land evaluation and bridging yield gap for different crops in Ramapura-2 micro-watershed**

| Particulars | KYT(25-50 cm) | HLG(50-75 cm) | | | | YLR(50-75 cm) | | SWR(100-150 cm) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Red gram | Cot ton | Green gram | Ground nut | Red gram | Cot ton | Red gram | Cotton | Green gram | Red gram |
| Total cost (Rs/ha) | 15877 | 39908 | 40480 | 33168 | 22635 | 32505 | 43158 | 39361 | 31151 | 25679 |
| Gross Return (Rs/ha) | 30875 | 42216 | 49400 | 33921 | 23289 | 36433 | 51115 | 42798 | 37050 | 30640 |
| Net returns (Rs/ha) | 14998 | 2309 | 8920 | 753 | 654 | 3927 | 7957 | 3436 | 5899 | 4960 |
| B:C | 1.95 | 1.06 | 1.22 | 1.02 | 1.03 | 1.12 | 1.25 | 1.08 | 1.19 | 1.26 |
| **Farmers Practices (FP)** | | | | | | | | | | |
| FYM (t/ha) | 1.6 | 3.0 | 4.2 | 2.1 | 0.7 | 3.9 | 4.3 | 6.0 | 3.3 | 2.7 |
| Nitrogen (kg/ha) | 38.8 | 91.2 | 132.4 | 60.8 | 58.6 | 182.0 | 171.0 | 108.7 | 171.7 | 63.4 |
| Phosphorus (kg/ha) | 49.4 | 90.8 | 124.8 | 57.5 | 65.7 | 126.6 | 113.9 | 101.4 | 88.3 | 55.7 |
| Potash (kg/ha) | 5.3 | 9.5 | 17.4 | 0.0 | 0.0 | 20.1 | 17.7 | 24.7 | 28.3 | 8.3 |
| Grain (Qtl/ha) | 7.8 | 10.8 | 12.5 | 8.3 | 5.4 | 9.2 | 12.0 | 9.8 | 8.3 | 7.5 |
| Price of Yield (Rs/Qtl) | 4000 | 4100 | 4000 | 4000 | 4400 | 4000 | 4500 | 4333 | 4500 | 4071 |
| **Soil test based fertilizer Recommendation (STBR)** | | | | | | | | | | |
| FYM (t/ha) | 7.5 | 12.5 | 7.5 | 7.5 | 7.5 | 12.5 | 7.5 | 12.5 | 7.5 | 7.5 |
| Nitrogen (kg/ha) | 18.8 | 135.0 | 9.8 | 18.8 | 18.8 | 150.0 | 25.0 | 150.0 | 9.8 | 25.9 |
| Phosphorus (kg/ha) | 50.0 | 75.0 | 31.3 | 50.0 | 50.0 | 93.8 | 59.4 | 87.5 | 31.3 | 57.1 |
| Potash (kg/ha) | 18.8 | 75.0 | 25.0 | 25.0 | 25.0 | 75.0 | 25.0 | 68.8 | 25.0 | 19.6 |
| Grain (Qtl/ha) | 13.8 | 18.5 | 6.3 | 9.0 | 13.8 | 18.5 | 13.8 | 18.5 | 6.3 | 13.8 |
| **% of Adoption/yield gap (STBR-FP) / (STBR)** | | | | | | | | | | |
| FYM (%) | 79.2 | 76.3 | 44.4 | 72.2 | 90.5 | 68.9 | 43.1 | 52.4 | 55.6 | 63.9 |
| Nitrogen (%) | -106.7 | 32.4 | -1257.9 | -224.4 | -212.4 | -21.3 | -584.0 | 27.5 | -1660.7 | -145.0 |
| Phosphorus (%) | 1.3 | -21.1 | -299.4 | -15.0 | -31.4 | -35.0 | -91.8 | -15.9 | -182.7 | 2.5 |
| Potash (%) | 71.7 | 87.3 | 30.6 | 100.0 | 100.0 | 73.2 | 29.2 | 64.1 | -13.3 | 57.9 |
| Grain (%) | 43.2 | 41.7 | -100.0 | 7.4 | 61.0 | 50.5 | 12.9 | 47.2 | -33.3 | 45.4 |
| **Value of yield and Fertilizer (Rs)** | | | | | | | | | | |
| Additional Cost (Rs/ha) | 5994 | 10673 | -2102 | 5082 | 6116 | 7880 | -776 | 7313 | -355 | 4629 |
| Additional Benefits (Rs/ha) | 23750 | 31652 | -25000 | 2667 | 36929 | 37413 | 7969 | 37909 | -9375 | 25426 |
| Net change income (Rs/ha) | 17756 | 20979 | -22898 | -2415 | 30812 | 29533 | 8745 | 30596 | -9020 | 20798 |

