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

ODDARAHATTI (4D4A1R2d) MICROWATERSHED

Irakallagada Hobli, Koppal Taluk & District, Karnataka

Karnataka Watershed Development Project – II

SUJALA – III

World Bank funded Project

THE WORLD BANK

ICAR – NATIONAL BUREAU OF SOIL SURVEY AND LAND USE PLANNING

ICAR - NBSS & LUP

WATERSHED DEVELOPMENT DEPARTMENT
GOVT. OF KARNATAKA, BANGALORE

About ICAR - NBSS&LUP

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

The Bureau has been engaged in carrying out soil resource survey, agro-ecological and soil degradation mapping at the country, state and district levels for qualitative assessment and monitoring the soil health towards viable land use planning. The research activities have resulted in identifying the soil potentials and problems, and the various applications of the soil surveys with the ultimate objective of sustainable agricultural development. The Bureau has the mandate to correlate and classify soils of the country and maintain a National Register of all the established soil series. The Institute is also imparting in-service training to staff of the soil survey agencies in the area of soil survey, land evaluation and soil survey interpretations for land use planning. The Bureau in collaboration with Panjabrao Krishi Vidyapeeth, Akola is running post-graduate teaching and research programme in land resource management, leading to M.Sc. and Ph.D. degrees.

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TO OBTAIN COPIES,
Please write to:
Director, ICAR - NBSS & LUP,

Amaravati Road, NAGPUR - 440 033, India

Phone : (0712) 2500386, 2500664, 2500545 (O)

Telefax : 0712-2522534

E-Mail : director@nbsslup.ernet.in

Website URL : nbsslup.in

Or

Head, Regional Centre, ICAR - NBSS&LUP, Hebbal, Bangalore - 560 024

Phone : (080) 23412242, 23510350 (O)

Telefax : 080-23510350

E-Mail : nbssrcb@gmail.com

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PREFACE

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

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

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

The natural resources (land, water and vegetation) of the state need adequate and constant care and management, backed by site-specific technological interventions and investments particularly by the government. Detailed database pertaining to the nature of the land resources, their constraints, inherent potentials and suitability for various land based rural enterprises, crops and other uses is a prerequisite for preparing location-specific action plans, which are in tune with the inherent capability of the resources. Any effort to evolve climate resilient technologies has to be based on the baseline scientific database. Then only one can expect effective implementation of climate resilient

technologies, monitor the progress, make essential review of the strategy, and finally evaluate the effectiveness of the implemented programs. The information available at present on the land resources of the state are of general nature and useful only for general purpose planning. Since the need of the hour is to have site-specific information suitable for farm level planning and detailed characterization and delineation of the existing land resources of an area into similar management units is the only option.

ICAR-NBSS&LUP, Regional Centre, Bangalore has taken up a project sponsored by the Karnataka Watershed Development Project-II, (Sujala-III), Government of Karnataka funded by the World Bank under Component -1 Land Resource Inventry. This study was taken up to demonstrate the utility of such a database in reviewing, monitoring and evaluating all the land based watershed development programs on a scientific footing. To meet the requirements of various land use planners at grassroots level, the present study on "Land Resource Inventory and Socio-Economic Status of Farm Households for Watershed Planning and Development of for Oddarahatti microwatershed in Koppal Taluk and District, Karnataka" for integrated development was taken up in collaboration with the State Agricutural Universities, IISC, KSRSAC, KSNDMC as Consortia partners. The project provides detailed land resource information at cadastral level (1:7920 scale) for all the plots and socio-economic status of farm households covering thirty per cent farmers randomely selected representing landed and landless class of farmers in the micro-watershed. The project report with the accompanying maps for the microwatershed will provide required detailed database for evolving effective land use plan, alternative land use options and conservation plans for the planners, administrators, agricutural extention personnel, KVK officials, developmental departments and other land users to manage the land resources in a sustainable manner.

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

Nagpur **S.K. SINGH**
Date:22.11.2017 Director, ICAR - NBSS&LUP, Nagpur

Contributors

Dr. Rajendra Hegde Principal Scientist, Head & Project Leader, Sujala-III Project ICAR-NBSS&LUP, Regional Centre, Bangalore	**Dr. S.K.Singh** Director, ICAR-NBSS&LUP Coordinator, Sujala-III Project Nagpur
Soil Survey, Mapping & Report Preparation	
Dr. K.V. Niranjana	Sh. R.S. Reddy
Dr. B.A. Dhanorkar	Mr. Somashekar T. N
	Ms. Arpitha, G.M.
	Dr. Gopali Bardhan
	Dr. Mahendra Kumar, M.B.
	Smt. Chaitra, S.P.
Field Work	
Sh. C.BacheGowda	Mr. Tirupati Meti
Sh. Somashekar	Sh. Mahesh, D.B.
Sh. M. Jayaramaiah	Sh. Ashok S Sindagi
Sh. Paramesha, K.	Sh. Veerabhadrappa B.
Sh. B. M. Narayana Reddy	Sh. Shankarappa
	Sh. Anand
	Sh. Arun N Kambar.
	Sh Kamalesh Awate
	Sh. Sharaan Kumar Huppar
	Sh. Yogesh H.N.
	Sh. Kalaveerachari R Kammar
GIS Work	
Dr. S.Srinivas	Sh. A.G. Devendra Prasad
Sh. D. H.Venkatesh	Sh. Abhijith Sastry, N.S.
Smt. K.Sujatha	Sh. Nagendra Babu Kolukondu
Smt. K. V. Archana	Sh. Avinash
Sh. N. Maddileti	Sh. Amar Suputhra, S.
	Sh. Deepak M.J.
	Sh. Madappaswamy
	Smt. K. Karunya Lakshmi
	Ms. Seema, K.V.
	Ms. Ramireddy Lakshmi Silpa
	Ms. Bhanu Rekha, T.
	Ms. Rajata Bhat
	Ms. Shruthi
	Ms. Suman, S.

Laboratory Analysis	
Dr. K.M.Nair	Ms. Steffi Peter
Smt. Arti Koyal	Ms. Thara, V.R
Smt. Parvathy	Ms. Roopa, G.
	Ms. Swati, H.
	Sh. Shantaveera Swami
	Ms. Shwetha, N.K.
	Smt. Ishrat Haji
	Ms. P. Pavan Kumari
	Ms. Padmaja
	Ms. Veena, M.
Socio-economic Analysis	
Dr. Ramesh Kumar, S.C.	Sh. Prakashanaik, M.K.
	Sh. Basavaraj
	Sh. Vinod, R.
Soil & Water Conservation	
Sh. Sunil P. Maske	
Socio-Economic Analysis	
Dr. S.C. Ramesh Kumar	Sh. M. K. Prakashanaik
	Ms. Sowmya K.B
	Sh.Manjunath M
	Sh.Veerabhadraswamy R
	Sh.Lankesh RS
	Sh.Kalaveerachari R Kammar
	Sh.Pradyumma U
	Sh.Yogesha HN
	Sh.Vijay kumar lamani
	Sh.Arun N Kambar
	Sh.Vinay
	Sh.Basavaraj.Biradar
	Sh.Vinod R
	Sh.Praveenkumar P Achalkar
	Sh.Rajendra D
Watershed Development Department, GoK, Bangalore	
Sh. Rajeev Ranjan IFS Project Director & Commissioner, WDD	Dr. A. Natarajan NRM Consultant, Sujala-III Project
Dr. S.D. Pathak IFS Executive Director & Chief Conservator of Forests, WDD	

PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

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

The present study covers an area of 546 ha in Koppal taluk and district, Karnataka. The climate is semiarid and categorized as drought - prone with an average annual rainfall of 662 mm, of which about 424 mm is received during south–west monsoon, 161 mm during north-east and the remaining 77 mm during the rest of the year. An area of about 95 per cent is covered by soils , 1 per cent by rock outcrops and 4 per cent by habitation and water bodies, settlements and others. The salient findings from the land resource inventory are summarized briefly below.

- *The soils belong to 15 soil series and 30 soil phases (management units) and 6 land management units.*
- *The length of crop growing period is <90 days and starts from 2nd week of August to 2nd week of November.*
- *From the master soil map, several interpretative and thematic maps like land capability, soil depth, surface soil texture, soil gravelliness, available water capacity, soil slope and soil erosion were generated.*
- *Soil fertility status maps for macro and micronutrients were generated based on the surface soil samples collected at every 320 m grid interval.*
- *Land suitability for growing 31 major agricultural and horticultural crops were assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area is suitable for agriculture.*
- *About 33 per cent of the soils are moderately shallow (50-75 cm), 30 per cent of the soils are moderately deep (75-100 cm) and 33 per cent area has deep (100-150 cm) soils.*
- *About 10 per cent has sandy soils, 41 per cent has loamy soils at the surface and 45 per cent has clayey soils at the surface.*
- *About 16 per cent of the area has non-gravelly (<15%) soils, 74 per cent gravelly (15-35% gravel) and 6 per cent has very gravelly (35-60%) soils.*
- *About 44 per cent are very low (<50 mm/m), 24 per cent low (51-100 mm/m), 21 per cent medium (101-150 mm/m), <1 per cent high (151-200 mm/m) and 6 per cent very high (>200 mm/m) in available water capacity.*
- *An area of about 6 per cent has nearly level (0-1%) and 89 per cent area has very gently sloping (1-3%) lands.*

- *An area of about 15 per cent has soils that are slightly eroded (e1) and 80 per cent moderately eroded (e2) lands.*
- *An area of about 29 per cent are moderately acid (pH 5.5-6.0), 25 per cent are slightly acid (pH 6.0-6.5) and 42 per cent are neutral (pH 6.5-7.3) in soil reaction.*
- *The Electrical Conductivity (EC) of the soils is <2 dS m^{-1} and as such the soils are non-saline.*
- *Organic carbon is medium (0.5-0.75%) in 30 per cent and high (>0.75%) in 66 per cent area of the soils.*
- *Available phosphorus is high (>57 kg/ha) in the entire cultivated area of the microwatershed.*
- *Available potassium content is medium (145-337 kg/ha) in 78 per cent and high (>337 kg/ha) in 17 per cent soils.*
- *Available sulphur is low (<10 ppm) in about 49 per cent, medium (10-20 ppm) in 46 per cent and high (>320 ppm) in the 1 per cent area of the soils.*
- *Available boron is low (0.5 ppm) in about 89 per cent and medium (0.5-1.0 ppm) in 6 per cent area.*
- *Available iron is sufficient (>4.5 ppm) in the entire area of the microwatershed.*
- *Available zinc is deficient (<0.6 ppm) in 25 per cent and sufficient (>0.6 ppm) in 70 per cent area of the microwatershed.*
- *Available manganese and copper are sufficient in all the soils.*
- *The land suitability for 31 major agricultural and horticultural 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	*53 (10)*	*200 (37)*	*Sapota*	*16 (3)*	*180 (33)*
Maize	*37 (7)*	*217 (40)*	*Pomegranate*	*16 (3)*	*229 (42)*
Bajra	*122 (22)*	*300 (55)*	*Musambi*	*32 (6)*	*213 (39)*
Groundnut	*22 (4)*	*323 (59)*	*Lime*	*32 (6)*	*213 (39)*
Sunflower	*28 (5)*	*156 (28)*	*Amla*	*97 (18)*	*423 (78)*
Red gram	*12 (2)*	*154 (28)*	*Cashew*	*5 (1)*	*179 (33)*
Bengalgram	*48 (9)*	*294 (54)*	*Jackfruit*	*16 (3)*	*180 (33)*
Cotton	*28 (5)*	*225 (41)*	*Jamun*	-	*190 (35)*
Chilli	*18 (3)*	*187 (34)*	*Custard apple*	*119 (22)*	*401 (74)*
Tomato	*50 (9)*	*155 (29)*	*Tamarind*	-	*101 (18)*
Brinjal	*87 (16)*	*215 (39)*	*Mulberry*	*70 (13)*	*273 (50)*
Onion	*22 (4)*	*232 (42)*	*Marigold*	*1 (<1)*	*253 (46)*
Bhendi	*22 (4)*	*280 (51)*	*Chrysanthemum*	*1 (<1)*	*253 (46)*
Drumstick	*70 (13)*	*192 (35)*	*Jasmine*	*1 (<1)*	*204 (38)*
Mango	-	*85 (16)*	*Crossandra*	*1 (<1)*	*222 (41)*
Guava	-	*195 (36)*			

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the 6 identified LMUs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and other horticulture crops that helps in maintaining productivity and ecological balance in the microwatershed.*
- *Maintaining soil-health is vital for crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested for these problematic soils like saline/alkali, highly eroded, sandy soils etc.*
- *Soil and water conservation treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. That would help in supplementing the farm income, provide fodder and fuel, and generate lot of biomass which in turn would help in maintaining the ecological balance and contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

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

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

In this critical juncture, the challenge before us is not only to increase the productivity per unit area which is steadily declining and showing a fatigue syndrome, but also to prevent or at least reduce the severity of degradation. If the situation is not reversed at the earliest, then the sustainability of the already fragile crop production system and the overall ecosystem will be badly affected in the state.

The continued neglect and unscientific use of the resources for a long time has led to the situation observed at present in the state. It is a known fact and established beyond doubt by many studies in the past that the cause for all kinds of degradation is the neglect and irrational use of the land resources. Hence, there is urgent need to generate a detailed site-specific farm level database on various land resources for all the villages/watersheds in a time bound manner that would help to protect the valuable soil and land resources and also to stabilize the farm production.

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

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

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

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

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

GEOGRAPHICAL SETTING

2.1 Location and Extent

The Oddarahatti Microwatershed is located in the central part of northern Karnataka in Koppal Taluk and District, Karnataka State (Fig. 2.1). It lies between $15^0$27' and $15^0$29' North latitudes and $76^0$11 and $76^0$13 East longitudes and covers an area of 546 ha. It comprises parts of Chamalapura, Chandinahala, Irakallagada, Kodadhala, Vaddarahatti and Yalamageri Villages. It is about 16 km from Koppal town. It is surrounded by Chandinahala and Kodadhala village on the north, Chamlapura on the northeast, Irakallagada on the east and west, Yalamageri on the southeast and Vaddarahatti on the southwestern side of the microwatershed.

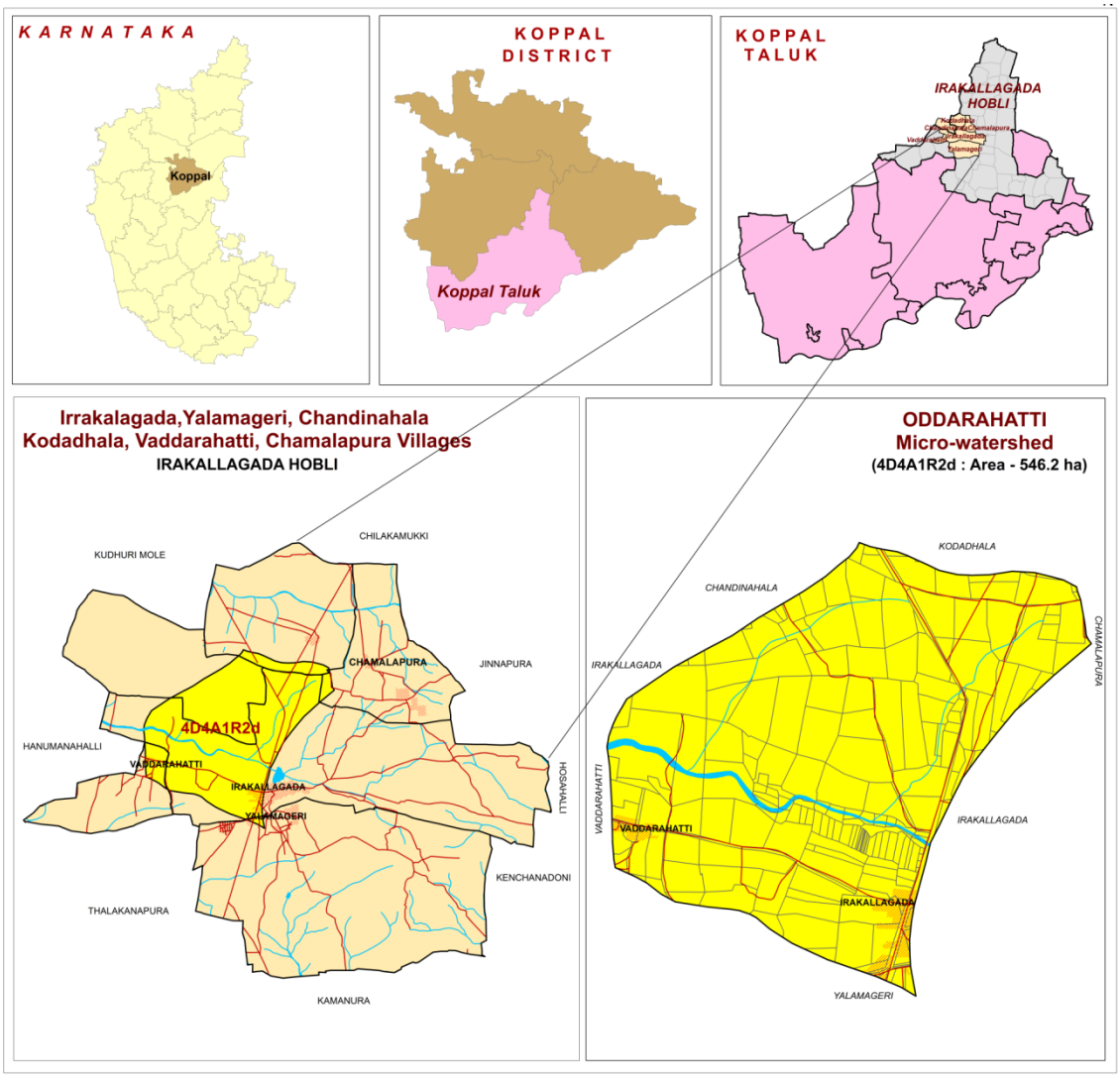


Fig. 2.1 Location map of Oddarahatti Microwatershed

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

Fig. 2.2 a Granite and granite gneiss rocks

Fig. 2.2 b Alluvium

2.3 Physiography

Physiographically, the area has been identified as granite gneiss and alluvial landscapes based on geology. The microwatershed area has been further divided into

summits, very gently sloping uplands and nearly level plains based on slope and its relief features. The elevation ranges from 573 to 602 m in the gently sloping uplands.

2.4 Drainage

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

2.5 Climate

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

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

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

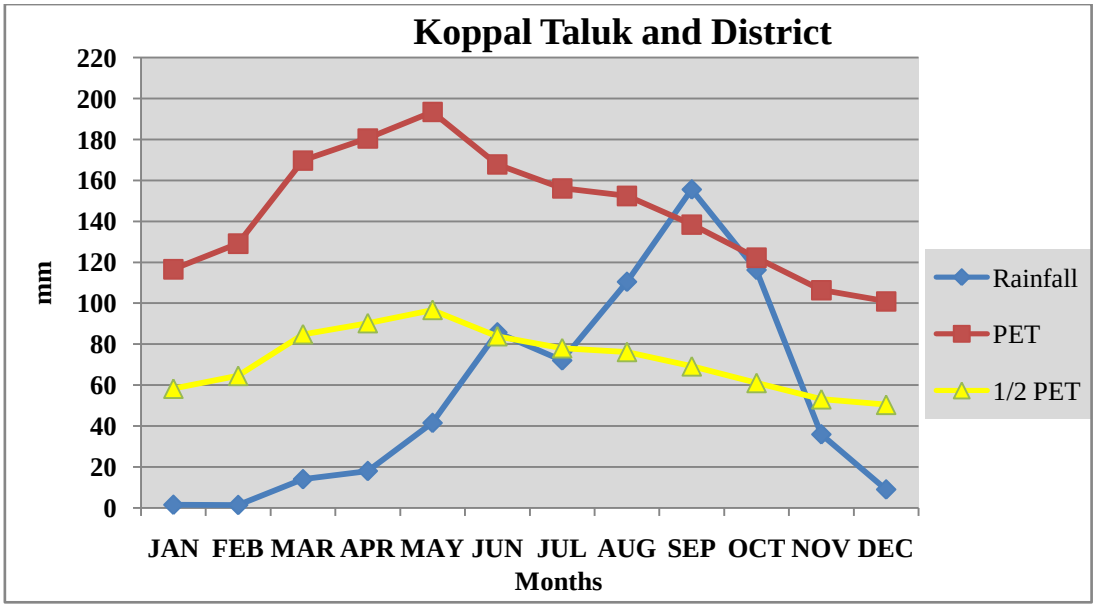


Fig. 2.3 Rainfall distribution in Koppal Taluk and District

2.6 Natural Vegetation

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

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

Fig 2.4 Natural vegetation of Oddarahatti Microwatershed

2.7 Land Utilization

About 91 per cent area (Table 2.2) in Koppal district is cultivated at present and about 16 per cent of the area is sown more than once. The cropping intensity is 118 per cent. An area of about 3 per cent is currently barren. Forests occupy a small area of about 5 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and bouldery areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, bajra, cotton, safflower, sunflower, red gram, horse gram, onion, mulberry, pomegranate, sugarcane, bengalgram and groundnut (Fig 2.5). While carrying out land resource inventory, the land use/land cover particulars are collected from all the survey numbers and a current land use map of the microwatershed is prepared. The current land use map prepared shows the arable and non-arable lands, other land uses and different types of crops grown in the area. The current land use map of Oddarahatti Microwatershed is presented in Fig. 2.6. Simultaneously, enumeration of existing wells (bore wells and open wells) and other soil and water conservation structures in the microwatershed is made and their location in different survey numbers is marked on the cadastral map. Map showing the location of wells in Oddarahatti Microwatershed is given Fig. 2.7.