*To be continued...*

**Table 22 a: Economic land evaluation and bridging yield gap for different crops in Ramapura-2 micro-watershed**

| Particulars | ANR | | KDR | | HGN | | | TMK |
|---|---|---|---|---|---|---|---|---|
| | Cotton | Redgram | Paddy | Redgram | Cotton | Greengram | Redgram | Redgram |
| Total cost (Rs/ha) | 40727 | 38485 | 28742 | 32376 | 43132 | 40480 | 34820 | 20604 |
| Gross Return (Rs/ha) | 43843 | 40343 | 53002 | 55575 | 47424 | 49400 | 49400 | 27209 |
| Net returns (Rs/ha) | 3115 | 1858 | 24261 | 23199 | 4292 | 8920 | 14580 | 6605 |
| B:C | 1.07 | 1.05 | 1.70 | 1.72 | 1.10 | 1.22 | 1.42 | 1.28 |
| **Farmers Practices (FP)** | | | | | | | | |
| FYM (t/ha) | 5.8 | 4.4 | 1.6 | 3.8 | 4.0 | 4.2 | 3.1 | 1.4 |
| Nitrogen (kg/ha) | 106.5 | 83.6 | 103.4 | 80.0 | 132.4 | 132.4 | 56.9 | 79.7 |
| Phosphorus (kg/ha) | 74.8 | 72.2 | 121.1 | 57.5 | 124.8 | 124.8 | 71.9 | 91.6 |
| Potash (kg/ha) | 10.6 | 5.3 | 13.3 | 0.0 | 17.4 | 17.4 | 0.0 | 7.1 |
| Grain (Qtl/ha) | 9.2 | 9.8 | 26.0 | 12.5 | 12.0 | 12.5 | 12.5 | 6.6 |
| Price of Yield (Rs/Qtl) | 4750 | 4200 | 2000 | 4500 | 4000 | 4000 | 4000 | 4250 |
| **Soil test based fertilizer Recommendation (STBR)** | | | | | | | | |
| FYM (t/ha) | 12.5 | 7.5 | 9.9 | 7.5 | 12.5 | 7.5 | 7.5 | 7.5 |
| Nitrogen (kg/ha) | 112.5 | 18.8 | 100.0 | 25.0 | 150.0 | 13.0 | 18.8 | 18.8 |
| Phosphorus (kg/ha) | 93.8 | 56.3 | 50.0 | 50.0 | 93.8 | 31.3 | 50.0 | 43.8 |
| Potash (kg/ha) | 75.0 | 25.0 | 50.0 | 25.0 | 75.0 | 25.0 | 18.8 | 21.9 |
| Grain (Qtl/ha) | 18.5 | 13.8 | 56.8 | 13.8 | 18.5 | 6.3 | 13.8 | 13.8 |
| **% of Adoption/yield gap (STBR-FP) / (STBR)** | | | | | | | | |
| FYM (%) | 53.3 | 41.7 | 84.2 | 50.0 | 68.0 | 44.4 | 58.3 | 81.3 |
| Nitrogen (%) | 5.4 | -346.1 | -3.4 | -220.0 | 11.7 | -918.4 | -203.3 | -325.0 |
| Phosphorus (%) | 20.2 | -28.3 | -142.2 | -15.0 | -33.1 | -299.4 | -43.8 | -109.3 |
| Potash (%) | 85.8 | 78.8 | 73.4 | 100.0 | 76.9 | 30.6 | 100.0 | 67.5 |
| Grain (%) | 50.5 | 28.8 | 54.2 | 9.1 | 35.2 | -100.0 | 9.1 | 51.7 |
| **Value of yield and Fertilizer (Rs)** | | | | | | | | |
| Additional Cost (Rs/ha) | 8861 | 2039 | 5883 | 3260 | 8497 | -2063 | 3330 | 3554 |
| Additional Benefits (Rs/ha) | 44428 | 16625 | 61517 | 5625 | 26080 | -25000 | 5000 | 30215 |
| Net change income (Rs/ha) | 35568 | 14586 | 55634 | 2365 | 17583 | -22937 | 1670 | 26661 |