Table 2.2 Land Utilization in Koppal District

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

Fig. 2.5 (a) Different crops and cropping systems in Oddarahatti Microwatershed

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

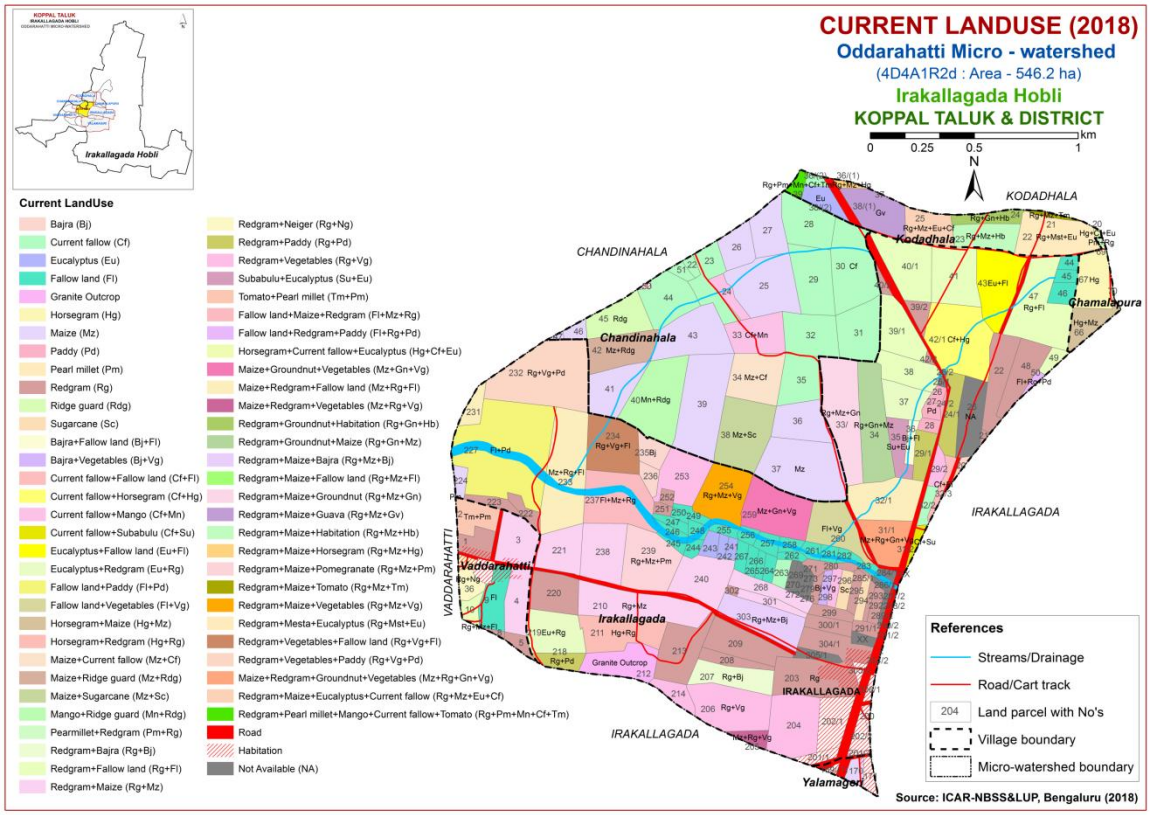


Fig. 2.6 Current Land Use – Oddarahatti Microwatershed

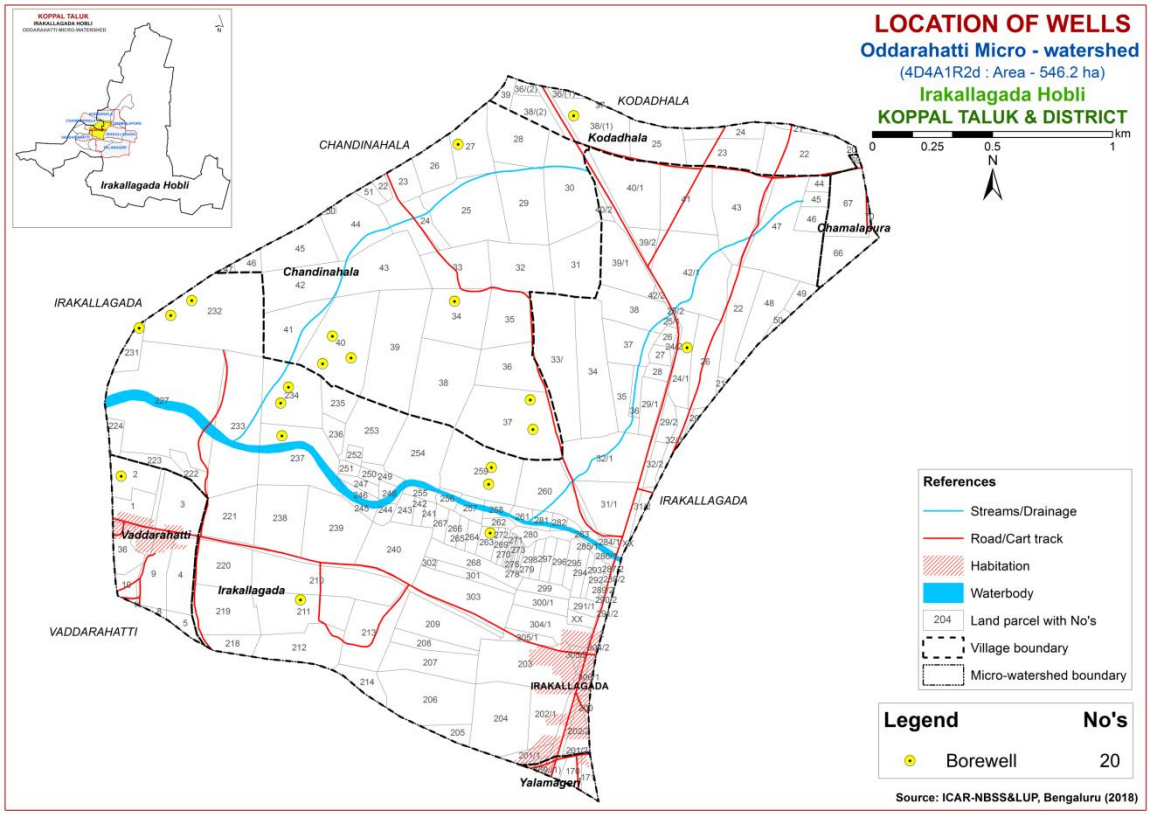


Fig. 2.7 Location of wells-Oddarahatti Microwatershed

Chapter 3

SURVEY METHODOLOGY

The purpose of land resource inventory is to delineate similar areas (soil series and phases), which respond or expected to respond similarly for a given level of management. This was achieved in Oddarahatti Microwatershed by the detailed study of all the soil characteristics (depth, texture, colour, structure, consistence, coarse fragments, porosity, soil reaction, soil horizons etc.) and site characteristics (slope, erosion, drainage, occurrence of rock fragments etc.) followed by grouping of similar areas based on soil-site characteristics into homogeneous (management units) units and showing their extent and geographic distribution on the microwatershed cadastral map. The detailed soil survey at 1:7920 scale was carried out in 546 ha area. The methodology followed for carrying out land resource inventory was as per the guidelines given in Soil Survey Manual (IARI, 1971; Soil Survey Staff, 2006; Natarajan *et al.,* 2015) which is briefly described below.

3.1 Base Maps

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

3.2 Image Interpretation for Physiography

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

Image Interpretation Legend for Physiography

G- Granite gneiss landscape

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

DSe Alluvial landscape

Dse 1 Summit

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

Dse 2 Very genetly sloping

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

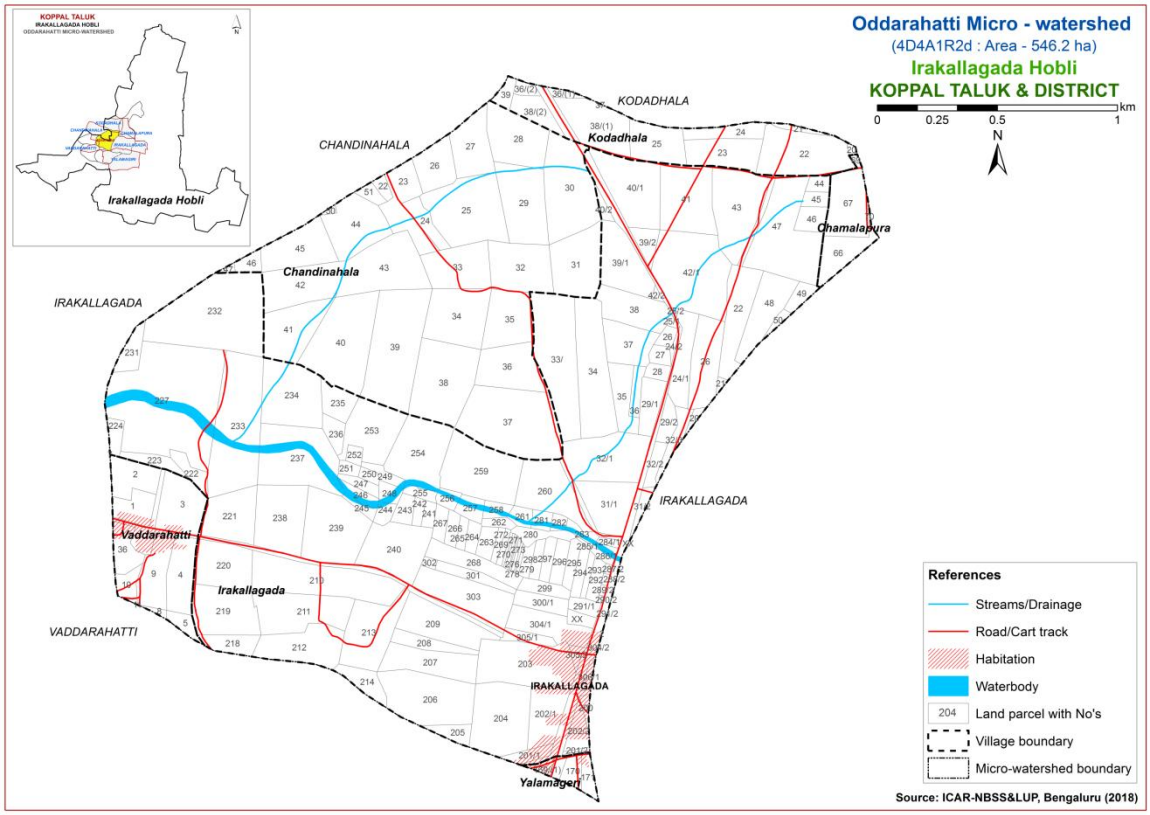


Fig. 3.1 Scanned and Digitized Cadastral map of Oddarahatti Microwatershed

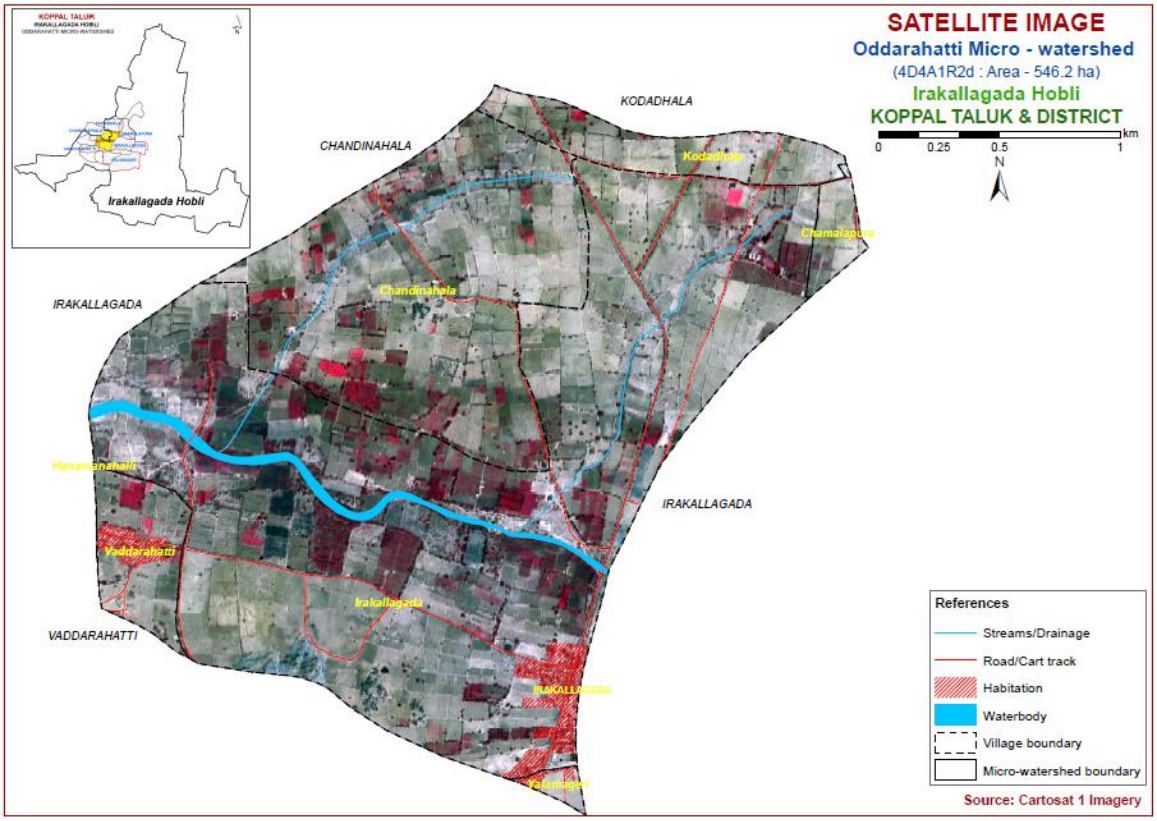


Fig. 3.2 Satellite Image of Oddarahatti Microwatershed

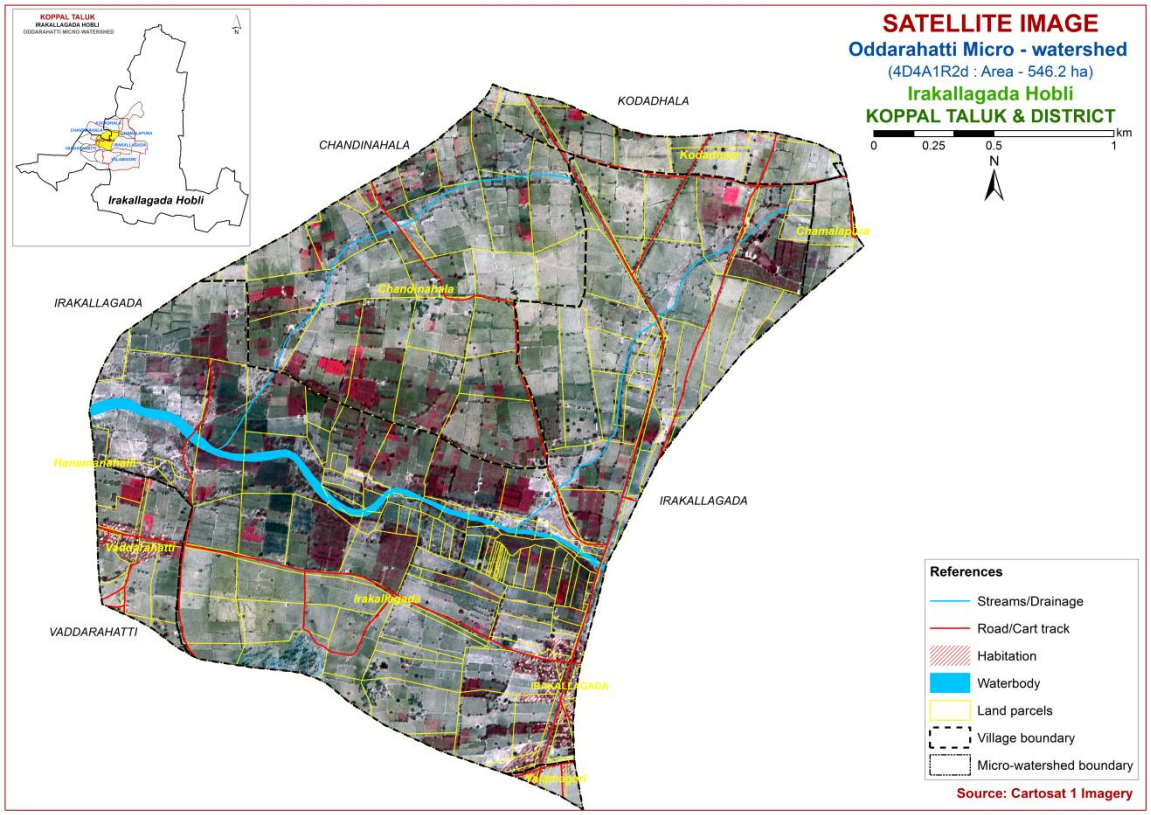


Fig. 3.3 Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Oddarahatti Microwatershed

3.3 Field Investigation

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

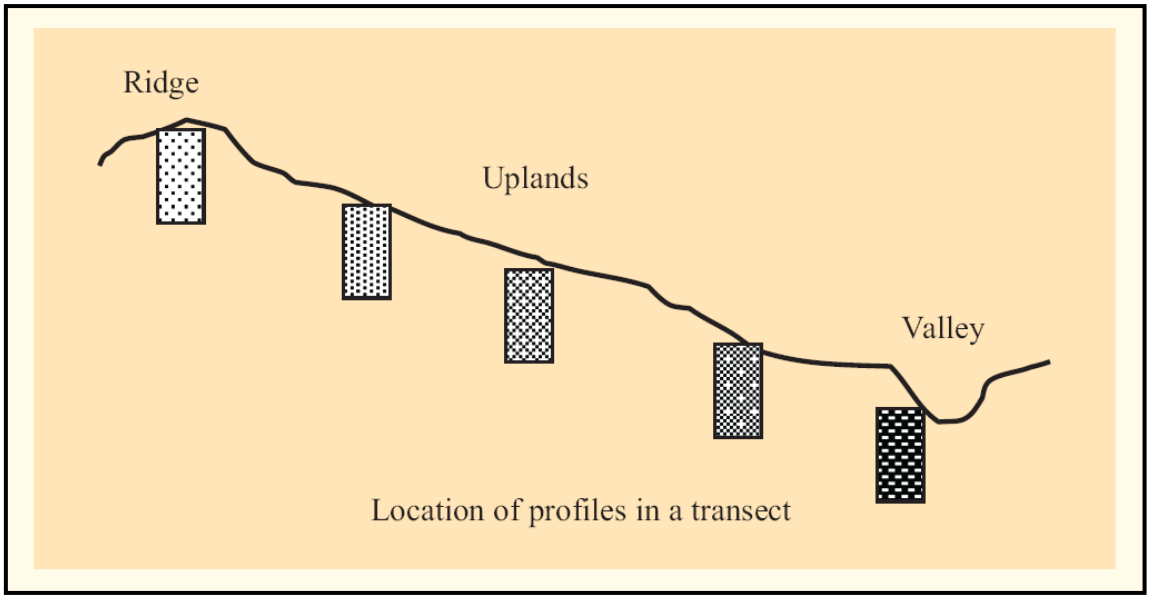


Fig. 3.4 Location of profiles in a transect

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

Based on the soil characteristics, the soils were grouped into different soil series. Soil series is the most homogeneous unit having similar horizons and properties and behaves similarly for a given level of management. Soil depth, texture, colour, kind of horizon and horizon sequence, amount and nature of gravel present, calcareousness, nature of substratum etc, were used as the major differentiating characteristics for identifying soil series occurring in the area. The differentiating characteristics used for identifying the soil series are given in Table 3.1. Based on the above characteristics, 15 soil series were identified in Oddarahatti Microwatershed.

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

Soils of Granite gneiss Landscape							
Sl. No.	**Soil Series**	**Depth (cm)**	**Colour (moist)**	**Texture**	**Gravel (%)**	**Horizon sequence**	**Calcareo-usness**
1	**Lakkur (LKR)**	50-75	2.5YR 2.5/3, 2.5/4, 3/4, 3/6	gsc	40-60	Ap-Bt-Bc-Cr	-
2	**Mukhadahalli (MKH)**	50-75	5YR3/3,3/4,4/3, 5/4,6/6 2.5YR3/4	gsc	>35	Ap-Bt-Cr	-
3	**Kethanapura (KTP)**	50-75	2.5YR3/4, 3/6	gsc	15-35	Ap-Bt-Cr	-
4	**Hooradhahalli (HDH)**	75-100	2.5YR2.5/4,3/4, 3/6	gsc-gc	>35	Ap-Bt-Cr	-
5	**Bidanagere (BDG)**	75-100	5YR3/3,3/4,4/3, 5/4 2.5YR3/4, 3/6	gc	35-60	Ap-Bt-Cr	-
6	**Gollarahatti (GHT)**	75-100	2.5YR3/4,3/6, 4/4,4/6	gscl	15-35	Ap-Bt-Cr	-
7	**Bisarahalli (BSR)**	75-100	5 YR 3/3, 3/4	gsc	15-35	Ap-Bt-Cr	-
8	**Jedigere (JDG)**	100-150	5YR 4/6, 3/4, 7.5YR 3/4, 4/6	sc-c	<15	Ap-Bt-BC-Cr	-
9	**Vaddarahalli (VDH)**	100-150	7.5YR3/2,3/3,3/4	sc-c	-	Ap-Bt-Cr	-
10	**Huliyapura (HLP)**	75-100	7.5YR3/3,4/6 10YR4/6	scl	-	Ap-Bw-C	-
11	**Balapur (BPR)**	100-150	2.5YR2.5/4,3/4	gsc-gc	>35	Ap-Bt-Cr	-
12	**Nagalapur (NGP)**	100-150	5YR2.5/2,3/2, 2.5YR3/6,4/6	gsc	>35	Ap-Bt-Cr	-
Soils of Alluvial Landscape							
13	**Dambarahalli (DRL)**	75-100	10YR 2/1, 3/1, 4/3	c	<15	Ap-Bss-Ck	e-es
14	**Gatareddihal (GRH)**	100-150	10YR 2/1, 3/1, 2.5Y 4/3, 5/4	c	<15	Ap-Bss-BC-C	es
15	**Kavalur (KVR)**	100-150	10 YR 2/2, 3/1, 3/2, 3/3, 4/4	c		Ap-Bss-Bck-Cr	es-ev

3.4 Soil Mapping

The area under each soil series was further separated into 30 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 soil map (Fig. 3.5) in the form of symbols. During the survey many soil profile pits, few minipits and a few auger bores representing different landforms occurring in the microwatershed were studied. In

addition to the profile study, spot observations in the form of minipits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map. The soil map shows the geographic distribution of 30 mapping units representing 15 soil series occurring in the microwatershed. The soil map unit (soil legend) description is presented in Table 3.2. The soil phase map (management units) shows the distribution of 30 soil phases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one phase will have similar management needs and have to be treated accordingly.

3.5 Laboratory Characterization

Soil samples for each 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 in the year 2018 from Oddarahatti farmer's fields for fertility status (major and micronutrients) at 320 m grid interval were analyzed in the laboratory (Katyal and Rattan, 2003). By linking the soil fertility data to the survey numbers through GIS, soil fertility maps were generated using Kriging method for the microwatershed.

Table 3.2 Soil map unit description of Oddarahatti Microwatershed

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
Soils of Granite and Granite gneiss landscape				
	LKR	Lakkur soils are moderately shallow (50-75cm), well drained, have reddish brown to dark red, gravelly sandy clay soils occurring on nearly level to very gently and gently sloping uplands		**108 (19.71)**
43		LKRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	76 (13.91)
54		LKRiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	32 (5.8)
	MKH	Mukhadahalli soils are moderately shallow (50-75 cm), well drained, have dark brown to reddish brown, gravelly sandy clay soils occurring on very gently to gently sloping uplands		**50 (9.13)**
77		MKHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	8 (1.4)
85		MKHhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	6 (1.11)
90		MKHiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	36 (6.62)
	KTP	Kethanapura soils are moderately shallow (50-75 cm), well drained, have dark reddish brown, red gravelly sandy clay soils occurring on very gently to gently sloping uplands		**20 (3.75)**
72		KTPhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	20 (3.75)

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
	HDH	Hooradhahalli soils are moderately deep (75-100 cm), well drained, have dark red to dark reddish brown, gravelly sandy clay to clay soils occurring on very gently to gently sloping uplands		**61 (11.17)**
108		HDHcB1	Sandy loam surface, slope 1-3%, slight erosion	0.10 (0.02)
111		HDHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	1 (0.16)
112		HDHcB2g2	Sandy loam surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	30 (5.53)
128		HDHiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	30 (5.46)
	BDG	Bidanagere soils are moderately deep (75-100 cm), well drained, have dark reddish brown, gravelly clay soils occurring on very gently sloping uplands under cultivation		**20 (3.64)**
180		BDGcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	4 (0.69)
192		BDGiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	16 (2.95)
	GHT	Gollarahatti soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay loam soils occurring on very gently to gently sloping uplands		**21 (3.98)**
134		GHTbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	1 (0.24)
137		GHTcB2	Sandy loam surface, slope 1-3%, moderate erosion	5 (0.96)
142		GHThB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	15 (2.78)
	BSR	Bisarahalli soils are moderately deep (75-100 cm), well drained, have dark reddish brown gravelly sandy clay red soils occurring on very gently sloping uplands under cultivation		**12 (2.08)**
158		BSRbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	6 (1.13)
161		BSRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	5 (0.83)
164		BSRiB1	Sandy clay surface, slope 1-3%, slight erosion	1 (0.12)
	HLP	Huliyapura soils are moderately deep (75-100 cm), well drained, have dark- strong brown to dark yellowish brown sandy clay loam soils occurring on very gently sloping low lands under cultivation		**32 (5.88)**

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
466		HLPmA1	Clay surface, slope 0-1%, slight erosion	32 (5.88)
	JDG	Jedigere soils are deep (100-150 cm) well drained, have yellowish red to strong brown sandy clay to clay soils occurring on nearly level to very gently sloping uplands under cultivation		**66 (12.22)**
213		JDGiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	50 (9.24)
456		JDGcB2	Sandy loam surface, slope 1-3%, moderate erosion	12 (2.27)
457		JDGcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	4 (0.71)
	VDH	Vaddarahalli soils are deep (100-150 cm), well drained, have dark reddish brown to dark brown sandy clay to clay soils occurring on nearly level to very gently sloping uplands under cultivation		**3 (0.61)**
246		VDHhB2g1	Sandy clay loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	3 (0.61)
	BPR	Balapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay to clay soils occurring on very gently to gently sloping uplands under cultivation		**51 (9.3)**
217		BPRbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	46 (8.44)
224		BPRcB2	Sandy loam surface, slope 1-3%, moderate erosion	1 (0.11)
229		BPRhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	4 (0.75)
	NGP	Nagalapur soils are deep (100-150 cm), well drained, have dark reddish brown to dark red, gravelly sandy clay soils occurring on very gently to gently sloping uplands under cultivation		**27 (5.01)**
258		NGPhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	27 (5.01)
Soils of Alluvial Landscape				
	DRL	Dambarahalli soils are moderately deep (75-100 cm), moderately well drained, have black and very dark gray to dark brown, calcareous cracking clay soils occurring on very gently to gently sloping plains under cultivation		**18 (3.22)**
350		DRLmB2	Clay surface, slope 1-3%, moderate erosion	18 (3.22)
	GRH	Gatareddihal soils are deep (100-150 cm), moderately well drained, have black or dark grey to light olive brown, calcareous sodic clay soils occurring on nearly level to very gently sloping plains under cultivation		**16 (2.86)**

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
384		GRHmB2	Clay surface, slope 1-3%, moderate erosion	16 (2.86)
	KVR	Kavalur soils are deep (100-150 cm), moderately well drained, have dark yellowish brown to very dark brown and very dark gray, calcareous black cracking clay soils occurring on very gently sloping plains under cultivation		**15 (2.75)**
385		KVRiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	15 (2.75)
999		Rock outcrops	Rock lands, both massive and bouldery with little or no soil	**6 (1.12)**
1000	Others	Habitation and water body		**20 (3.57)**

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

3.6 Land Management Units (LMU's)

The 30 soil phases identified and mapped in the microwatershed were regrouped into 6 Land Management Units (LMU's) for the purpose of preparing a Proposed Crop Plan for sustained development of the microwatershed. The database (soil phases) generated under LRI was utilized for identifying Land Management Units (LMU's) based on the management needs. One or more than one soil site characteristic having influence on the management have been choosen for identification and delineation of LMUs. For Oddarahatti Microwatershed, five soil and site characteristics, namely soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The Land Management Units are expected to behave similarly for a given level of management.

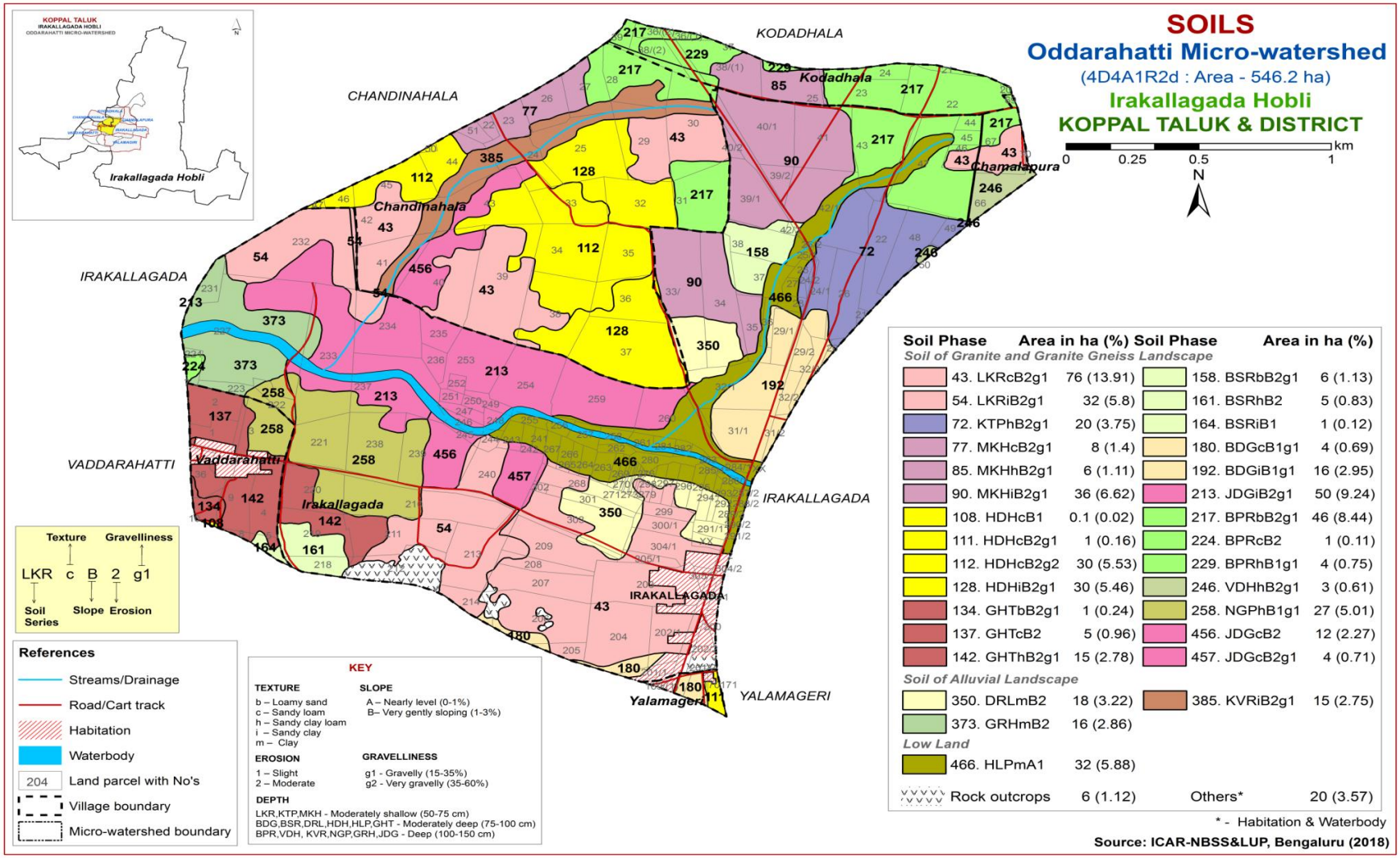


Fig 3.5 Soil Phase or Management Units-Oddarahatti Microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and distribution of different kinds of soils occurring in Oddarahatti Microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscapes based on geology. In all, 15 soil series are identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. The soil formation is dominantly influenced by the parent material, climate, time and relief.

A brief description of each of the 15 soil series identified followed by 30 soil phases (management units) mapped (Fig. 3.4) are furnished below. The physical and chemical characteristics of soil series identified in Oddarahatti 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 and granite gneiss landscape

In this landscape, 12 soil series are identified and mapped. Of these, Lakkur (LKR) series occupies maximum area of 108 ha (20%), Jedigere (JDG) 66 ha (12%), Hooradhahalli (HDH) 61 ha (11%), Balapur (BPR) 51 ha (9%), Mukhadahalli (MKH) 50 ha (9%), Huliyapura (HLP) 32 ha (6%), Nagalapur (NGP) 27 ha (5%), Gollarahatti (GHT) 21 ha (4%), Kethanapura (KTP) 20 ha (4%), Bidanagere (BDG) 20 ha (4%), Bisarahalli (BSR) 12 ha (2%) and Vaddarahalli (VDH) occupy minor area of about 3 ha (1%) in the microwatershed. The brief description of each soil series along with the soil phases identified and mapped is given below.

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

The thickness of the solum ranges from 51 to 74 cm. The thickness of A horizon ranges from 12 to 18 cm. Its colour is in 5YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. The texture varies from loamy sand to sandy clay loam with 15 to 50 per cent gravel. The thickness of B horizon ranges from 39 to 58 cm. Its colour is in 2.5 YR

hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay with 40 to 60 per cent gravel. The available water capacity is low (50-100 mm/m). Two soil phases were identified and mapped.

Landscape and soil profile characteristics of Lakkur (LKR) Series

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

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

Landscape and soil profile characteristics of Mukhadahalli (MKH) Series

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

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

Landscape and soil profile characteristics of Kethanapura (KTP) Series

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

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

Landscape and soil profile characteristics of Hooradhahalli (HDH) Series

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

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

Landscape Soil Profile Characteristics of Bidanagere (BDG) Series

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

The thickness of the solum ranges from 78 to 98 cm. The thickness of A-horizon ranges from 12 to 18cm. Its colour is in 5 YR and 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture varies from gravelly sandy clay loam with 15 to 35 per cent gravel. The thickness of B horizon ranges from 66 to 81cm. Its colour is in 2.5 YR hue with value 3 to 4 and chroma 4 to 6. Texture is sandy clay loam with 15 to 35 per cent gravel. The available water capacity is medium (100-150 mm/m). Three soil phases were identified and mapped.

Landscape and soil profile characteristics of Gollarahatti (GHT) Series

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

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

Landscape and soil profile characteristics of Bisarahalli (BSR) Series

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

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

Landscape and soil profile characteristics of Huliyapura (HLP) Series

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

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

Landscape and soil Profile Characteristics of Jedigere (JDG) Series

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

The thickness of the solum ranges from 106 to 148 cm. The thickness of A horizon ranges from 13 to 23 cm. Its colour is in 7.5 YR and 10 YR hue with value 3 and chroma 3 to 4. The texture varies from sandy loam to clay. The thickness of B horizon ranges from 95 to 132 cm. Its colour is in 7.5 YR and 5 YR hue with value 3 to 4 and chroma 2 to 4. Its texture is sandy clay to clay. The available water capacity is high (150-200 mm/m). One soil phase was identified and mapped.

Landscape and soil profile characteristics of Vaddarahalli (VDH) Series

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

The thickness of the solum ranges from 102 to 147 cm. The thickness of A horizon ranges from 12 to 17 cm. Its colour is in 5 YR and 2.5 YR hue with value and chroma 3 to 4. The texture ranges from loamy sand to sandy clay with 15 to 50 per cent gravel. The thickness of B horizon ranges from 90 to 132 cm. Its colour is in 2.5 YR hue with value 2.5 to 3 and chroma 4 to 6. Texture is sandy clay to clay with 35 to 50 per cent gravel. The available water capacity is medium (100-150 mm/m). Three soil phases were identified and mapped.

Landscape and soil profile characteristics of Balapur (BPR) Series

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

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

Landscape and soil Profile Characteristics of Nagalapur (NGP) Series

4.2 Soils of Alluvial Landscape

In this landscape, three soil series have been identified and mapped. Of these, Dambarahalli (DRL) series occupies maximum area of 18 ha (3%), Gatareddihal (GRH) 16 ha (3%) and Kavalur (KVR) occupy an area of about 15 ha (3%), in the microwatershed. The brief description of soil series along with the soil phases identified and mapped is given below.

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

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

Landscape and soil profile characteristics of Dambarahalli (DRL) Series

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

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

Landscape and soil profile characteristics of Gatareddihal (GRH) Series

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

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

Landscape and soil profile characteristics of Kavalur (KVR) series

Table: 4.1 Physical and Chemical Characteristics of Soil Series identified in Oddarahatti Microwatershed

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

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

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

Cont…

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

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

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

Cont…

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

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

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-18	6.42	-		0.07	1.24	-	2.95	0.93	0.57	0.02	4.48	4.41	0.75	100.00	0.05
18-38	6.63	-	-	0.09	0.70	-	11.71	3.53	0.98	0.08	16.31	16.59	0.34	98.30	0.50
38-73	6.88	-	-	0.15	0.48	-	11.36	3.30	0.72	0.13	15.50	15.75	0.39	98.42	0.80

Cont…

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

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

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

Cont…

Series: Bidanagere (BDG), **Pedon**: RM-3
Location: $13^0$22'11"N, $76^0$38'03"E, (4D3D8G1a), Tharabenahalli village, Chikkanayakanahalli Taluk, Tumakuru District.
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Rhodic, Paleustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-20	Ap	81.19	11.25	7.56	12.54	15.07	17.90	21.94	13.75	50	ls	-	-
20-35	Bt1	57.45	11.45	31.10	12.76	11.02	10.92	12.45	10.31	50	scl	-	-
35-92	Bt2	44.63	7.85	47.52	12.40	9.61	8.37	7.75	6.51	60	c	-	-

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

Cont…

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

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

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

Cont…

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

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

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

Cont…

Series Name: Jedigere (JDG), **Pedon:** R5
Location: Chennahalu village, Yelburga Taluk and Koppal District
Analysis at: NBSS&LUP, Regional Centre, Bangalore. **Classification:** Fine, mixed, isohyperthermic Typic Haplustalfs

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

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-14	6.11			0.078	0.83		5.58	2.49	0.18	0.19	8.45	9.41	0.45	90	2.06
14-39	6.87			0.123	0.67		12.01	5.62	0.32	0.29	18.24	18.22	0.47	100	1.59
39-62	7.65			0.121	0.50				0.42	0.43		21.68	0.51	-	1.99
62-94	8.21			0.188	0.28				0.34	0.41		21.09	0.43	-	1.93
94-118	8.23			0.189	0.24				0.33	0.36		17.62	0.41	-	2.02

Cont…

Soil Series: Balapur (BPR), **Pedon**: RM-78
Location: $13^0$26'39"N, $76^0$35'03"E, (4D3D8G2c), Kasaba, Chikkanayakanahalli taluk, Tumakuru district
Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Typic Rhodustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-12	Ap	65.66	18.66	15.68	4.14	6.16	13.33	21.82	20.20	-	sl	-	-
12-34	Bt1	61.91	11.52	26.57	2.36	6.78	12.53	21.36	18.89	-	scl	-	-
34-60	Bt2	51.81	11.24	36.94	4.66	5.70	12.23	15.96	13.26	30	sc	-	-
60-84	Bt3	46.61	9.02	44.37	14.70	6.88	7.51	8.97	8.55	55	sc	-	-
84-112	Bt4	48.75	12.92	38.33	15.73	8.13	6.87	8.23	9.79	60	sc	-	-
112-127	Bc	50.98	24.74	24.28	5.25	4.63	5.15	10.92	25.03	50	scl	-	-

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-12	6.64	-	-	0.03	0.56	0.00	1.90	1.32	0.21	0.03	3.46	5.45	0.35	63.48	0.51
12-34	6.99	-	-	0.02	0.48	0.00	3.66	1.90	0.07	0.08	5.70	7.82	0.29	72.93	0.96
34-60	7.29	-	-	0.02	0.40	0.00	5.13	2.08	0.11	0.20	7.52	11.19	0.30	67.18	1.75
60-84	7.50	-	-	0.02	0.32	0.00	5.83	6.36	0.13	0.23	12.55	12.38	0.28	101.43	1.83
84-112	7.54	-	-	0.02	0.24	0.00	6.02	6.59	0.11	0.25	12.96	12.77	0.33	101.49	1.97
112-127	7.90	-	-	0.02	0.20	0.00	8.04	3.62	0.07	0.32	12.04	12.47	0.51	96.56	2.55

Cont…

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

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

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

Cont…

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

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

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-15	8.78	-	-	0.42	0.32	12.35	-	-	0.59	4.25	-	49.70	0.95	100.00	5.62
15-27	9.03	-	-	0.61	0.30	12.48	-	-	0.30	8.96	-	57.23	0.98	100.00	10.07
27-45	9.10	-	-	0.67	0.34	11.70	-	-	0.25	11.85	-	60.71	0.95	100.00	14.05
45-80	9.18	-	-	0.86	0.32	13.39	-	-	0.27	15.40	-	63.33	0.90	100.00	18.45

Contd...

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

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

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-18	9.08	-	-	0.23	0.33	6.89	-	-	0.70	6.36	-	63.21	1.05	100.00	7.11
18-51	9.19	-	-	0.61	0.49	9.10	-	-	0.54	14.20	-	66.05	0.98	100.00	15.98
51-80	9.27	-	-	0.56	0.29	9.36	-	-	0.49	14.75	-	65.63	0.96	100.00	17.07
80-107	9.28	-	-	0.57	0.39	9.62	-	-	0.44	14.64	-	63.95	1.02	100.00	17.49
107-131	9.04	-	-	1.08	0.31	8.32	-	-	0.52	16.40	-	68.36	0.94	100.00	17.30

Contd...

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

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

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-24	8.4	-	-	0.265	0.2	8.04	-	-	0.97	0.65		43.25	0.94		0.60
24-50	9.27	-	-	0.23	0.37	8.04	-	-	0.31	3.21		41.66	0.91		3.08
50-85	9.44	-	-	0.297	0.41	8.64	-	-	0.35	6.43		43.99	0.91		5.85
85-124	9.37	-	-	0.46	0.41	11.40	-	-	0.42	7.99		51.09	0.85		6.26

Chapter 5

INTERPRETATION FOR LAND RESOURCE MANAGEMENT

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

5.1 Land Capability Classification

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

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

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

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

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

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

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

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

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

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

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

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

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

The land capability subclasses are recognised based on the dominant limitations observed within a given land capability class. The subclasses are designated by adding a lower case letter like 'e', 'w', 's', or 'c' to the class numeral. The subclass "e" indicates that the main hazard is risk of erosion, "w" indicates drainage or wetness as a limitation for plant growth, "s" indicates shallow soil depth, coarse or heavy textures, calcareousness, salinity/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 30 soil map units identified in the Oddarahatti Microwatershed are grouped under two land capability classes and five land capability subclasses (Fig. 5.1).

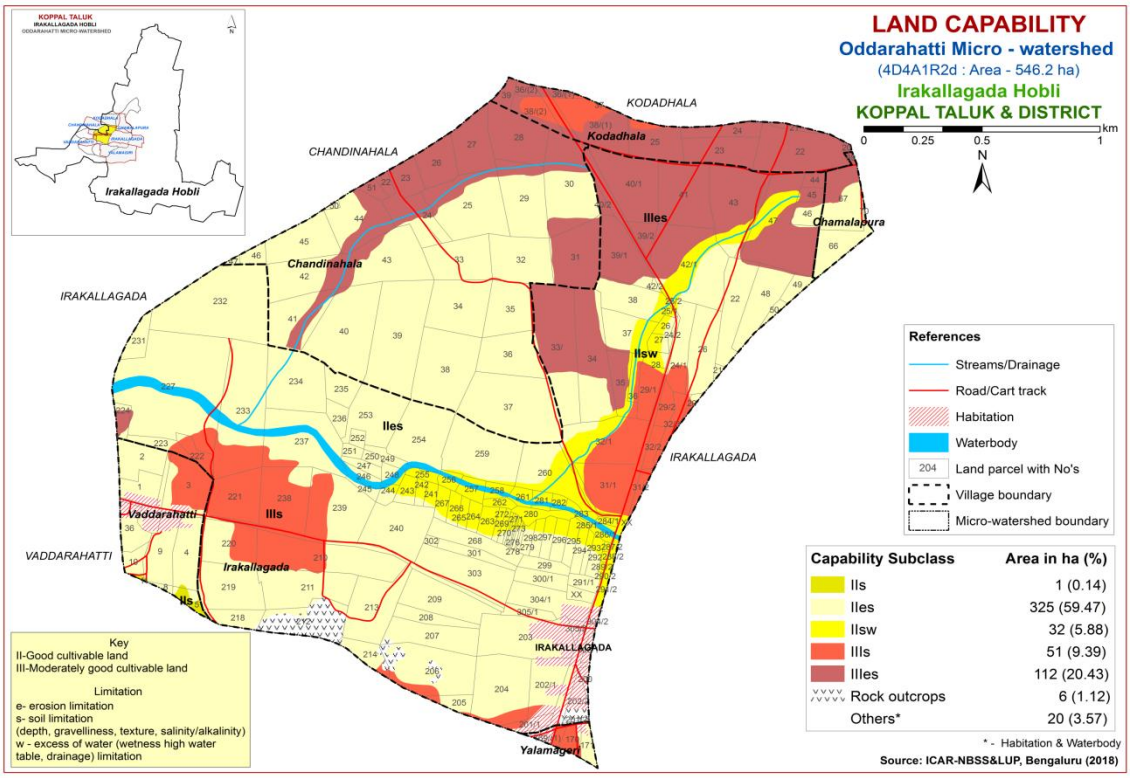


Fig. 5.1 Land Capability map of Oddarahatti Microwatershed

Entire cultivated area of the microwatershed is suitable for agriculture. Maximum area of 358 ha (65%) are good lands (Class II) that have minor limitations and require moderate conservation practices and are distributed in the major part of the microwatershed. Moderately good lands (Class III) cover an area of 163 ha (30%) and are distributed in the northern, eastern, southern and western part of the microwatershed with moderate problems of soil that require special conservation practices. An area of about 6 ha (1 %) is covered by rock out crops and 20 ha (4%) is under habitations and water bodies.

5.2 Soil Depth

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

An area of 178 ha (33%) is moderately shallow (50-75 cm) and are distributed in the northern, western, central, southern and eastern part of the microwatershed. Moderately deep soils (75-100 cm) occupy an area of 164 ha (30%) and occur in the central, eastern, western and southern part of the microwatershed. Deep (100-150 cm) soils occupy a maximum area of 179 ha (33%) and are distributed in the major part of the microwatershed.

The most problem lands with an area of about 178 ha (33%) having moderately shallow (50-75 cm) rooting depth. They are suitable for growing short or medium duration agricultural crops but well suited for pasture, forestry or other recreational purposes. The most productive lands cover a maximum area about 179 ha (33%) where all climatically adapted long duration crops be grown.

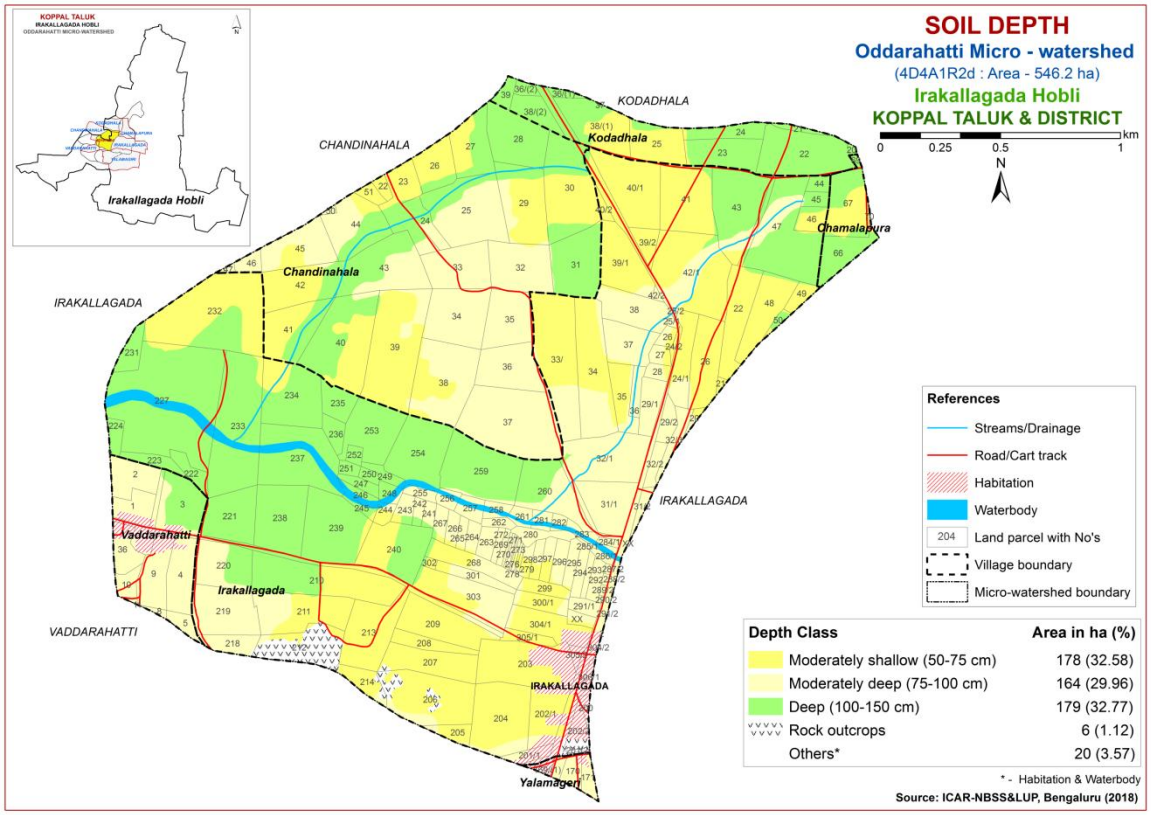


Fig. 5.2 Soil Depth map of Oddarahatti Microwatershed

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 (fig. 5.3). The area extent and their spatial distribution in the microwatershed is shown in figure 5.3.

An area of 54 ha (10%) has sandy soils at the surface and are distributed in the northern and western part of the microwatershed. An area of 222 ha (41%) is loamy soils at the surface and are distributed in the northeastern, western and southern part of the microwatershed. Major area of 245 ha (45%) has clayey soils at the surface and are distributed in major part of the microwatershed (Fig. 5.3).

The most productive lands 245 ha (45%) with respect to surface soil texture are the clayey soils that have high potential for soil-water retention and availability, and nutrient retention and availability, but have more problems of drainage, infiltration, workability and other physical problems. The other most productive lands 222 ha (41%) are loamy soils which also have high potential for AWC, nutrient availability but have no drainage or other physical problems compared to loamy soils.

The problem soils cover 10 per cent area which have problem of moisture and nutrient availability and require frequent irrigation and nutrient management. They are better suited for root and tuber crops.

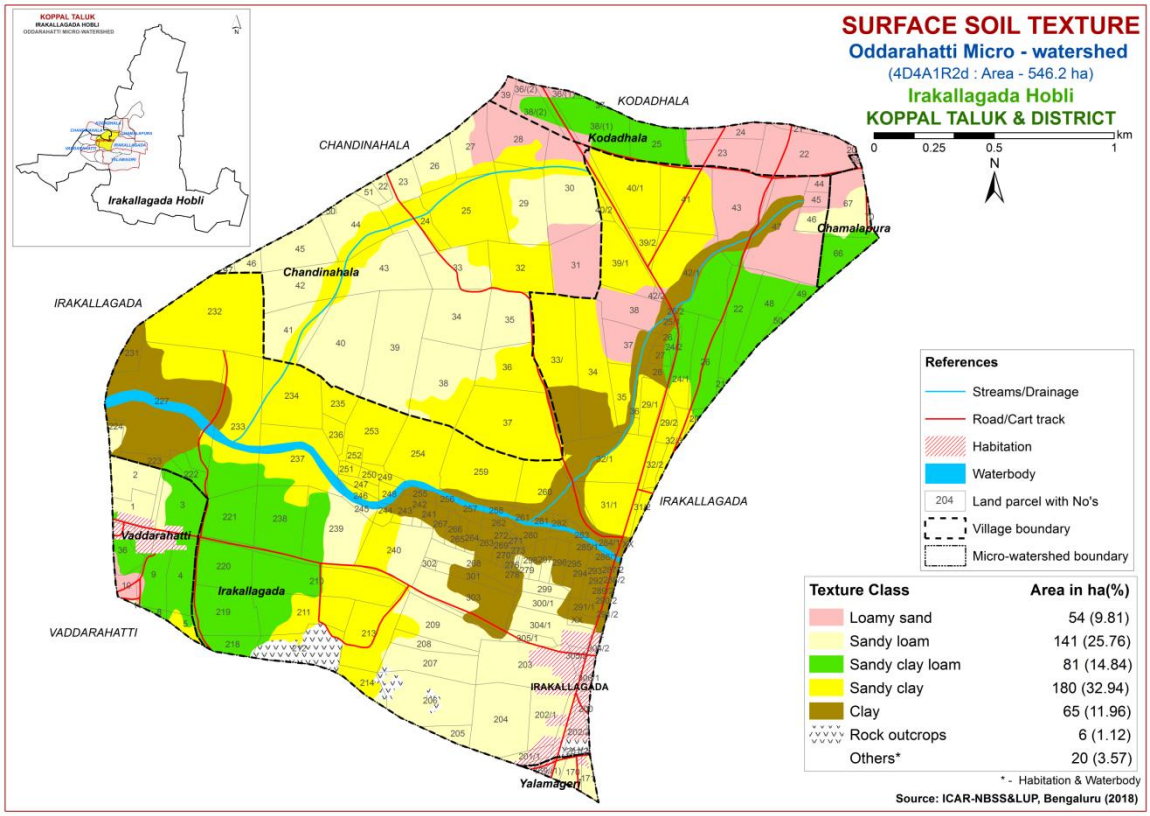


Fig. 5.3 Surface Soil Texture map of Oddarahatti Microwatershed

5.4 Soil Gravelliness

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

The soils that are non-gravelly (<15% gravel) cover an area of 89 ha (16%) and are distributed in the central, western, eastern and southern part of the microwatershed. Maximum area of 401 ha (74%) is covered by gravelly (15-35% gravel) soils and are distributed in the major part of the microwatershed. An area of 30 ha (6%) is very gravelly (35-60%) and are distributed in the western and central part of the microwatershed (Fig. 5.4).