Redgram range between Rs.43158/ha in YLR soil (with of 1.25) and Rs.15877/ha in KYT soil (With BCR of 1.95). Greengram range between Rs.40480/ha in HLG soil (with BCR of 1.22) and Rs.31151/ha in SWR soil (with BCR of 1.19). Paddy cultivation in KDR soil is Rs.28742/ha (with BCR of 1.17) and groundnut cultivation in HLG soil is Rs.33168/ha (with BCR of 1.02).

The data on FYM, Nitrogen, Phosphorus and Potash application by the farmers to different crops and recommended FYM for different crops is given in Table 22 and 22a. There is a huge gap between FYM application by farmers and recommended FYM in all the crops across the soils. There is a larger yield gap in crops grown across different soil series. Adequate knowledge about recommended package of practices is the pre-requisite for their use in cultivation of crops. It is a fact that, recommended practices are major contributing factors to yield. Inadequate knowledge about recommended practices leads to their improper adoption. Strengthening of extension services by concerned agency is required to increase adoption of recommended cultivation practices and ultimately reducing the gap. By adopting soil-test fertiliser recommendation, there is scope to increase yield and income to a maximum of Rs.55634 in paddy and a minimum of Rs.1670 in bajra cultivation.

Economic valuation of Ecosystem Services (ES) was aimed at combining use and non-use values to determine Total Economic Value (TEV) of ES. Ecosystem Services (ES) were valued based on their annual flow or utilization in common monetary units, Rs/year. The valuation of ES was based on market price in 2017 or market cost approaches whichever is applicable, and in other cases on value or benefit transfer from previous valuation studies.

The onsite cost of different soil nutrients lost due to soil erosion is given in Table 23 and Figure 10. The average value of soil nutrient loss is around Rs.2036 per ha/year. The total cost of annual soil nutrients is around Rs.1115717per year for the total area of 576.6 ha.

**Table 23: Estimation of onsite cost of soil erosion in Ramapura-2 micro-watershed**

| | Quantity(kg) | | Value (Rs) | |
|---|---|---|---|---|
| **Particulars** | **Per ha** | **Total** | **Per ha** | **Total** |
| Organic matter | 301.3 | 165102 | 1898.1 | 1040145 |
| Phosphorus | 0.2 | 138 | 11.1 | 6065 |
| Potash | 2.6 | 1414 | 51.6 | 28282 |
| Iron | 0.1 | 65 | 5.7 | 3137 |
| Manganese | 0.2 | 98 | 49.3 | 26996 |
| Cupper | 0.0 | 9 | 8.8 | 4841 |
| Zinc | 0.0 | 3 | 0.2 | 114 |
| Sulpher | 0.3 | 145 | 10.6 | 5817 |
| Boron | 0.0 | 8 | 0.6 | 321 |
| Total | 304.7 | 166983 | 2036 | 1115717 |