The most productive lands with respect to gravelliness are found to be 16 per cent. They are non-gravelly with less than 15 per cent gravel and have potential for growing both annual and perennial crops. The problem soils that are very gravelly (35-60%) cover 6 per cent where only short or medium duration crops can be grown.

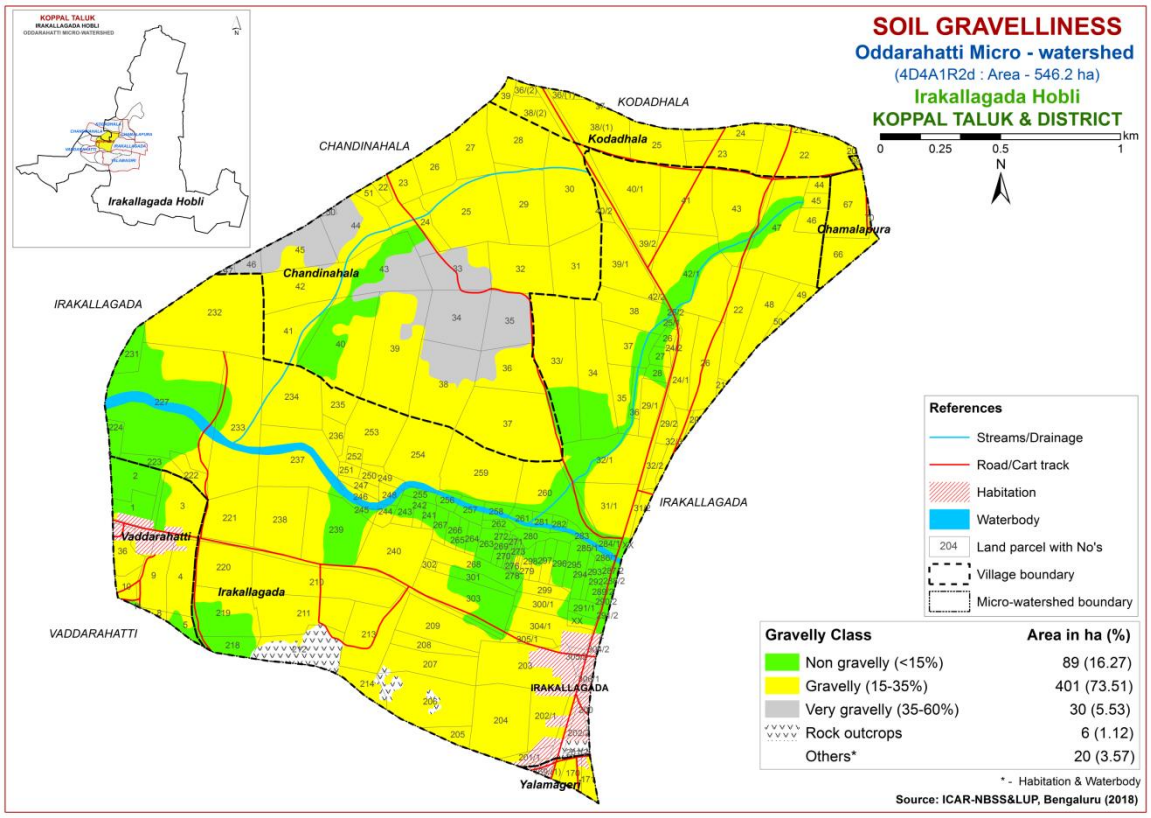


Fig. 5.4 Soil Gravelliness map of Oddarahatti Microwatershed

5.5 Available Water Capacity

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

Maximum area of about 238 ha (44%) are very low (<50 mm/m) in available water capacity and are distributed in the major part of the microwatershed. Soils with low available water capacity (51-100 mm/m) occupy an area of 132 ha (24%) and are distributed in the northern, eastern and southwestern part of the microwatershed. An area of about 117 ha (21%) is medium (101-150 mm/m) in available water capacity and are distributed in the western, central, eastern and northern part of the microwatershed. An

area of 34 ha (6%) is high to very high (151->200 mm/m) and are distributed in the western and northeastern part of the microwatershed.

An area of about 238 ha (44%) in the microwatershed has soils that are problematic with regard to available water capacity. Here, only short duration crops can be grown and the probability of crop failure is very high. These areas are best put to other alternative uses. The potential soils with respect to AWC cover about 34 ha (6%) that have high to very high AWC, where all climatically adapted long duration crops can be grown.

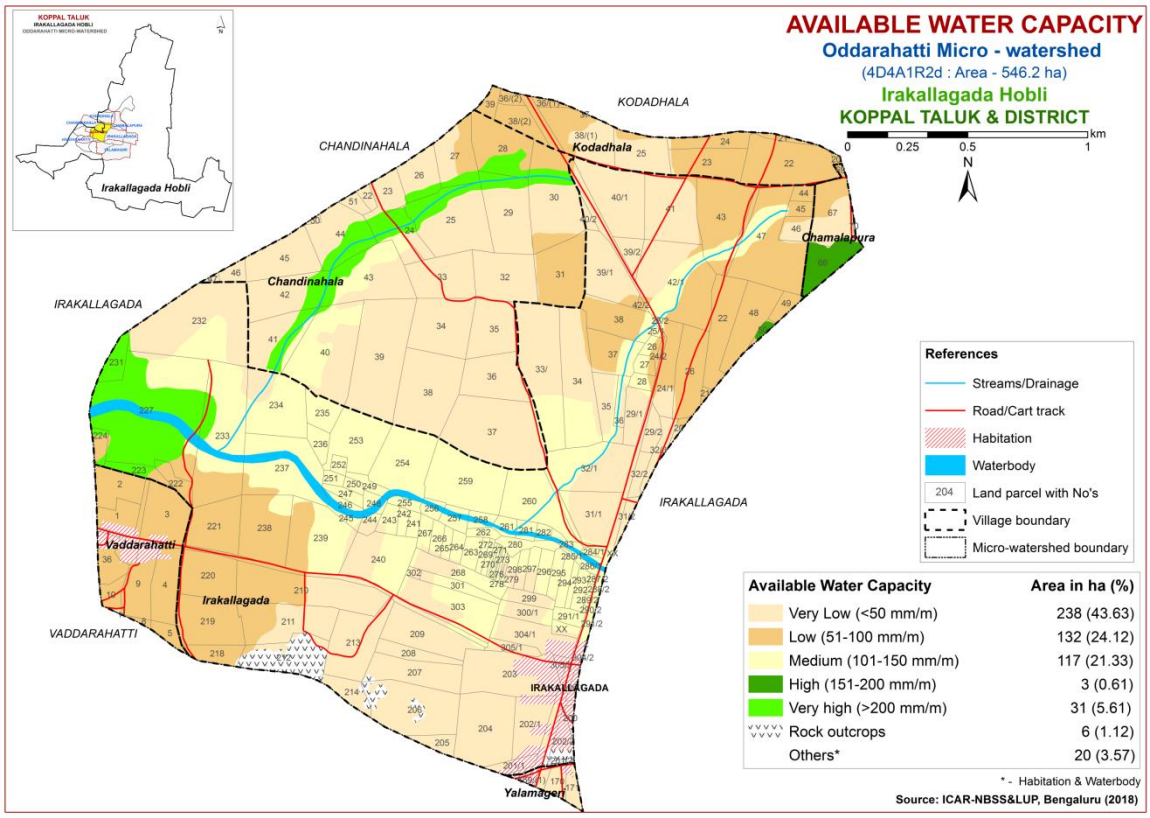


Fig. 5.5 Soil Available Water Capacity map of Oddarahatti Microwatershed

5.6 Soil Slope

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

An area of 32 ha (6%) is nearly level (0-1%) and are distributed in the northern and eastern part of the microwatershed. Major area of about 488 ha (89%) falls under very gently sloping (1-3% slope) lands and are distributed in the major part of the microwatershed. In all these lands, all climatically adapted annual and perennial crops can

be grown without much soil and water conservation and other land development measures.

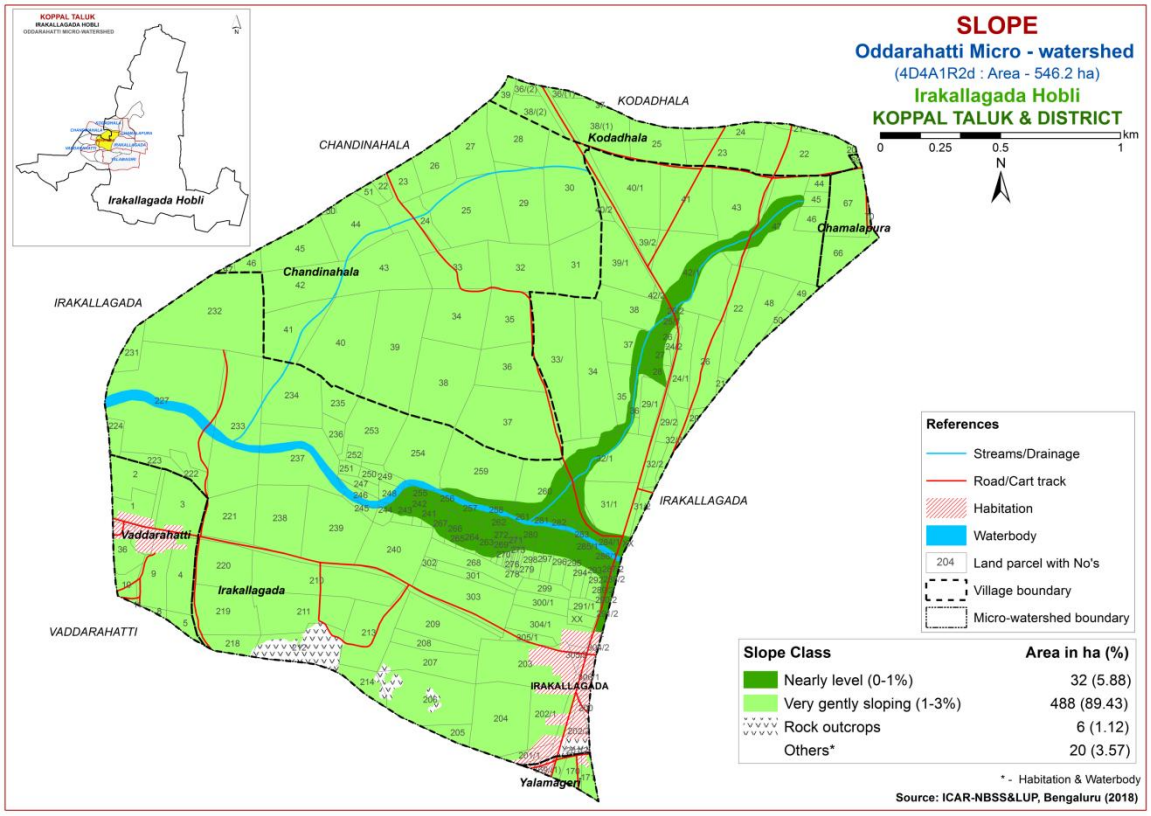


Fig. 5.6 Soil Slope map of Oddarahatti Microwatershed

5.7 Soil Erosion

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

Soils that are slightly eroded (e1 Class) occupy an area of about 84 ha (15%) and are distributed in the northern, eastern, central and southern part of the microwatershed. Moderately eroded (e2 Class) soils cover an area of 436 ha (80%) and are distributed in the major part of the microwatershed.

An area of about 436 ha (80%) in the microwatershed is problematic because of moderate erosion. These areas need soil and water conservation and other land development measures for restoring the soil health.

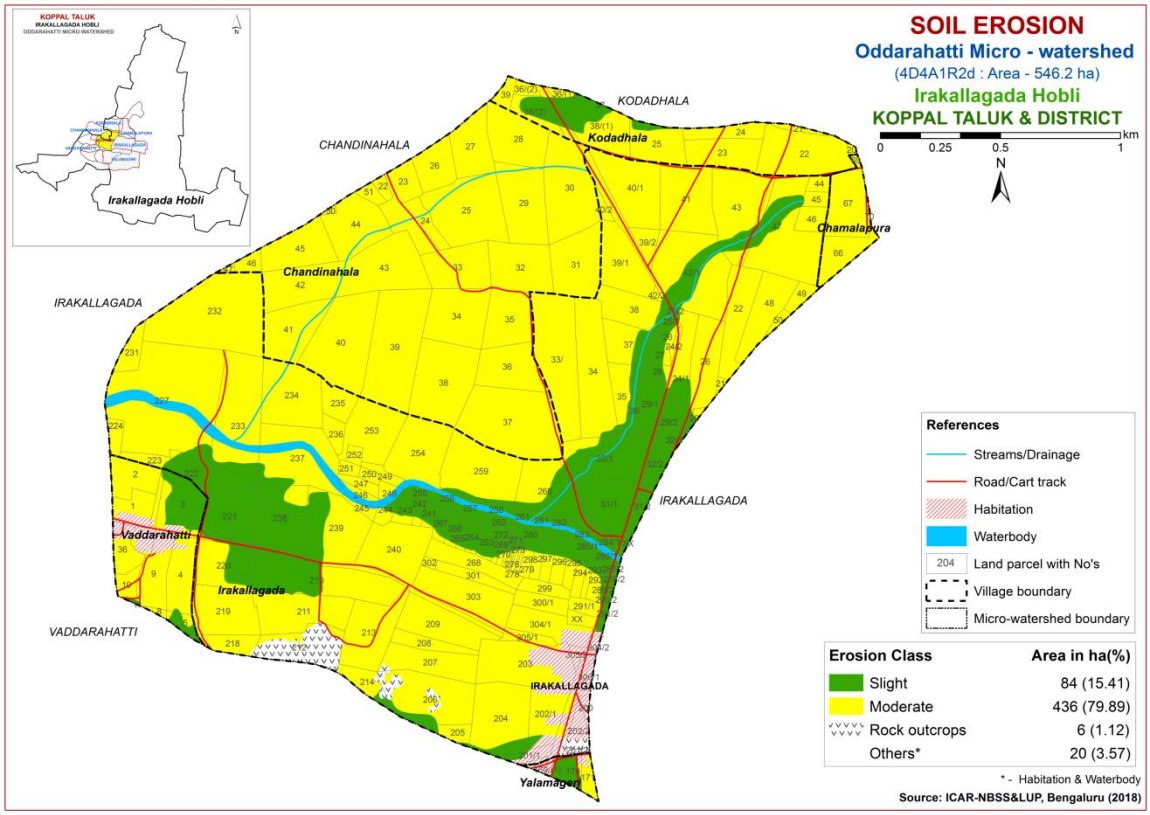


Fig. 5.7 Soil Erosion map of Oddarahatti Microwatershed

Chapter 6

FERTILITY STATUS

Soil fertility plays an important role in increasing crop yield. The adoption of high yielding varieties that require high amounts of nutrients has resulted in deficiency symptoms in crops and plants due to imbalanced fertilization and poor inherent fertility status, as these areas are characterised by low rainfall and high temperatures. Hence, it is necessary to know the fertility (macro and micro nutrients) status of the soils of the watersheds for assessing the kind and amount of fertilizers required for each of the crop intended to be grown. For this purpose, the surface soil samples collected from the grid points (one soil sample at every 320 m grid interval) all over the microwatershed through land resource inventory in the year 2018 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 by using the Kriging method under GIS. The village/survey number wise fertility data for the microwatershed is given in Appendix-II.

6.1 Soil Reaction (pH)

The soil analysis of the Oddarahatti Microwatershed for soil reaction (pH) showed that an area of 158 ha (29%) is moderately aicd (pH 5.5-6.0) and is distributed in the northern and eastern part of the microwatershed. Slightly acid (pH 6.0-6.5) soils occur in an area of 134 ha (25%) and is distributed in the central and southern part of the microwaterhsed. Maximum area of 228 ha (42%) is neutral (pH 6.5-7.3) and is distributed in the major part of the microwatershed. Thus, entire soils in the microwatershed are acid covering 292 ha (53%) and neutral 228 ha(42%).

6.2 Electrical Conductivity (EC)

The Electrical Conductivity of the soils is <2 dS m^{-1} in the entire microwatershed (Fig. 6.2) area and as such the soils are nonsaline.

6.3 Organic Carbon

The soil organic carbon content (an index of available Nitrogen) in the soils of the microwatershed is medium (0.5-0.75%) covering an area of 162 ha (30%) and is distributed in the northern and central part of the microwatershed. Maximum area of 359 ha (66%) is high (>0.75%) and is distributed in the major part of the microwatershed (Fig. 6.3).