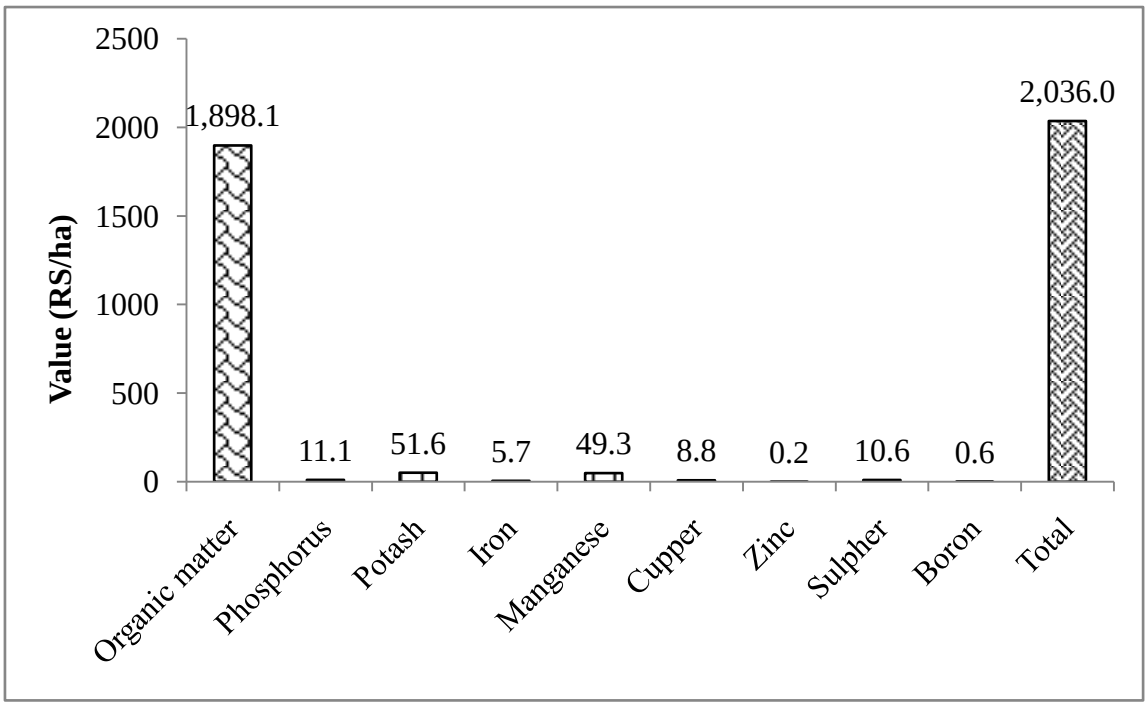



Figure 10: Estimation of onsite cost of soil erosion in Ramapura-2 micro-watershed

The average value of ecosystem service for food grain production is around Rs.5610/ ha/year (Table 24 and Figure 11). Per hector food grain production services is maximum in greengram (Rs.8370) followed by redgram (Rs.7306), cotton (Rs.3491) and groundnut is negative return.

**Table 24: Ecosystem services of food grain production in Ramapura-2 Microwatershed**

| Production items | Crops | Area in ha | Yield (Qtl/ha) | Price (Rs/Qtl) | Gross Returns (Rs/ha) | Cost of Cultivation (Rs/ha) | Net returns (Rs/ha) |
|---|---|---|---|---|---|---|---|
| Pulses | Greengram | 2.2 | 11.0 | 4167 | 45741 | 37371 | 8370 |
| | Redgram | 39.4 | 8.7 | 4174 | 36200 | 28894 | 7306 |
| Oil seeds | Groundnut | 2.4 | 8.2 | 4000 | 32933 | 33168 | -235 |
| Commercial crops | Cotton | 15.7 | 9.7 | 4263 | 41271 | 37779 | 3491 |
| Average value | | 59.7 | 9.3 | 4205 | 38911 | 33301 | 5610 |

The average value of ecosystem service for fodder production is around Rs.3775/ ha/year (Table 25). Per hector fodder production services is maximum in groundnut (Rs. 2400) followed by paddy (Rs.1500), cotton (Rs.1406) and redgram (Rs.270).