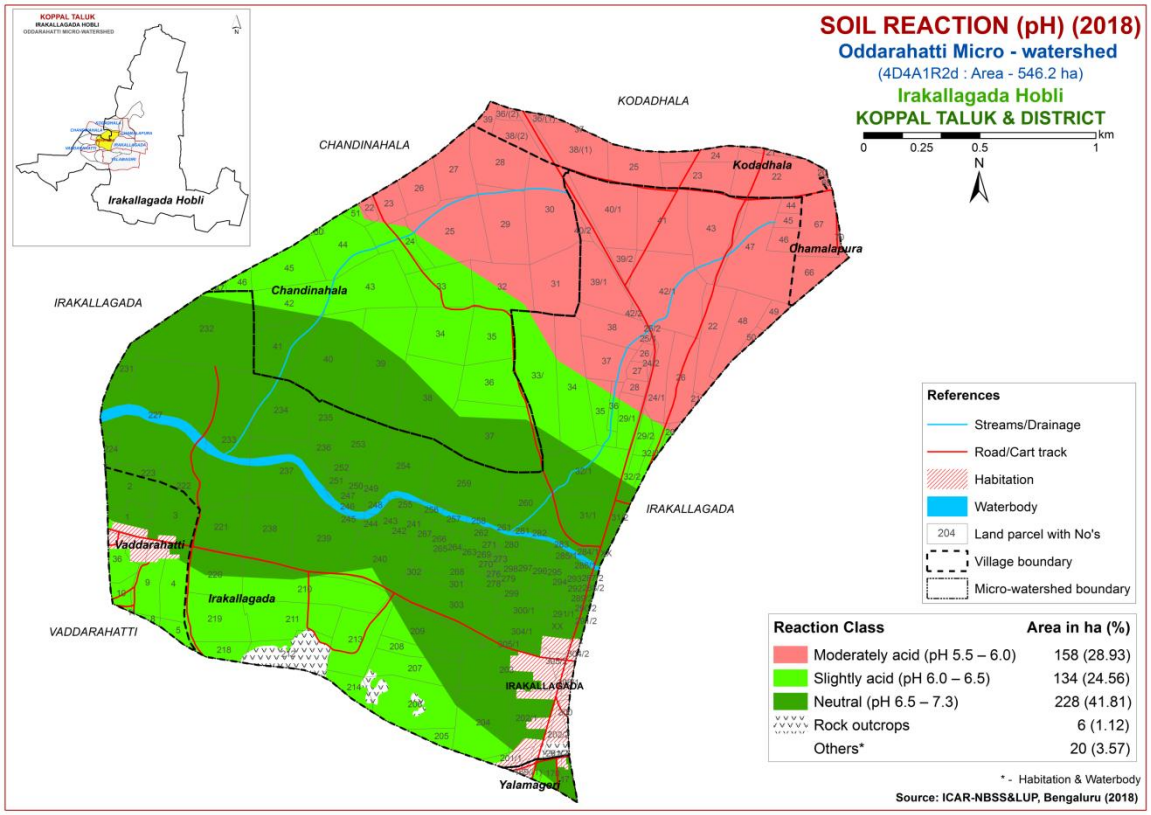


Fig. 6.1 Soil Reaction (pH) map of Oddarahatti Microwatershed

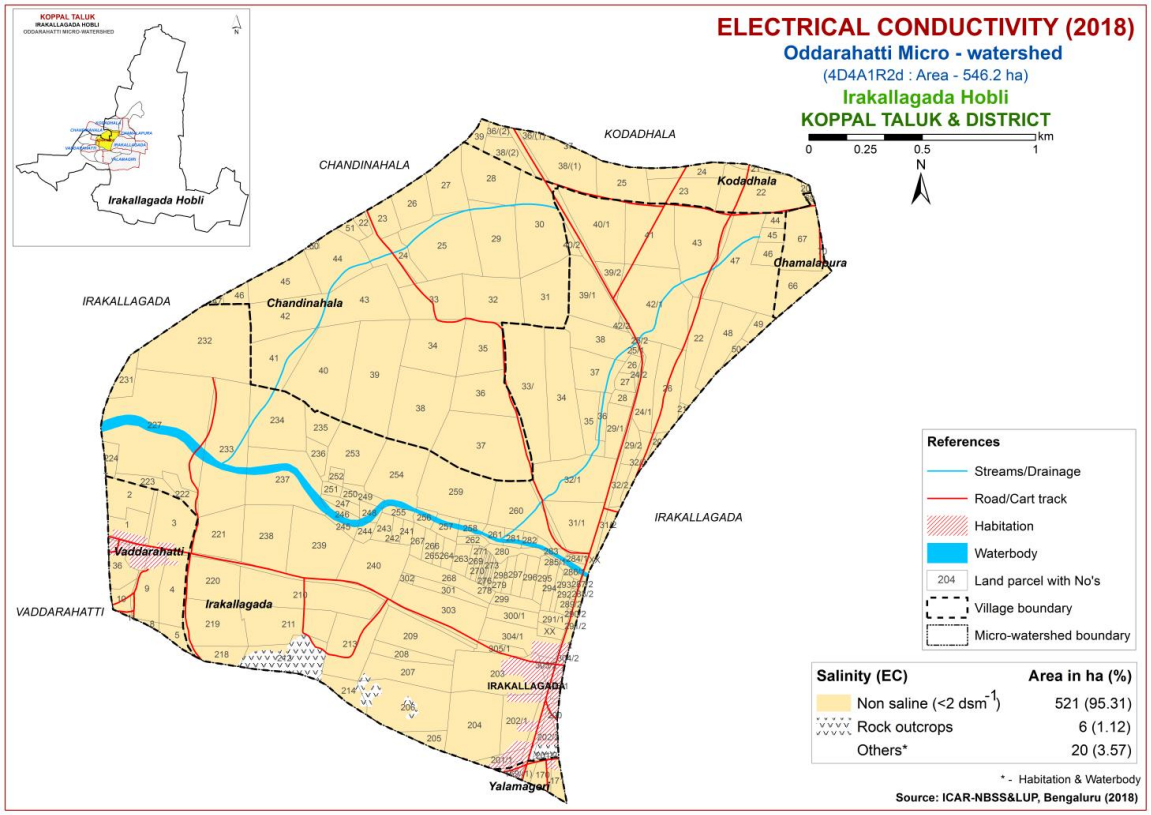


Fig. 6.2 Electrical Conductivity (EC) map of Oddarahatti Microwatershed

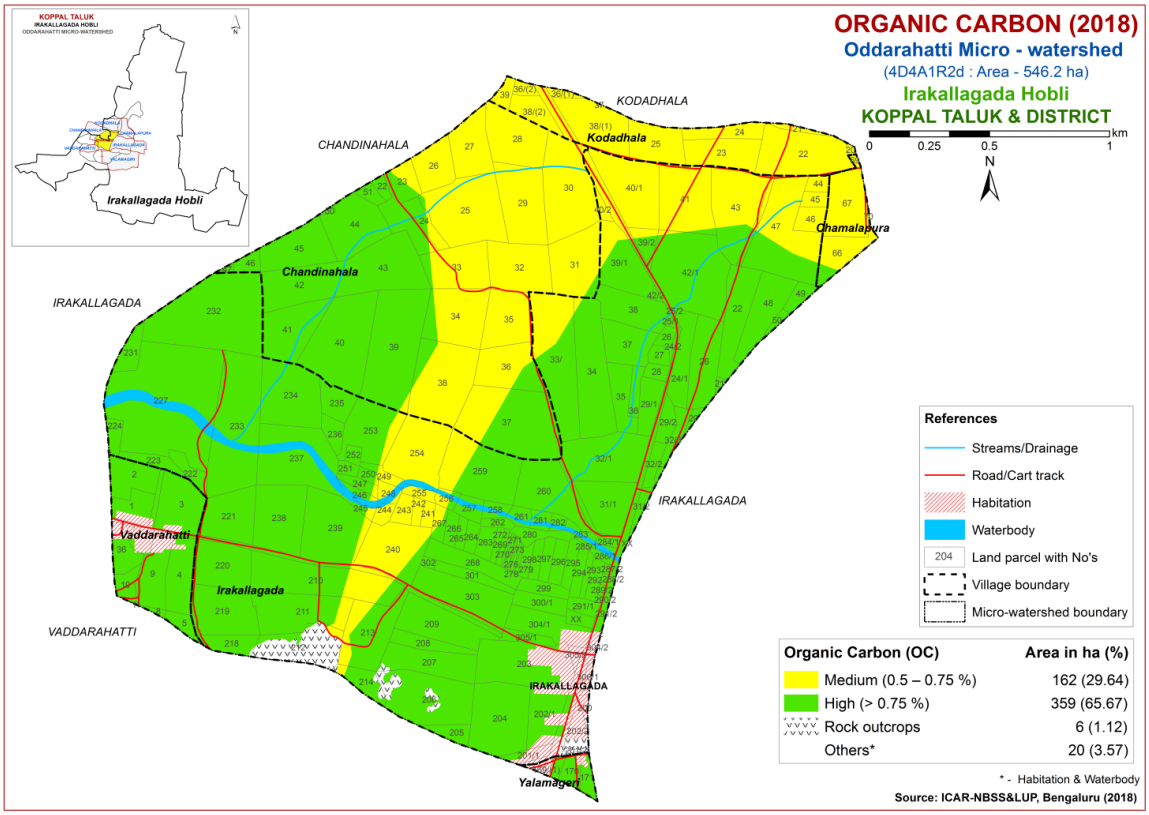


Fig. 6.3 Soil Organic Carbon map of Oddarahatti Microwatershed

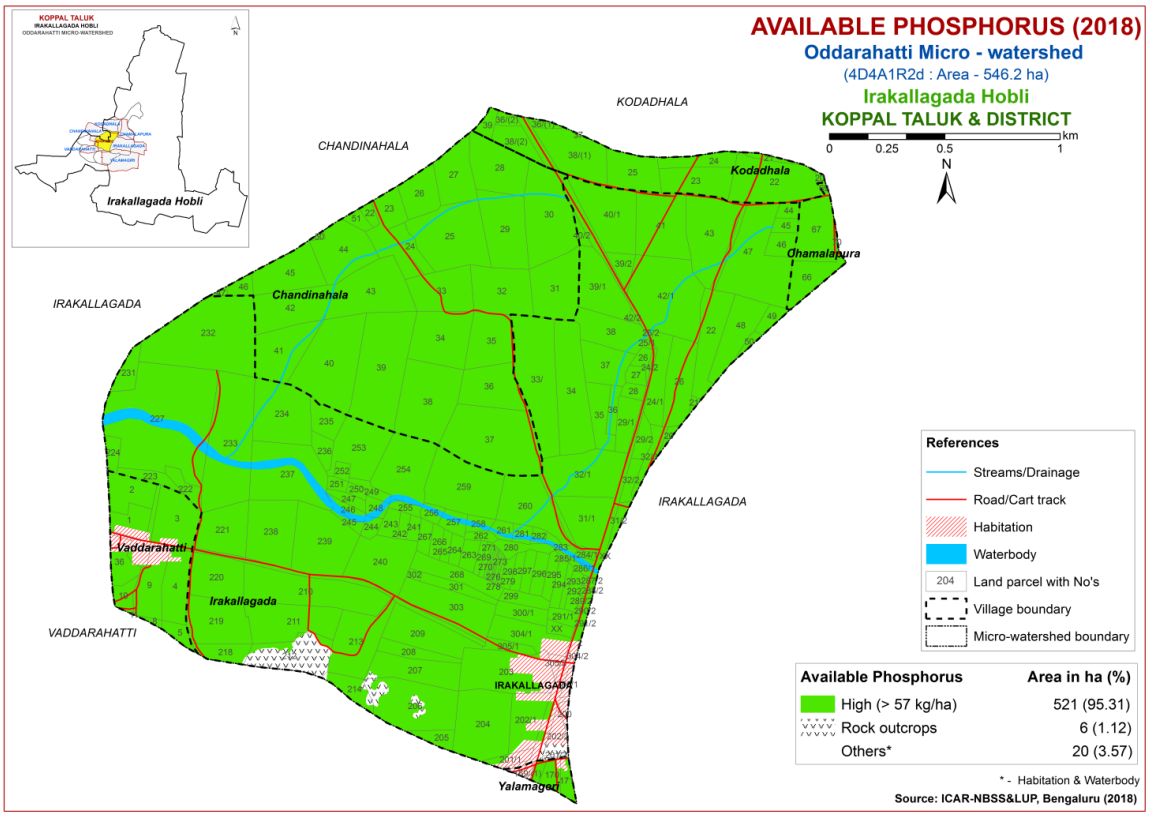


Fig. 6.4 Soil Available Phosphorus map of Oddarahatti Microwatershed

6.4 Available Phosphorus

Entire area of about 521 ha (95%) is high (>57 kg/ha) in available phosphorus and is distributed in the major part of the microwatershed (Fig. 6.4).

6.5 Available Potassium

Maximum area of 425 ha (78%) is medium (145-337 kg/ha) and is distributed in the major part of the microwatershed. An area of about 95 ha (17%) is high (>337 kg/ha) and is distributed in the western and southeastern part of the microwatershed (Fig. 6.5).

6.6 Available Sulphur

Soils that are low (>10 ppm) in available sulphur content occupy a maximum area of 265 ha (49%) and is distributed in the major part of the microwatershed. An area of 250 ha (46%) is medium (10-20 ppm) and is distributed in the northern, eastern, southern and western part of the microwatershed. High (>20 ppm) in available sulphur occur in an area of 5 ha (1%) and is distributed in the eastern part of the microwatershed (Fig. 6.6).

6.7 Available Boron

Available boron content is low (<0.5 ppm) in a maximum area of 487 ha (89%) and is distributed in the major part of the microwatershed. An area of about 34 ha (6%) is medium (0.5-1.0 ppm) in available boron and is distributed in the southeastern part of the microwatershed (Fig. 6.7).

6.8 Available Iron

Available iron content is sufficient (>4.5 ppm) in the entire area of the microwatershed (Fig. 6.8).

6.9 Available Manganese

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

6.10 Available Copper

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

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in an area of 138 ha (25%) and is distributed in the eastern and southern part of the microwatershed. Maximum area of 382 ha (70%) is sufficient (>0.6 ppm) and is distributed in the major part of the microwatershed (Fig. 6.11).

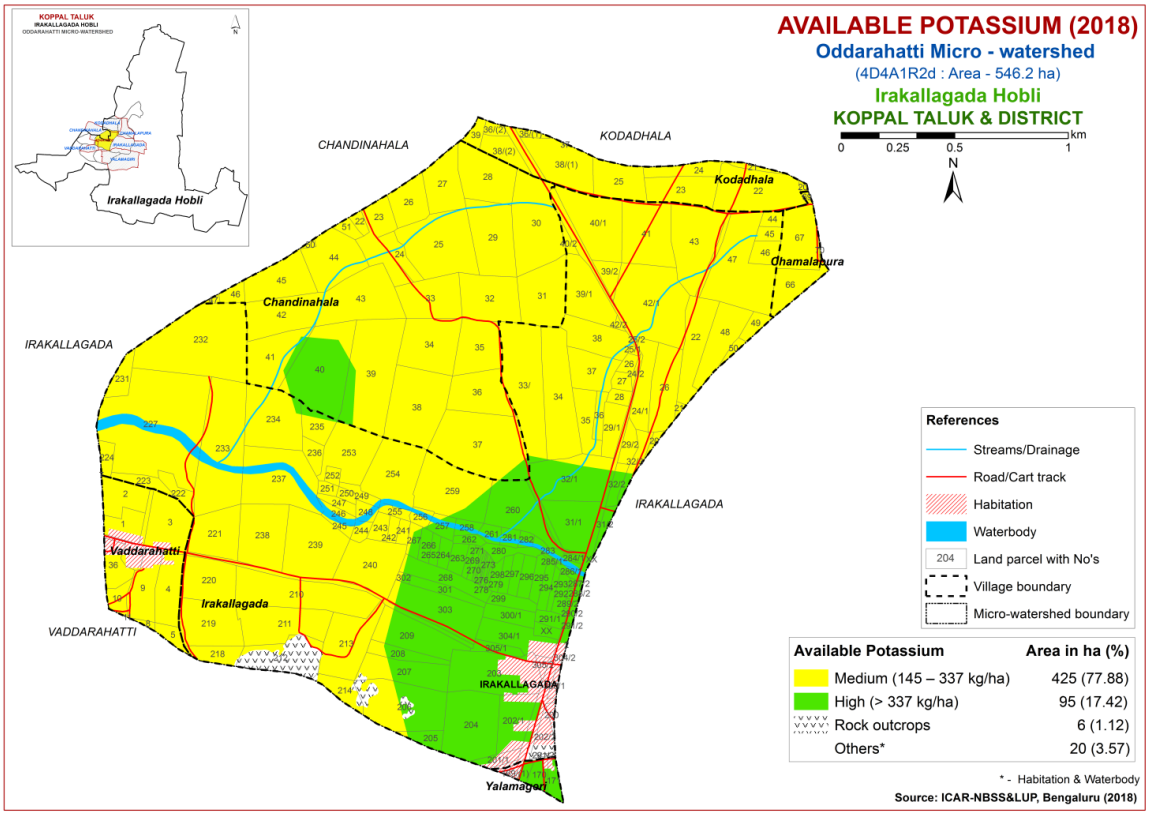


Fig. 6.5 Soil Available Potassium map of Oddarahatti Microwatershed

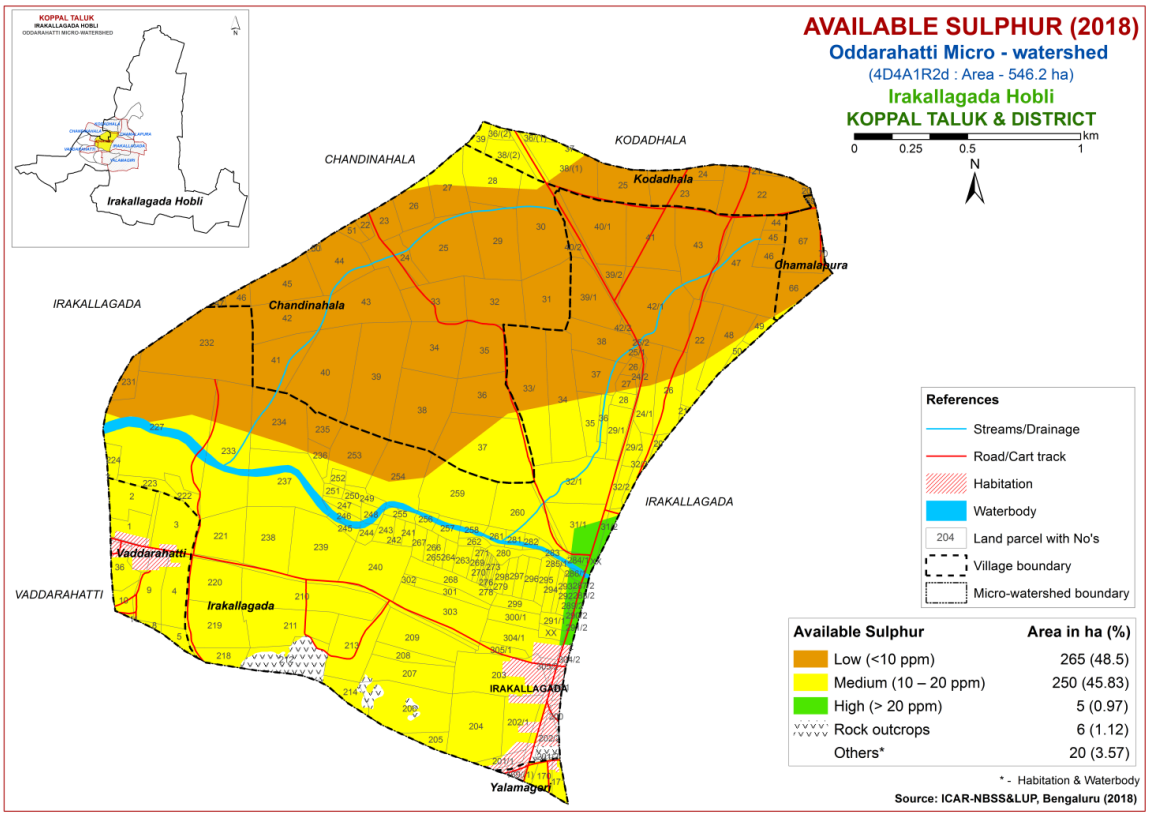


Fig. 6.6 Soil Available Sulphur map of Oddarahatti Microwatershed

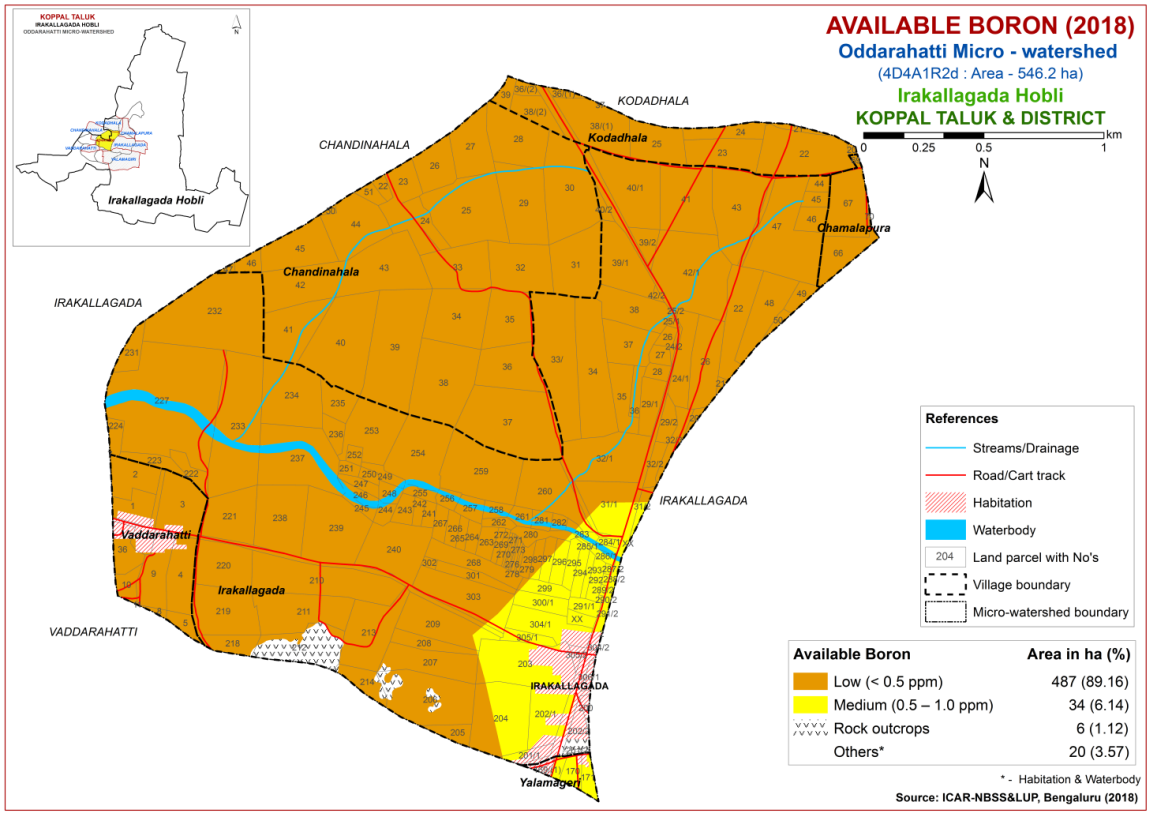


Fig. 6.7 Soil Available Boron map of Oddarahatti Microwatershed

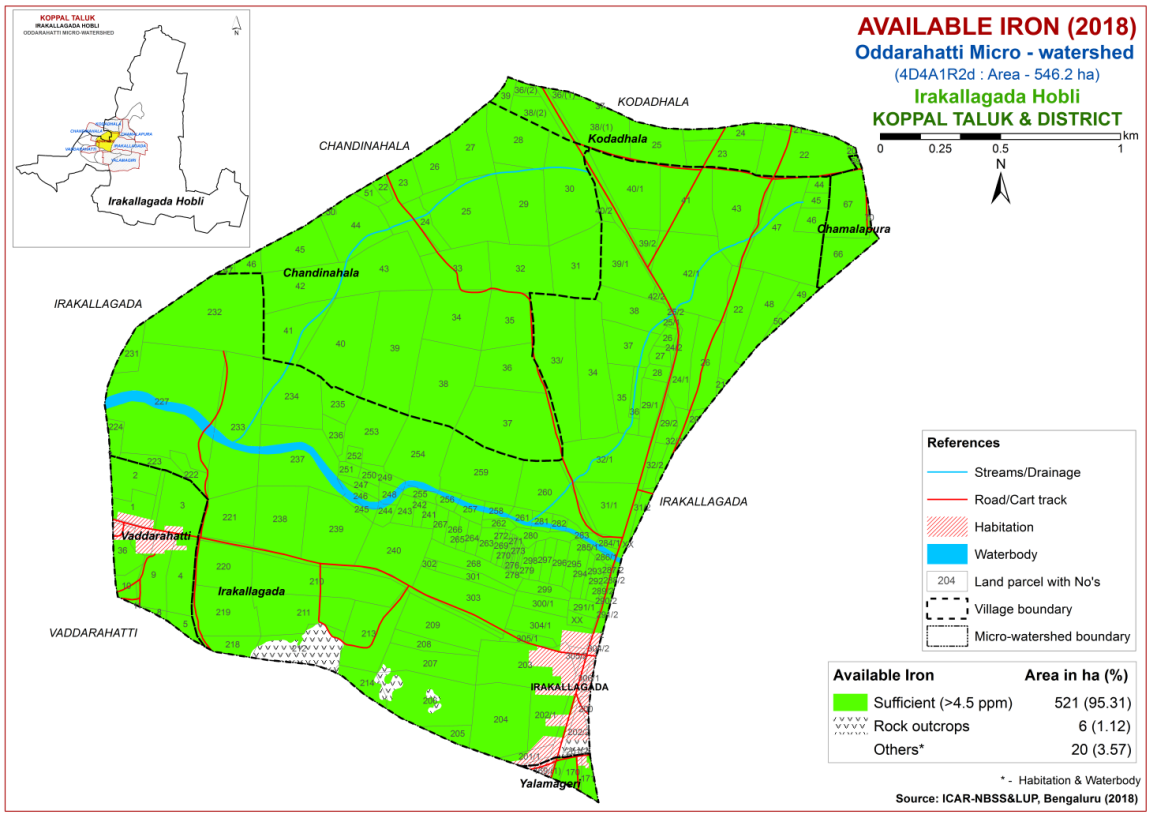


Fig. 6.8 Soil Available Iron map of Oddarahatti Microwatershed

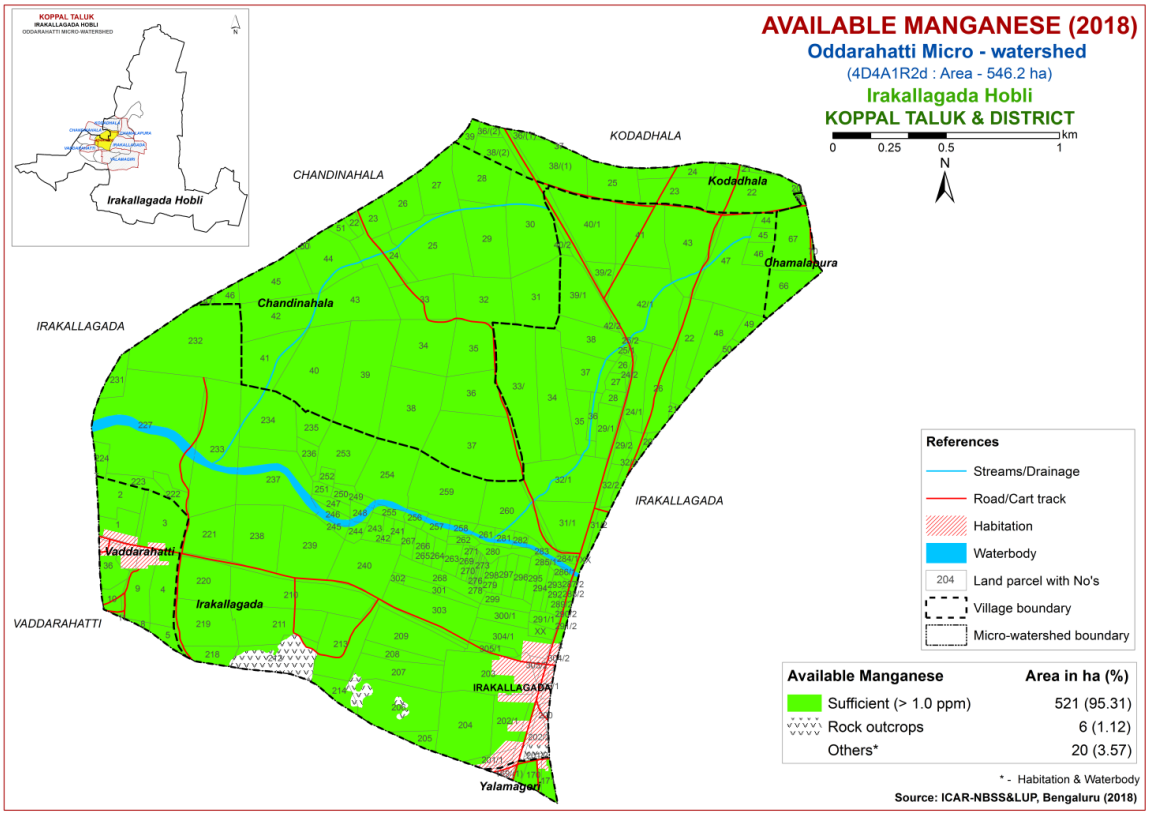


Fig. 6.9 Soil Available Manganese map of Oddarahatti Microwatershed

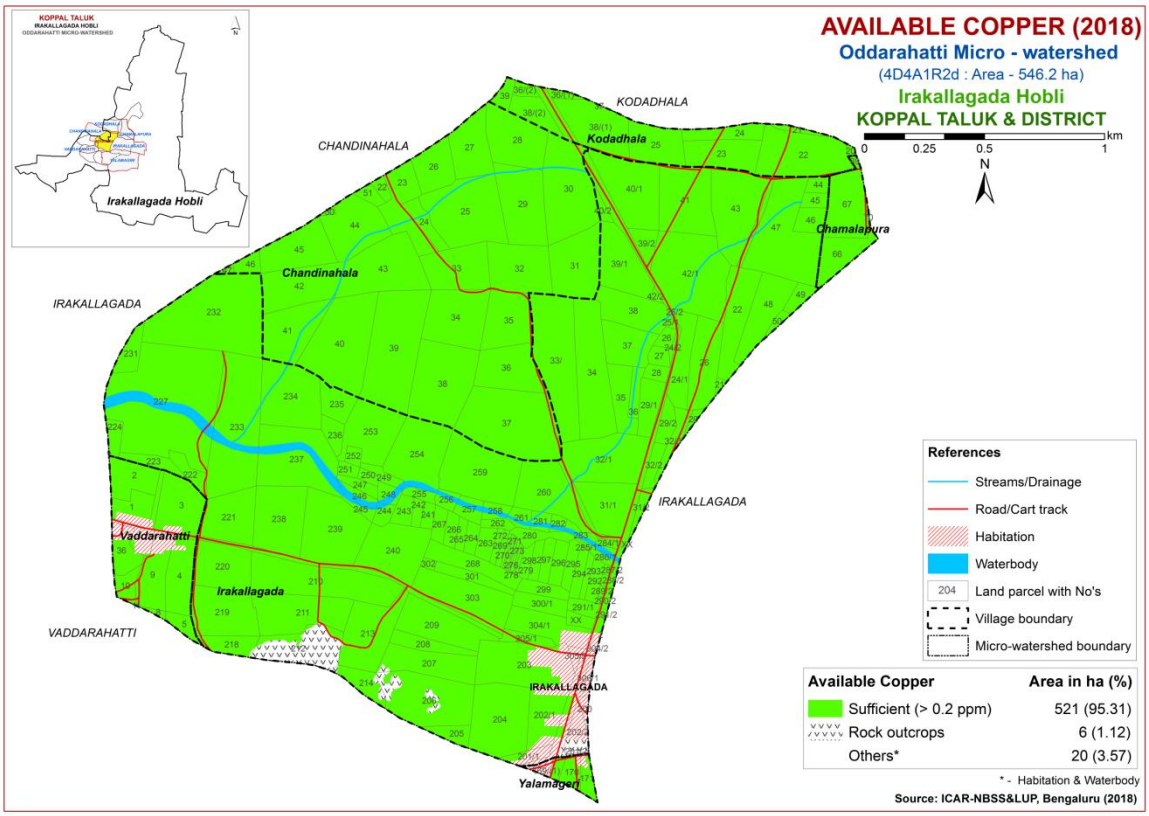


Fig. 6.10 Soil Available Copper map of Oddarahatti Microwatershed

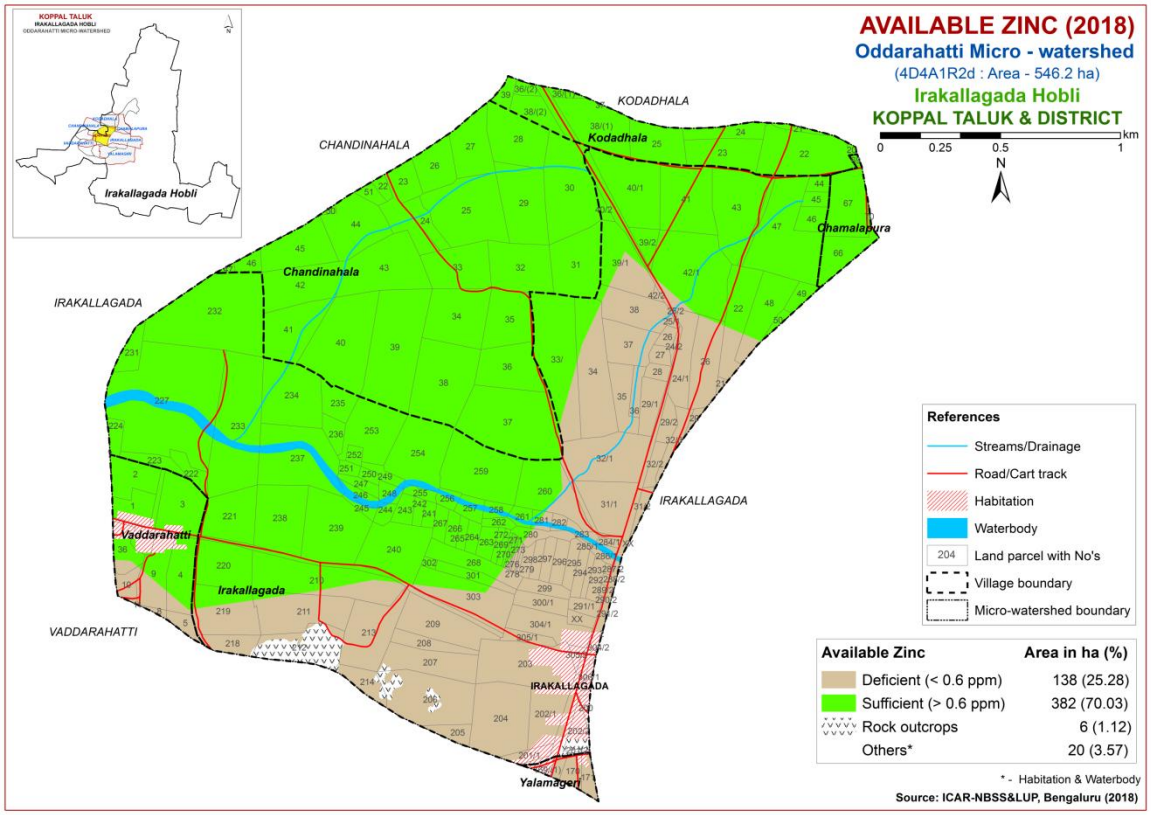


Fig. 6.11 Soil Available Zinc map of Oddarahatti Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Oddarahatti 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 (Table 7.2 to 7.33) were matched with the soil and land characteristics (Table 7.1) to arrive at the crop suitability. The criteria tables are given at the end of the Chapter. In FAO land suitability classification, two orders are recognized. Order S-Suitable and Order N- Not suitable. The orders have classes, subclasses and units. Order-S has three classes, Class S1-Highly Suitable, Class S2-Moderately Suitable and Class S3-Marginally Suitable. Order N has two Classes, N1-Currently not Suitable and N2-Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2, S3, N1 and N2 are divided into subclasses based on the kinds of limitations encountered. The limitations that affect crop production are 'c' for erratic rainfall and its distribution and length of growing period (LGP), 'e' for erosion hazard, 'r' for rooting condition, 't' for lighter or heavy texture, 'g' for gravelliness or stoniness, 'n' for nutrient availability, 'l' for topography, 'm' for moisture availability, 'z' for calcareousness 's' for sodium and 'w' for drainage. These limitations are indicated as lower case letters to the class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

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

7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

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

An area of 53 ha (10%) is highly suitable (Class S1) for growing sorghum and are distributed in the western, southern, eastern, northern part of the microwatershed. An area of 200 ha (37%) is moderately suitable (Class S2) and are distributed in the northern, eastern, central and southwestern part of the microwatershed. They have minor

limitations of gravelliness, calcareousness, nutrient availability, texture and rooting condition. Marginally suitable (Class S3) lands occur in a maximum area of 267 ha (49%) and are distributed in the major part of the microwatershed. They have moderate limitations gravelliness and rooting condition.

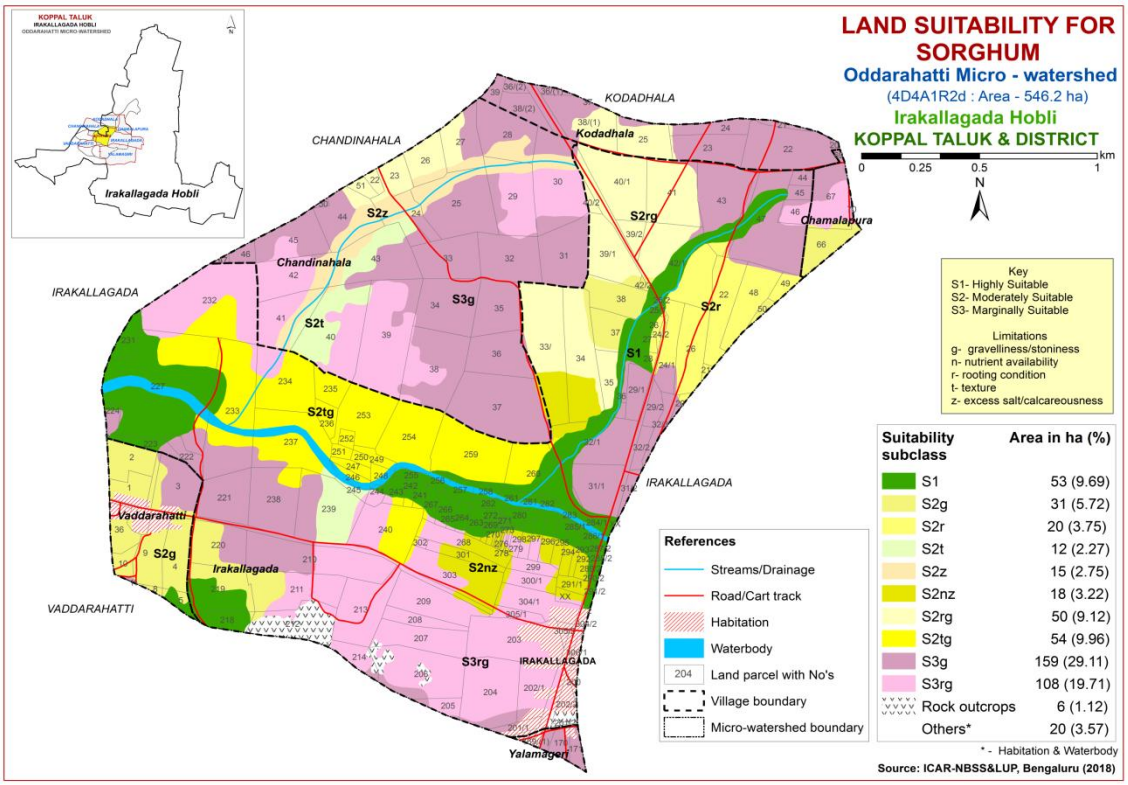


Fig. 7.1 Land Suitability map of Sorghum

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.

An area of 37 ha (7%) is highly suitable (Class S1) and are distributed in the southern and northern and eastern part of the microwatershed. An area of 217 ha (40%) is moderately suitable (Class S2) and are distributed in the northern, eastern, central and southwest part of the microwatershed with minor limitations of calcareousness, rooting condition, gravelliness and texture. Marginally suitable (Class S3) lands occur in a maximum area of 267 ha (49%) and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness and rooting depth.

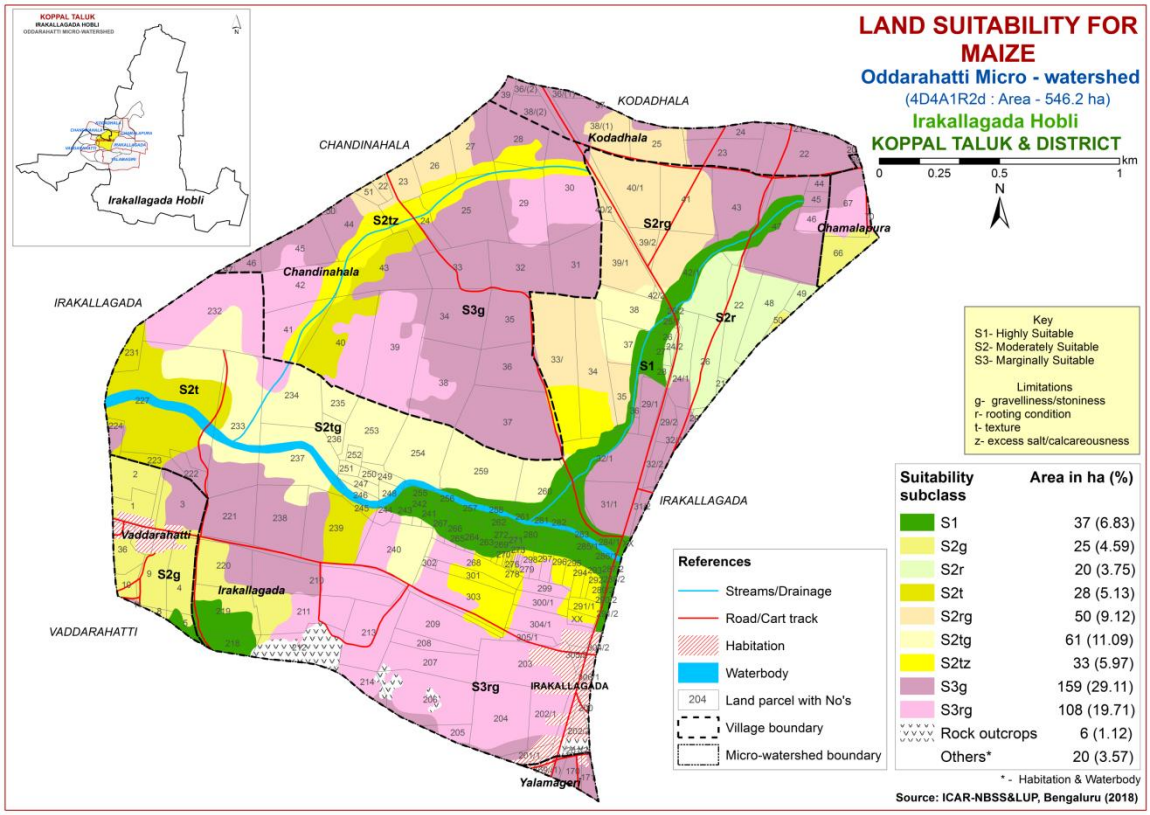


Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

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

An area of 122 ha (22%) is highly suitable (Class S1) and eastern, central and southern part of the microwatershed. Maximum area of 300 ha (55%) is moderately suitable (Class S2) and are distributed in the major part of the microwatershed with minor limitations of texture, rooting condition, calcareousness and gravelliness. Marginally suitable (Class S3) lands cover an area of 98 ha (18%) and are distributed in the northern, eastern, southern and western part of the microwatershed. They have moderate limitation of gravelliness.

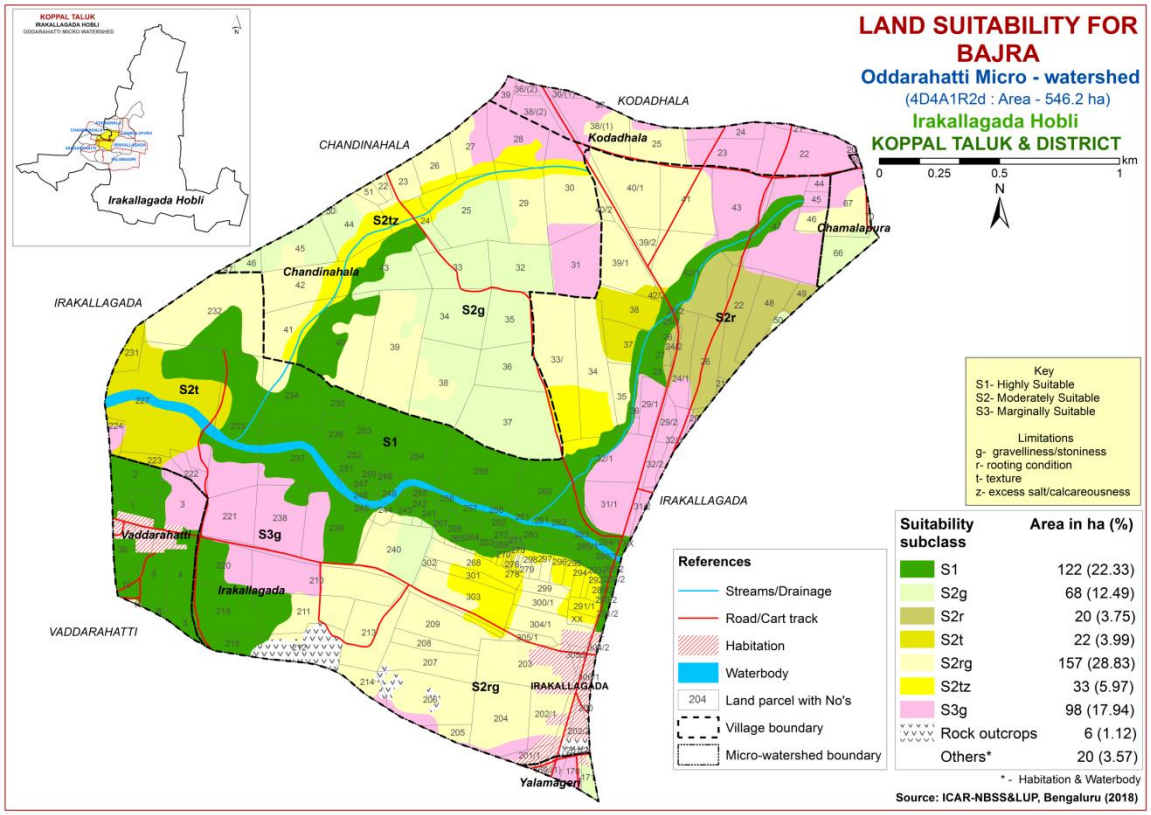


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

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

An area of 22 ha (4%) is highly suitable (Class S1) and are distributed in the western part of the microwatershed. Maximum area of 323 ha (59%) is moderately suitable (Class S2) and are distributed in the major part of the microwatershed. They have minor limitations of gravelliness, texture, drainage and rooting condition. An area of 177 ha (32%) is marginally suitable (Class S3) and are distributed in the northern, eastern, western and southern part of the microwatershed. They have moderate limitations of calcareousness, gravelliness, rooting condition and texture.

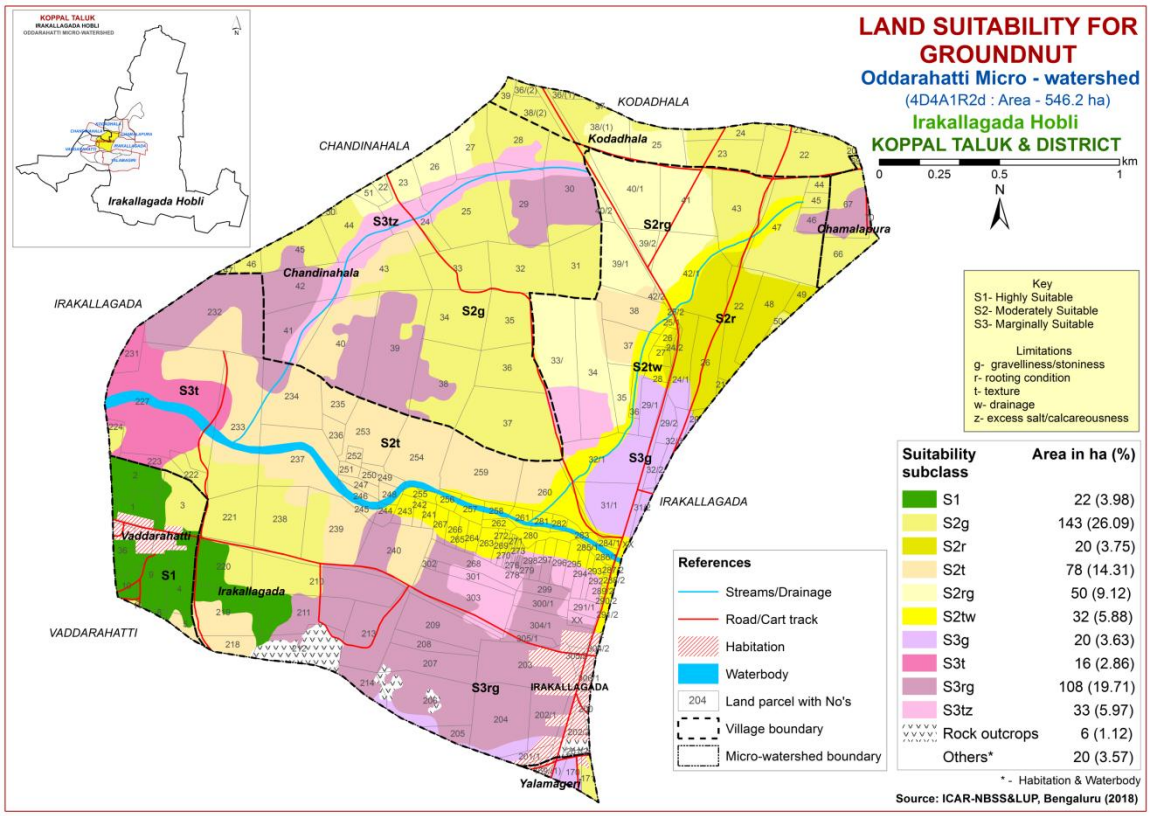


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annus*)

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

An area of 28 ha (5%) is highly suitable (Class S1) for growing sunflower and are distributed in the western and central part of the microwatershed. An area of 156 ha (28%) is moderately suitable (Class S2) and are distributed in the northeastern, central, eastern and southwestern part of the microwatershed. They have minor limitations of calcareousness, drainage and rooting condition. Maximum area of 336 ha (62%) is marginally suitable (Class S3) for growing sunflower and are distributed in the major part of the microwatershed with moderate limitations of rooting condition and gravelliness.

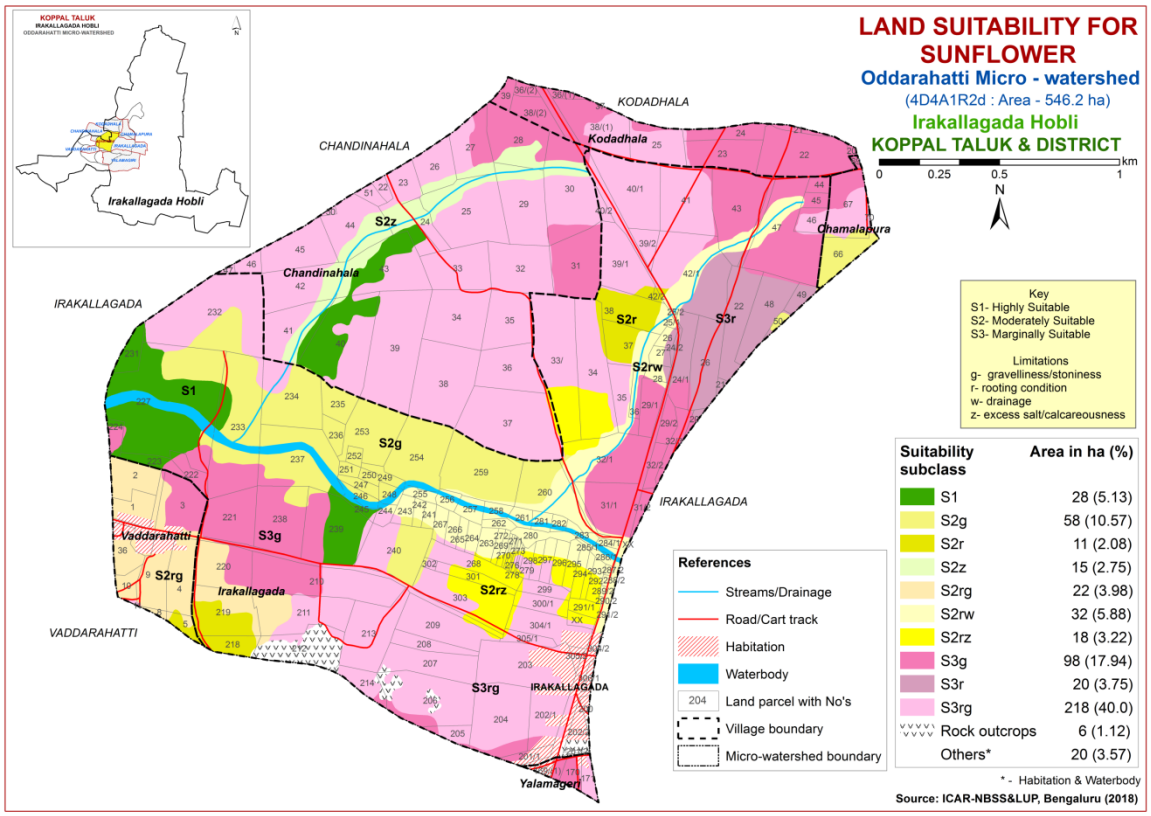


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land Suitability 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 redgram (Table 7.7) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing redgram was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.6.

An area of 12 ha (2%) highly suitable (Class S1) for growing red gram and are distributed in the central part of the microwatershed. Moderately suitable (Class S2) lands occupy an area of 154 ha (28%) and are distributed in the eastern, central and southwestern part of the microwatershed with minor limitations of texture, rooting condition, gravelliness, drainage and calcareousness. Marginally suitable (Class S3) lands cover a maximum area of 354 ha (65%) and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness, calcareousness and rooting condition.