**Table 25: Ecosystem services of fodder production in Ramapura-2 Microwatershed**

| Production items | Crops | Area in ha | Yield (Qtl/ha) | Price (Rs/Qtl) | Net Returns (Rs/ha) |
|---|---|---|---|---|---|
| Cereals | Paddy | 1.9 | 1.0 | 750 | 772 |
| | Redgram | 39.4 | 0.3 | 26 | 7 |
| Oil seeds | Groundnut | 2.4 | 0.8 | 1200 | 988 |
| Commercial crops | Cotton | 15.7 | 0.8 | 112 | 90 |
| Average value | | 61.7 | 0.5 | 122 | 61 |

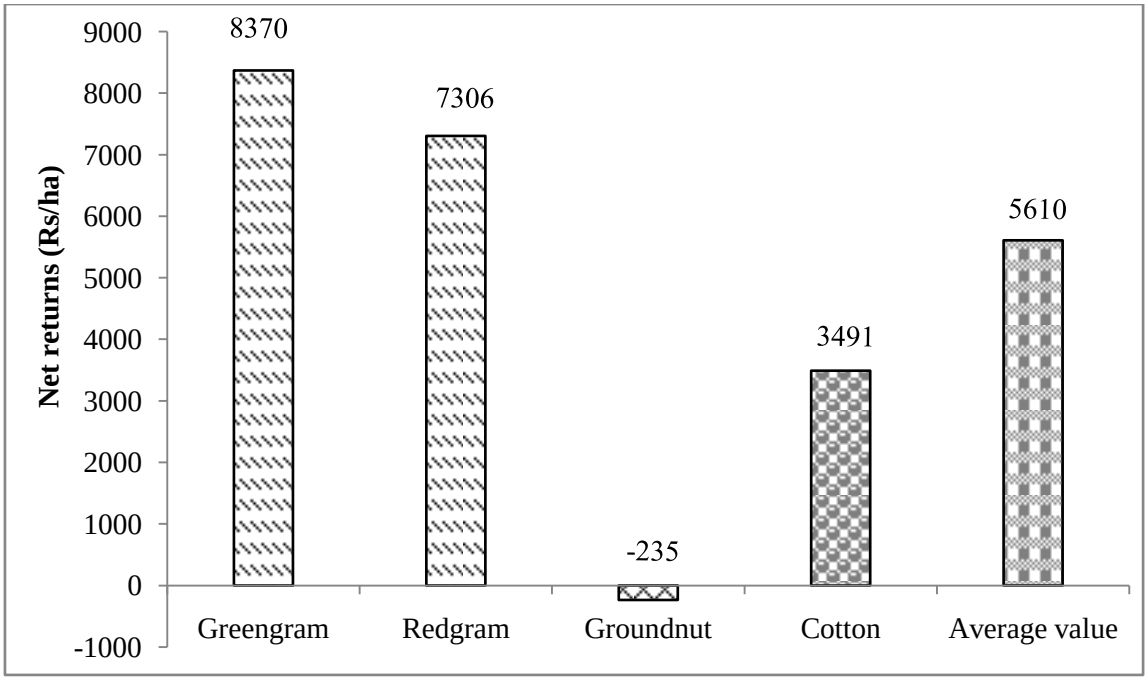



Figure 11: Ecosystem services of food production in Ramapura-2 Microwatershed

**Table 26: Ecosystem services of water supply in Ramapura-2 Microwatershed**

| Crops | Yield (Qtl/ha) | Virtual water (cubic meter) per ha | Value of Water (Rs/ha) | Water consumption (Cubic meters/Qtl) |
|---|---|---|---|---|
| Greengram | 11.0 | 7581.3 | 75812 | 690.6 |
| Redgram | 8.7 | 4721.8 | 47218 | 544.4 |
| Cotton | 9.7 | 3900.9 | 39009 | 402.9 |
| Groundnut | 8.2 | 2290.5 | 22905 | 278.2 |
| Average value | 9.2 | 4542.7 | 45426 | 490.9 |