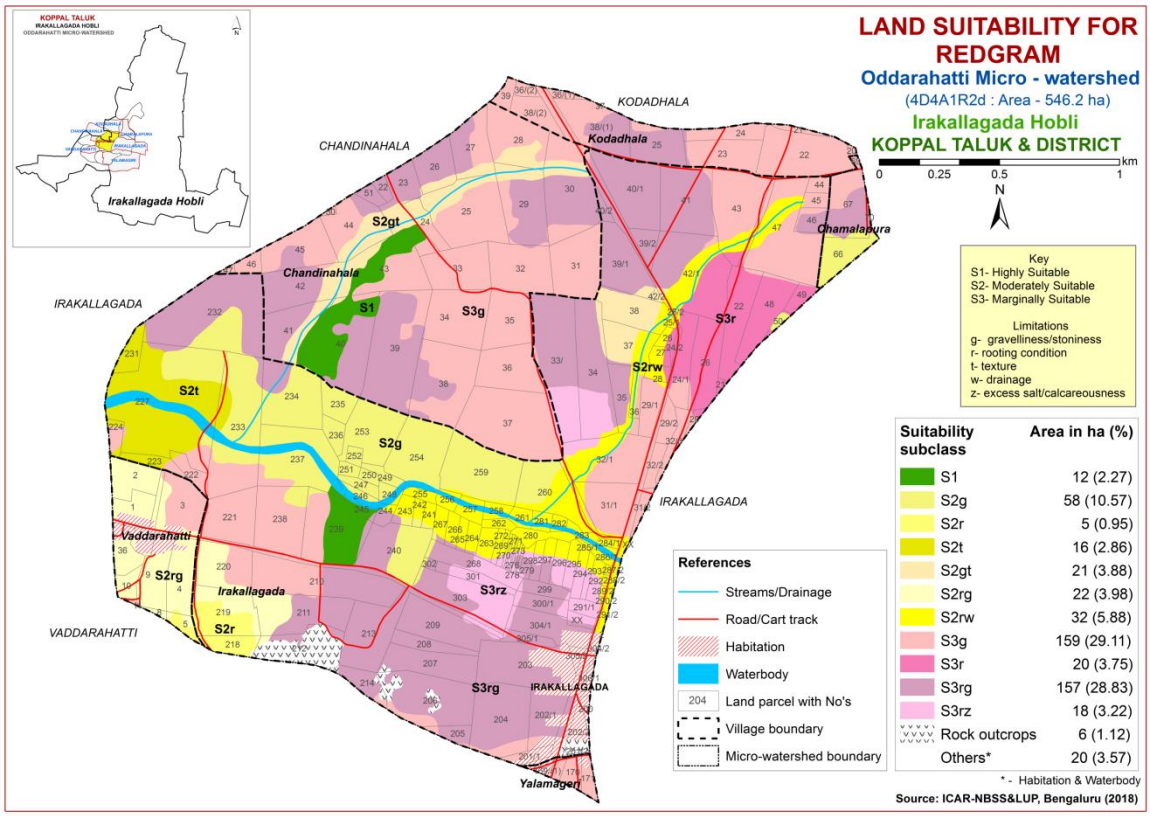


Fig. 7.6 Land Suitability map of Redgram

7.7 Land Suitability for Bengalgram (*Cicer arietinum*)

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

An area of 48 ha (9%) is highly suitable (Class S1) for growing bengalgram and are distributed in the western. eastern part of the microwatershed. Moderately suitable lands (Class S2) occupy a maximum area of 294 ha (54%) and are distributed in the major part of the microwatershed with minor limitations of calcareousness, texture, gravelliness and rooting condition. An area of 179 ha (33%) is marginally suitable (Class S3) and are distributed in the northern, eastern, central, southern and western part of the microwatershed. They have moderate limitations of gravelliness and texture.

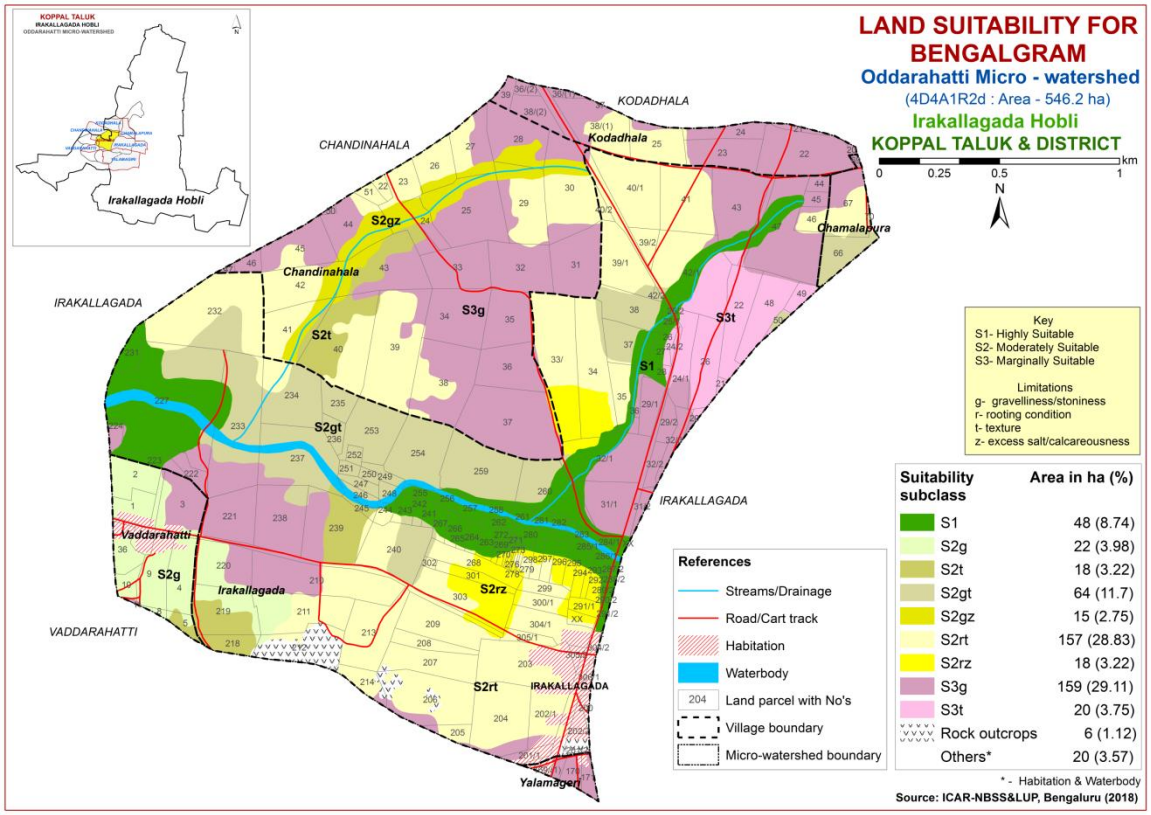


Fig. 7.7 Land Suitability map of Bengalgram

7.8 Land Suitability for Cotton (*Gossypium hirsutum*)

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

An area of 28 ha (5%) is highly suitable (Class S1) for growing cotton and are distributed in the central and western part of the microwatershed. Moderately suitable (Class S2) lands occupy an area of 225 ha (41%) and are distributed in the northern, eastern, central, western and southwestern part of the microwatershed. They have minor limitations of rooting condition, gravelliness, texture, drainage and calcareousness. Marginally suitable (Class S3) lands occur in a maximum area of 267 ha (49%) for growing cotton and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness and rooting condition.

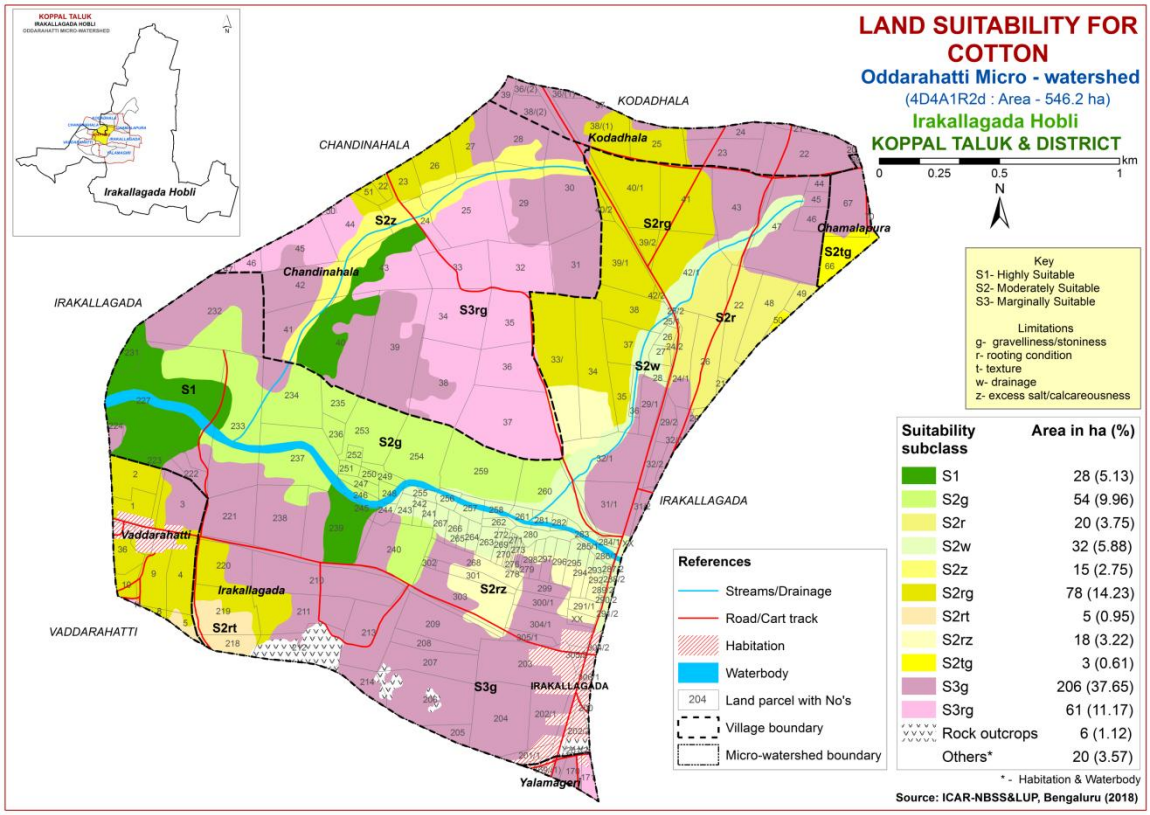


Fig. 7.8 Land Suitability map of Cotton

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

Chilli is one of the most important commercial spice crop grown in an area of 0.89 lakh ha in all the districts of Karnataka State. The crop requirements for growing chilli (Table 7.10) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing chilli was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.9.

An area of 18 ha (3%) is highly (Class S1) for growing chilli and are distributed in the central and southern part the microwatershed. Moderately suitable (Class S2) lands occur in an area of 187 ha (34%) and are distributed in the northern, eastern, central, southwestern and western part of the microwatershed. They have minor limitations of rooting condition, texture, drainage and gravelliness. Maximum area of 316 ha (58%) is marginally suitable (Class S3) and are distributed in the major part of the microwatershed. They have moderate limitations of texture, gravelliness and calcareousness.

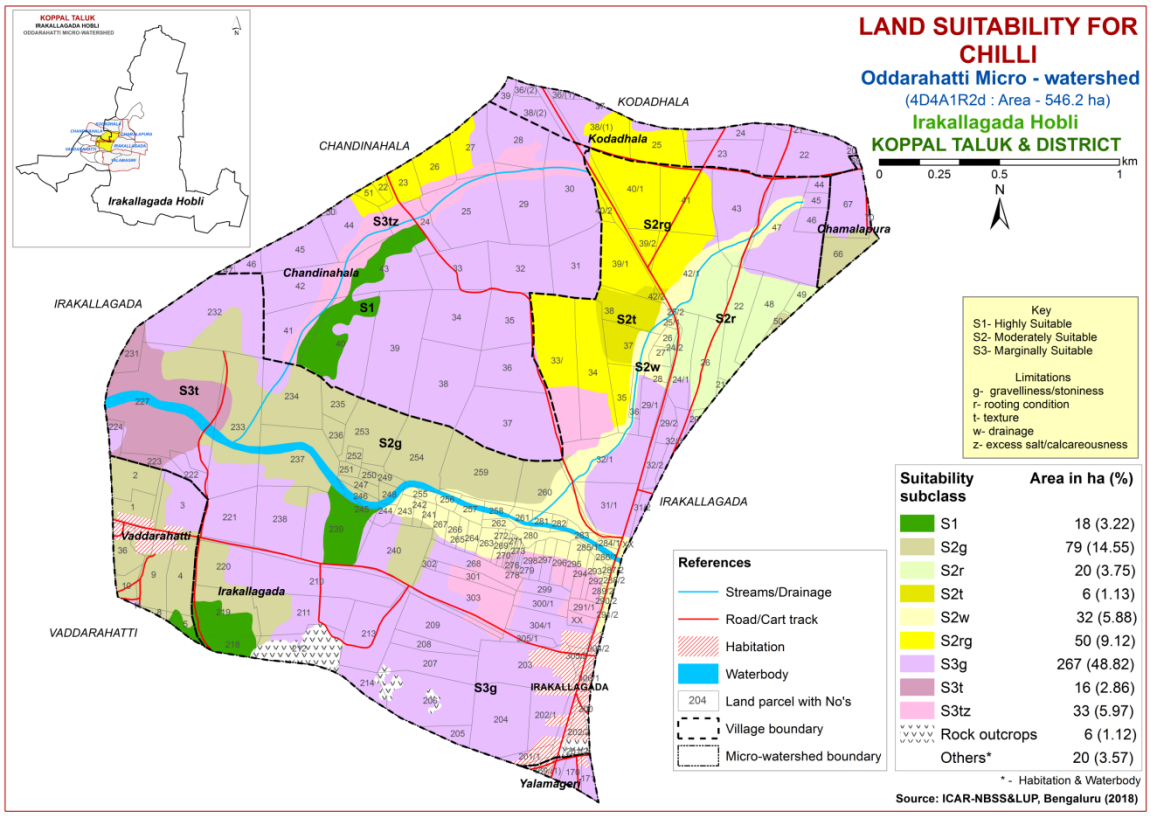


Fig. 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Solanum lycopersicum*)

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

An area of 50 ha (9%) is highly (Class S1) suitable for growing tomato and are distributed in the central, eastern and western part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 155 ha (29%) and are distributed in the northern, eastern, central, western and southern part of the microwatershed with minor limitations of rooting condition, texture and gravelliness. Marginally suitable (Class S3) lands occupy a maximum area of 316 ha (58%) and are distributed in the major part of the microwatershed with moderate limitations of texture, gravelliness and calcareousness.

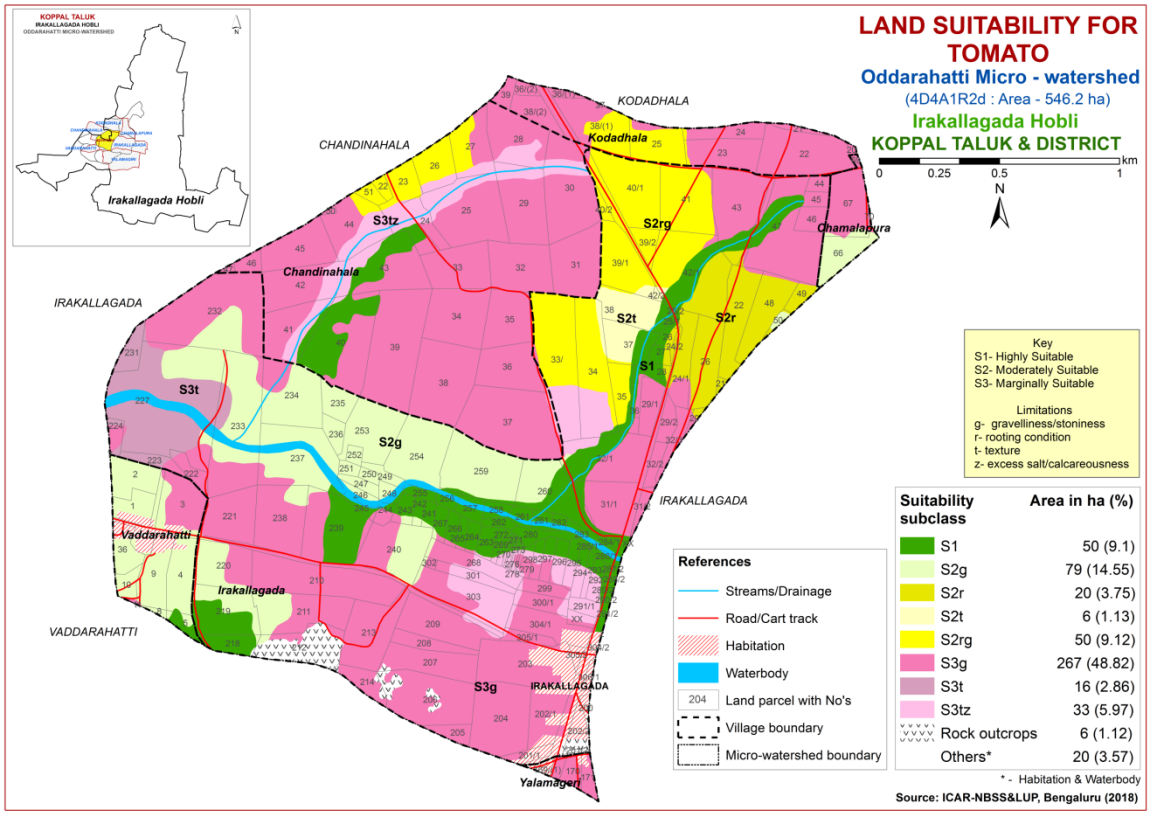


Fig. 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Brinjal (*Solanum melongena*)

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

An area of 87 ha (16%) is highly suitable (Class S1) for growing brinjal and are distributed in the northeastern, central and southwestern part of the microwatershed. An area of about 215 ha (39%) is moderately suitable (Class S2) and are distributed in the northern, eastern, western, southern and central part of the microwatershed with minor limitations of texture, drainage, rooting condition, gravelliness and calcareousness. Marginally suitable lands (Class S3) occur in a maximum area of 218 ha (40%) and are distributed in the major part of the microwatershed with moderate limitation of gravelliness.

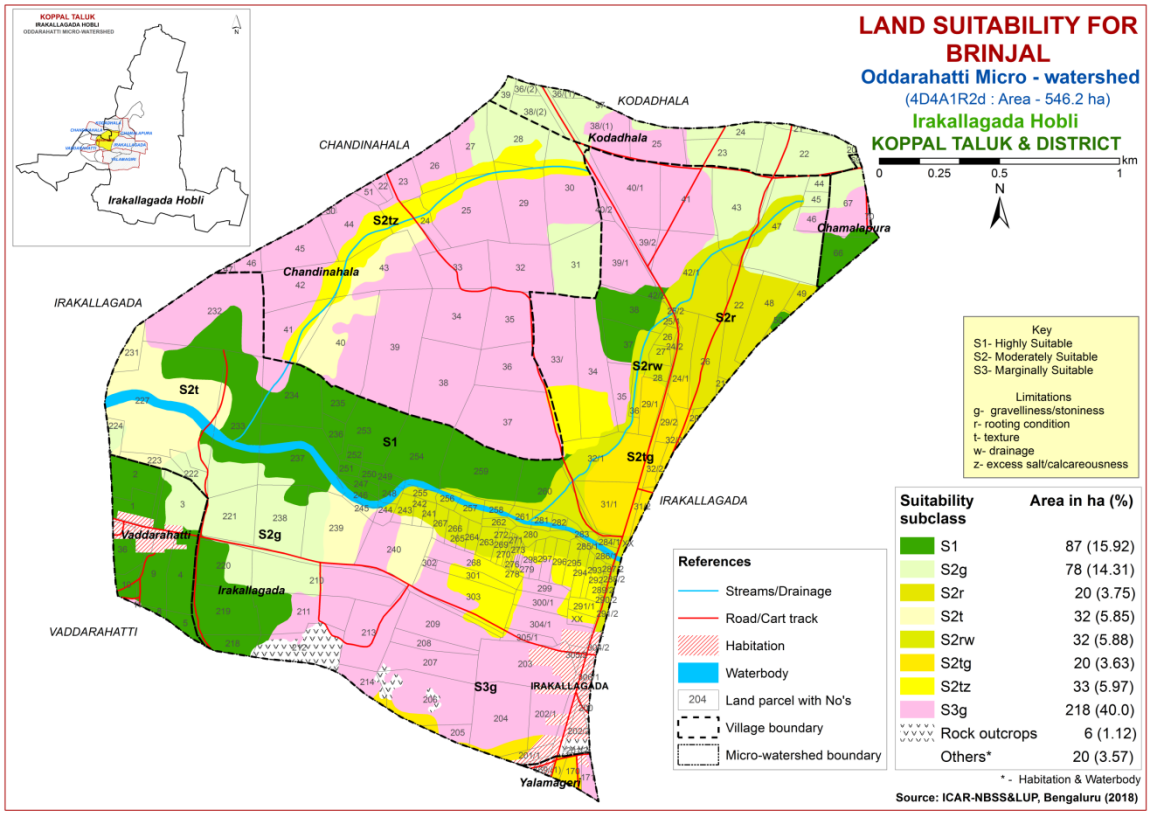


Fig. 7.11 Land Suitability map of Brinjal

7.12 Land Suitability for Onion (*Allium cepa*)

Onion is one of the most important vegetable crop grown in Raichur, Dharwad, Belgaum, Gulbarga, Bijapur, Bidar, Bellary, Chitradurga and Tumakuru districts. The crop requirements for growing onion (Table 7.13) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing Onion was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.12.

An area of 22 ha (4%) is highly (Class S1) and are distributed in the southwestern part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 232 ha (42%) and are distributed in the northern, eastern, central, western and southern part of the microwatershed with minor limitations of gravelliness, texture, rooting condition, and drainage. Marginally suitable lands (Class S3) occupy a maximum area of 267 ha (49%) and are distributed in the major part of the microwatershed with moderate limitations of gravelliness, calcareousness and texture.

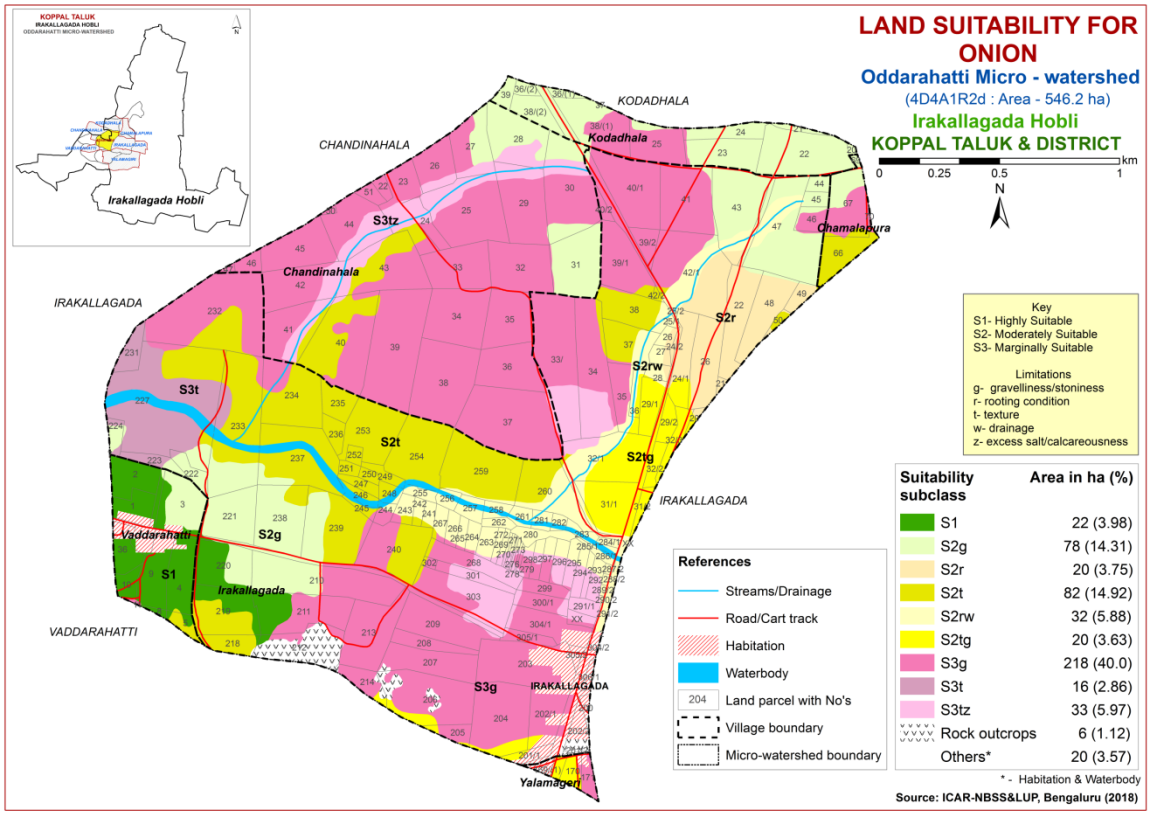


Fig. 7.12 Land Suitability map of Onion

7.13 Land Suitability for Bhendi (*Abelmoschus esculentus*)

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

An area of 22 ha (4%) is highly suitable (Class S1) for growing bhendi and are distributed in the southwestern part of the microwatershed. Maximum area of 280 ha (51%) is moderately suitable (Class S2) and are distributed in the major part of the microwatershed with minor limitations of texture, gravelliness, rooting condition, drainage and calcareousness. Marginally suitable lands (Class S3) occur in an area of 218 ha (40%) and are distributed in the northern, eastern, central, western and southern part of the microwatershed with moderate limitation of gravelliness.