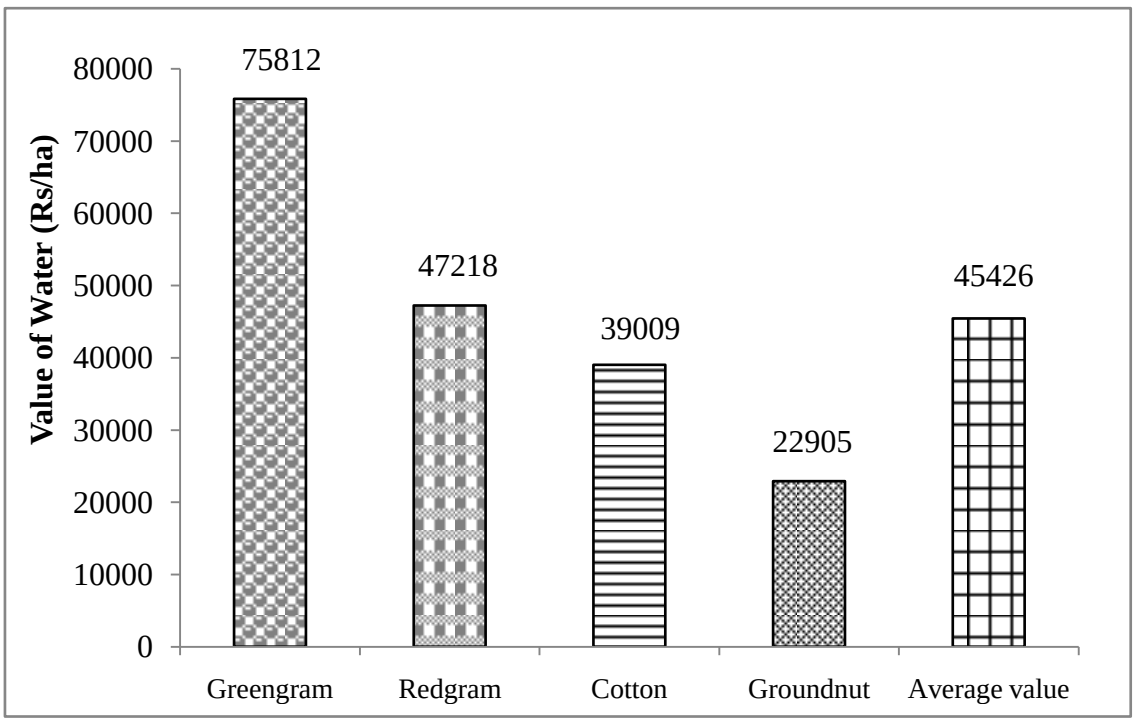



Figure 12: Ecosystem services of water supply in Ramapura-2 Microwatershed

The water demand for production of different crops was worked out in arriving at the ecosystem services of water support to crop growth. The data on water requirement for producing one quintal of grain is considered for estimating the total value of water required for crop production. The value of per hector water used was maximum (Table 26 and Figure 12) in greengram (Rs.75812) followed by redgram (Rs.47218), cotton (Rs.39009) and groundnut (Rs.22905).

The main constraints in farming is climate change particularly decline in rainfall and increasing temperature. Farmers reported that they are not getting timely support/extension services from the concerned development department (Table 27).

**Table 27: Farming constraints related land resources of sample households in Ramapura-2 Microwatershed**

| **Particulars** | **Per cent** |
|---|---|
| **Farmers awareness of climate change** | |
| Yes | 0 |
| No | 100 |
| **Perception on climate change** | |
| Decrease in rainfall | 0.0 |
| Increase in temperature | 0.0 |
| **Availability agricultural technology information** | |
| Yes | 0 |
| No | 100 |

The findings of the study would be very much useful to the planners and policy makers of the study area to identify the irrationality in the existing production pattern and to suggest appropriate production plans for efficient utilization of their scarce resources resulting in increased net farm incomes and employment. The study also throws light on future potentialities of increasing net farm income and employment under different situations viz., with existing and recommended technology.