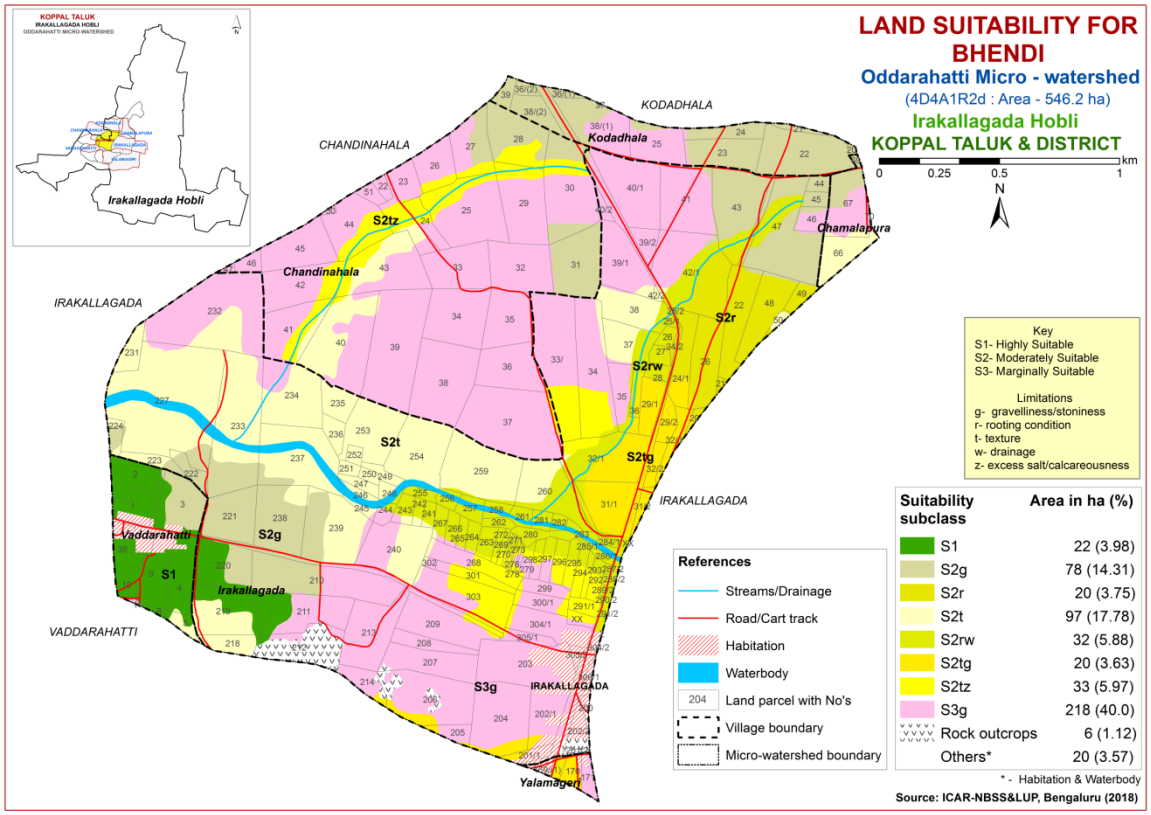


Fig. 7.13 Land Suitability map of Bhendi

7.14 Land Suitability for Drumstick (*Moringa oleifera)*

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

An area of 70 ha (13%) is highly suitable (Class S1) for growing drumstick and are distributed in the northeastern and central part of the microwaterhsed. An area of 192 ha (35%) is moderately suitable (Class S2) and are distributed in the northern, eastern, western and southern part of the microwatershed. They have minor limitations of texture, rooting condition, gravelliness, drainage and calcareousness. Marginally suitable (Class S3) lands cover a maximum area of 258 ha (47%) and are distributed in the major part of the microwatershed. They have moderate limitations of gravelliness and rooting condition.

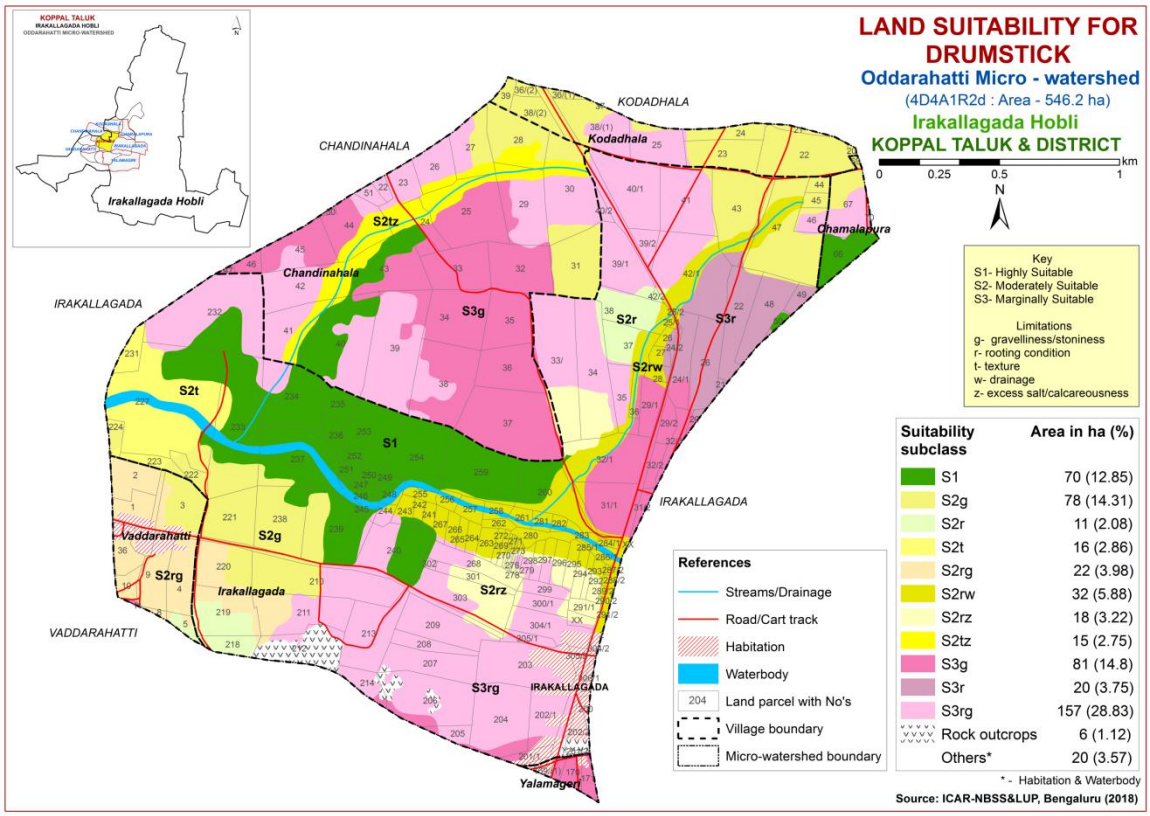


Fig. 7.14 Land Suitability map of Drumstick

7.15 Land Suitability for Mango (*Mangifera indica*)

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

There are no highly (Class S1) suitable lands for growing mango in the microwaterhsed. Moderately suitable (Class S2) lands occupy an area of 85 ha (16%) and are distributed in the central part of the microwatershed. They have minor limitations of calcareousness, gravelliness and rooting condition. Marginally suitable (Class S3) lands cover a maximum area of 258 ha (47%) and are distributed in the major part of the microwatershed. They have moderate limitations of texture, rooting condition, gravelliness, drainage and calcareousness. An area of 178 ha (33%) is currently not suitable (Class N1) for growing mango and occur in the northern, western, southern and eastern part of the microwatershed with severe limitations of gravelliness and rooting condition.

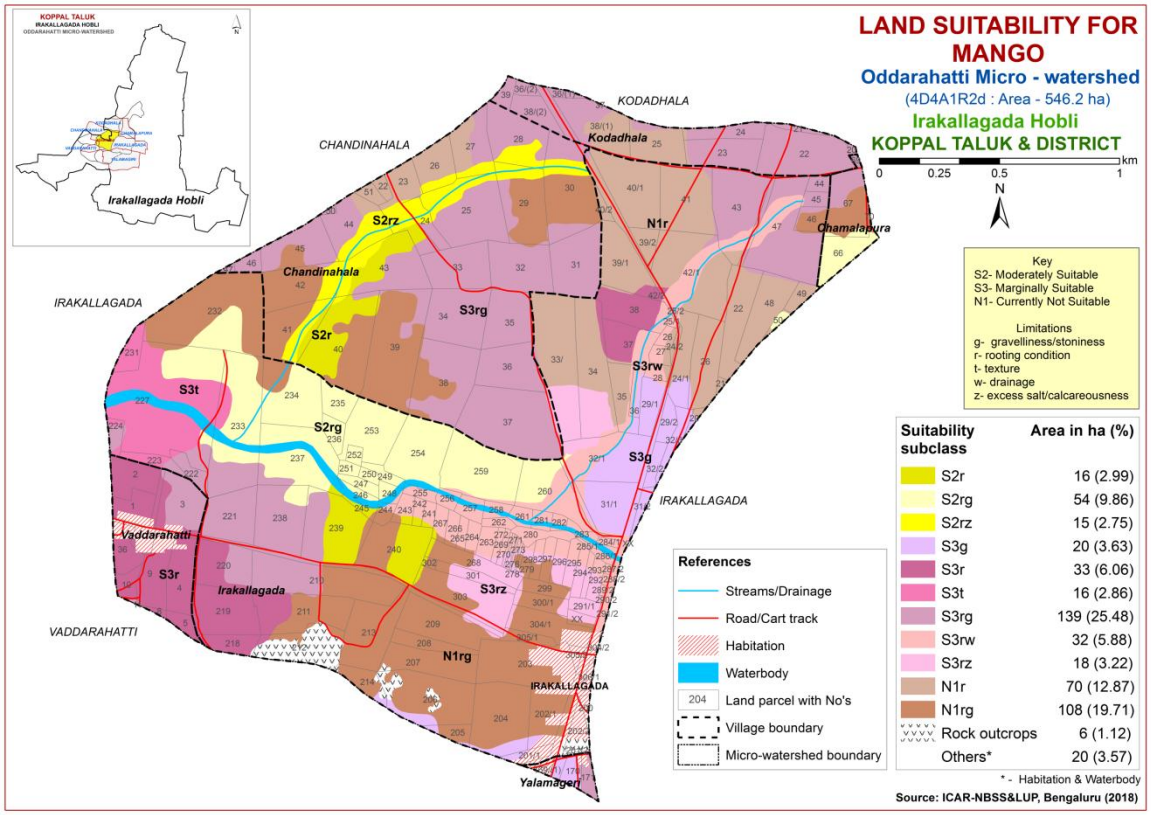


Fig. 7.15 Land Suitability map of Mango

7.16 Land suitability for Guava (*Psidium guajava*)

Guava is one of the most important fruit crop grown in an area of about 0.64 lakh ha in almost all the districts of the State. The crop requirements (Table 7.17) for growing guava were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing guava was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.16.

There are no highly (Class S1) suitable lands for growing guava in the microwatershed. Moderately suitable (Class S2) lands occur in an area of 195 ha (36%) and are distributed in the central, northeastern, southern, eastern and western part of the microwatershed. They have minor limitations of gravelliness, rooting condition, texture and drainage. Maximum area of about 324 ha (59%) area is marginally suitable (Class S3) for growing guava and occur in the major part of the microwatershed with moderate limitations of rooting condition, calcareousness, gravelliness and texture.

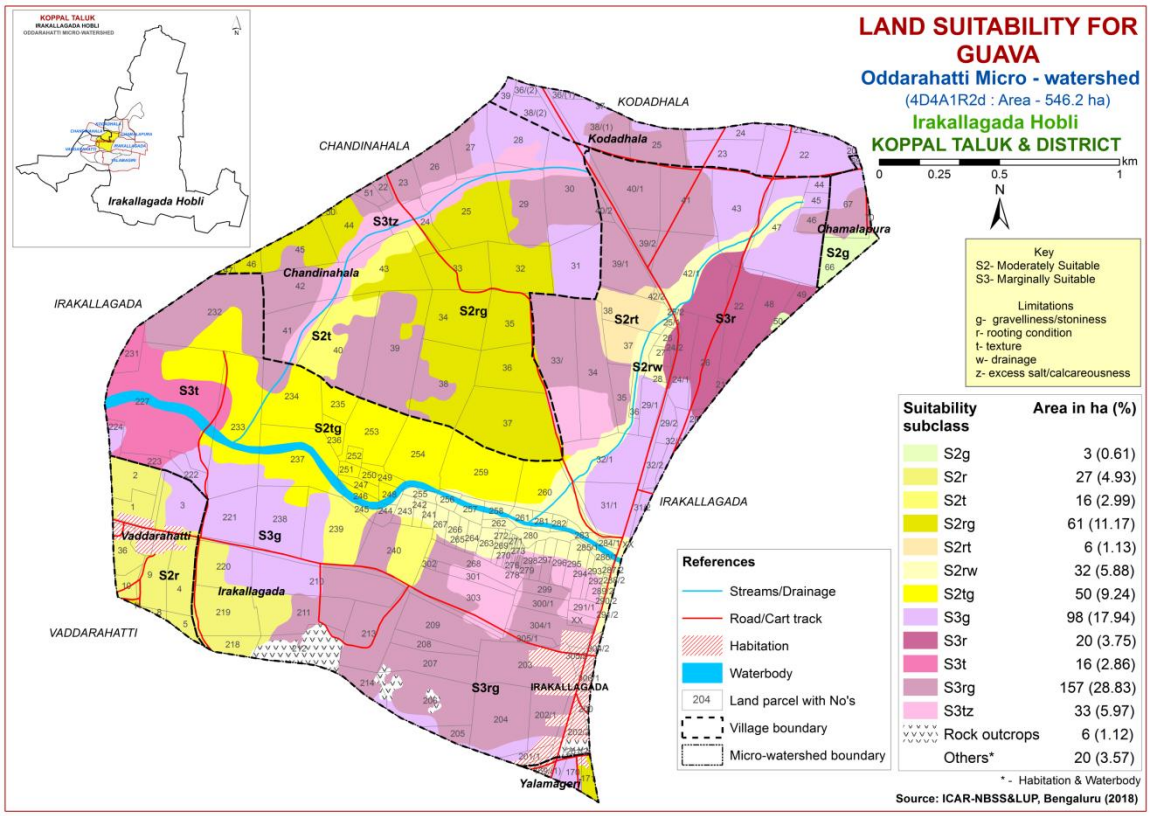


Fig. 7.16 Land Suitability map of Guava

7.17 Land Suitability for Sapota (*Manilkara zapota*)

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

An area of 16 ha (3%) is highly suitable (Class S1) for growing sapota and are distributed in the central part of the microwatershed. Moderately suitable (Class S2) lands occur in an area of 180 ha (33%) and are distributed in the northeastern, central, southern and western part of the microwatershed. They have minor limitations of gravelliness, rooting condition and drainage. Major area of 324 ha (59%) is marginally suitable (Class S3) for growing sapota and occur in the major part of the microwatershed with moderate limitations of rooting condition, gravelliness, texture and calcareousness.

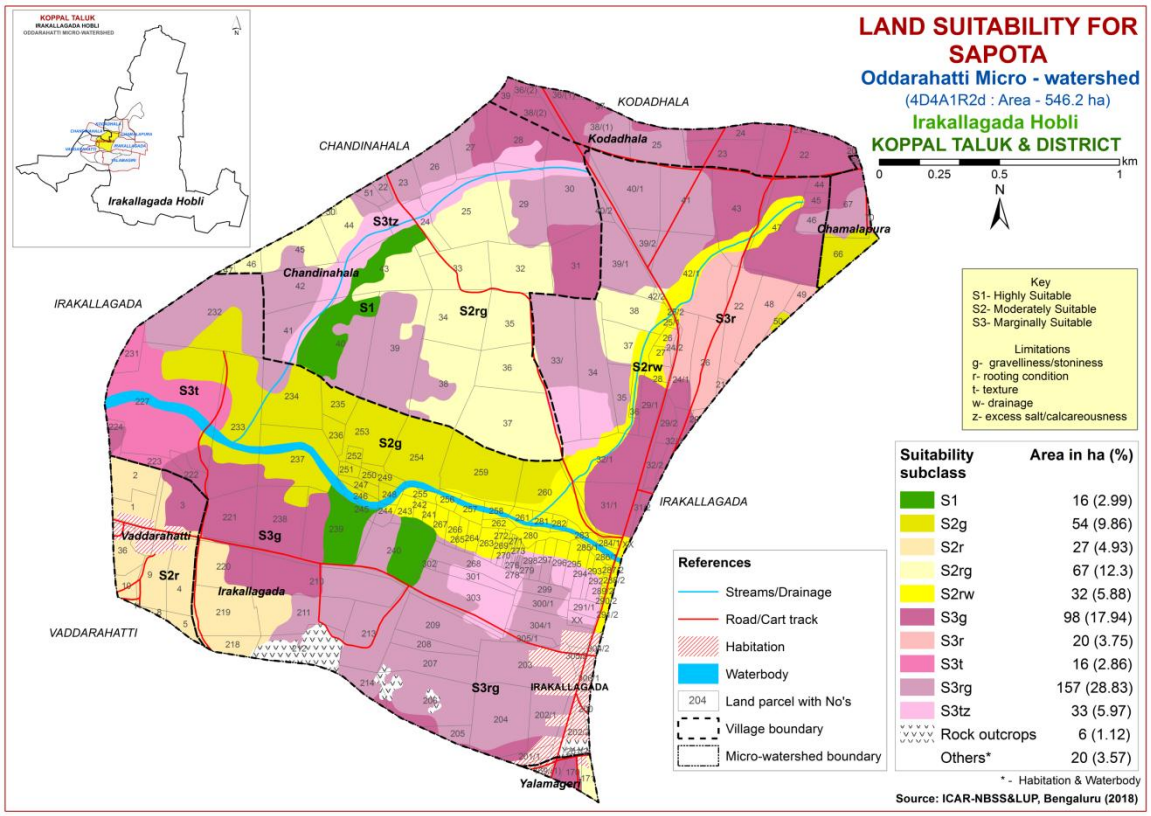


Fig. 7.17 Land Suitability map of Sapota

7.18 Land Suitability for Pomegranate (*Punica granatum*)

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

An area of 16 ha (3%) is highly suitable (Class S1) for growing pomegranate and are distributed in the central part of the microwatershed. Moderately suitable (Class S2) lands occupy an area of 229 ha (42%) and are distributed in the western, central, eastern and southwestern part of the microwatershed. They have minor limitations of texture, rooting condition, gravelliness, drainage and calcareousness. Maximum area of 275 ha (51%) is marginally suitable (Class S3) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting condition and gravelliness.

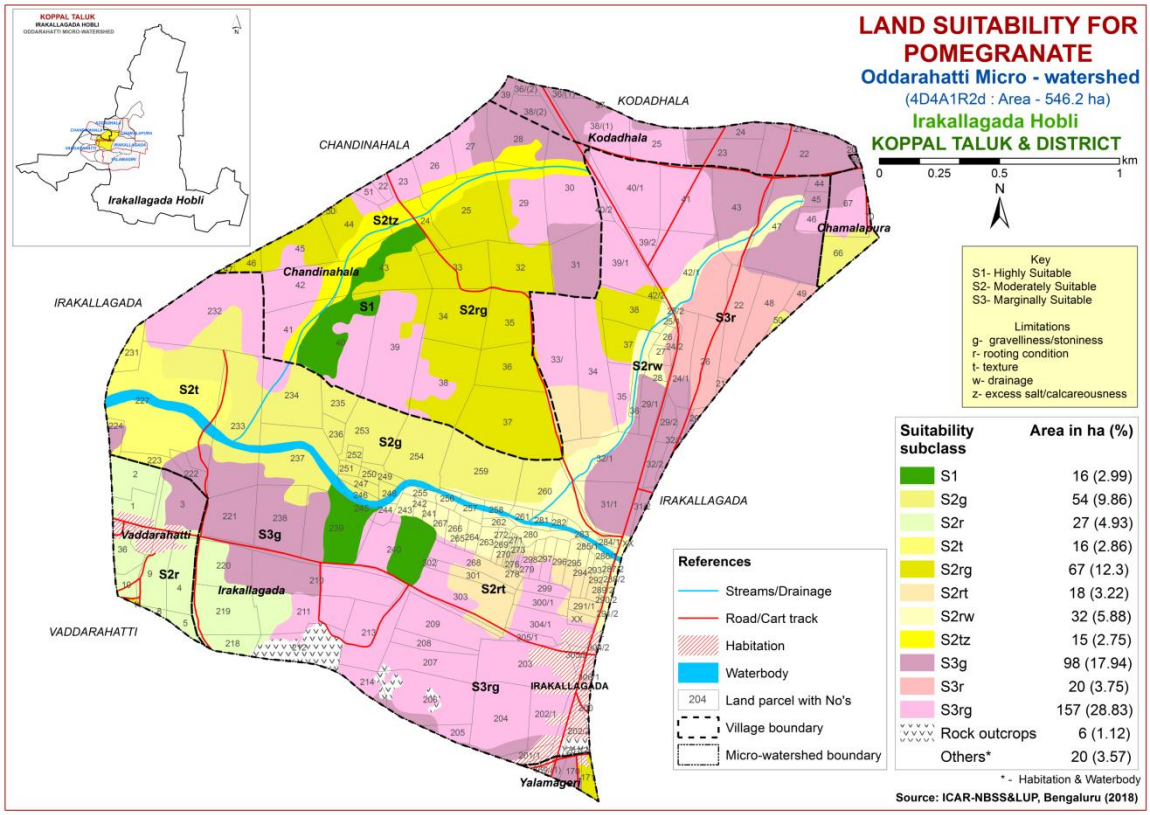


Fig. 7.18 Land Suitability map of Pomegranate

7.19 Land Suitability for Musambi (*Citrus limetta*)

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

An area of 32 ha (6%) is highly suitable (Class S1) for growing musambi and are distributed in the western and central part of the microwatershed. An area of 213 ha (39%) is moderately suitable (Class S2) and are distributed in the central, western, southwestern and eastern part of the microwatershed. They have minor limitations of calcareousness, gravelliness, drainage and rooting condition. Marginally suitable (Class S3) lands occur in a maximum area of 275 ha (51%) and are distributed in the major part of the microwatershed with moderate limitations of rooting condition and gravelliness.

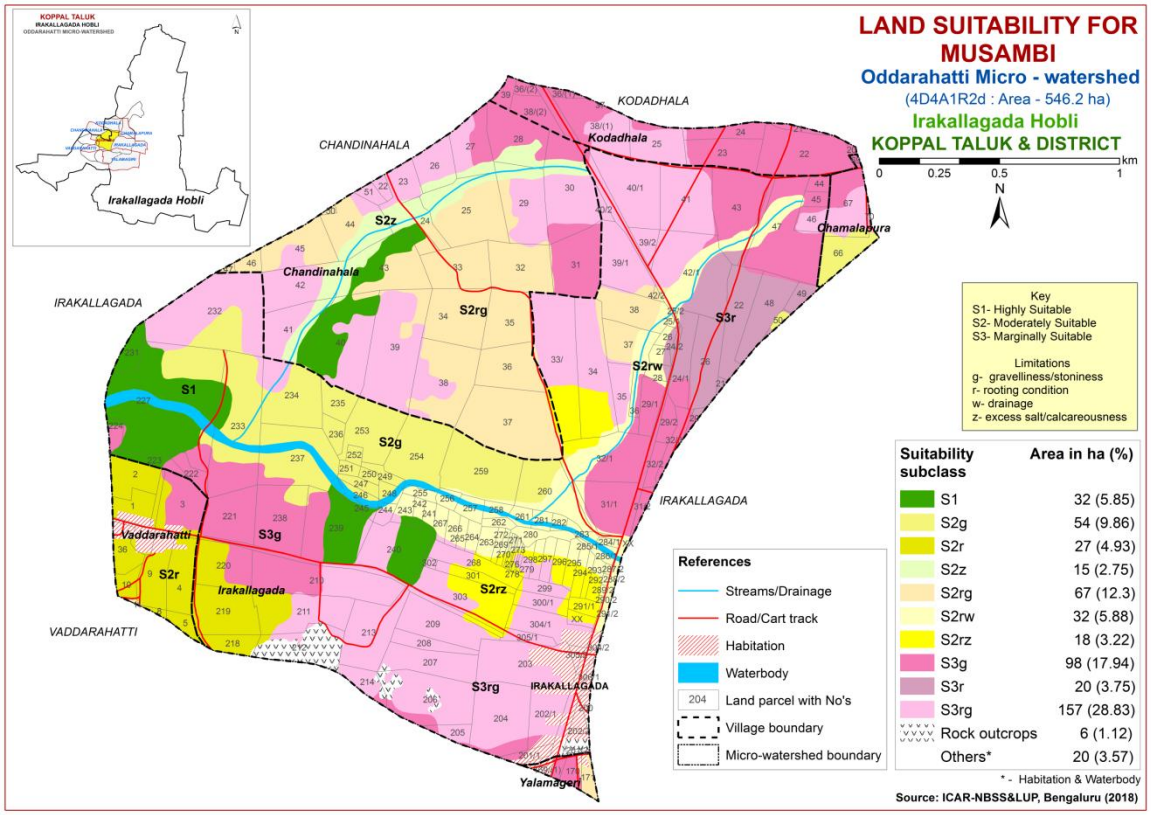


Fig. 7.19 Land Suitability map of Musambi

7.20 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 0.11 lakh ha in almost all the districts of the State. The crop requirements for growing lime (Table 7.21) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing lime was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.20.

An area of 32 ha (6%) is highly suitable (Class S1) for growing lime and are distributed in the western and central part of the microwatershed. An area of 213 ha (39%) is moderately suitable (Class S2) and are distributed in the central, western, eastern and southwestern part of the microwatershed. They have minor limitations of calcareousness, gravelliness, drainage and rooting condition. Marginally suitable (Class S3) lands occur in a maximum area of 275 ha (51%) for growing lime and distributed in the major part of the microwatershed with moderate limitations of rooting condition and gravelliness.

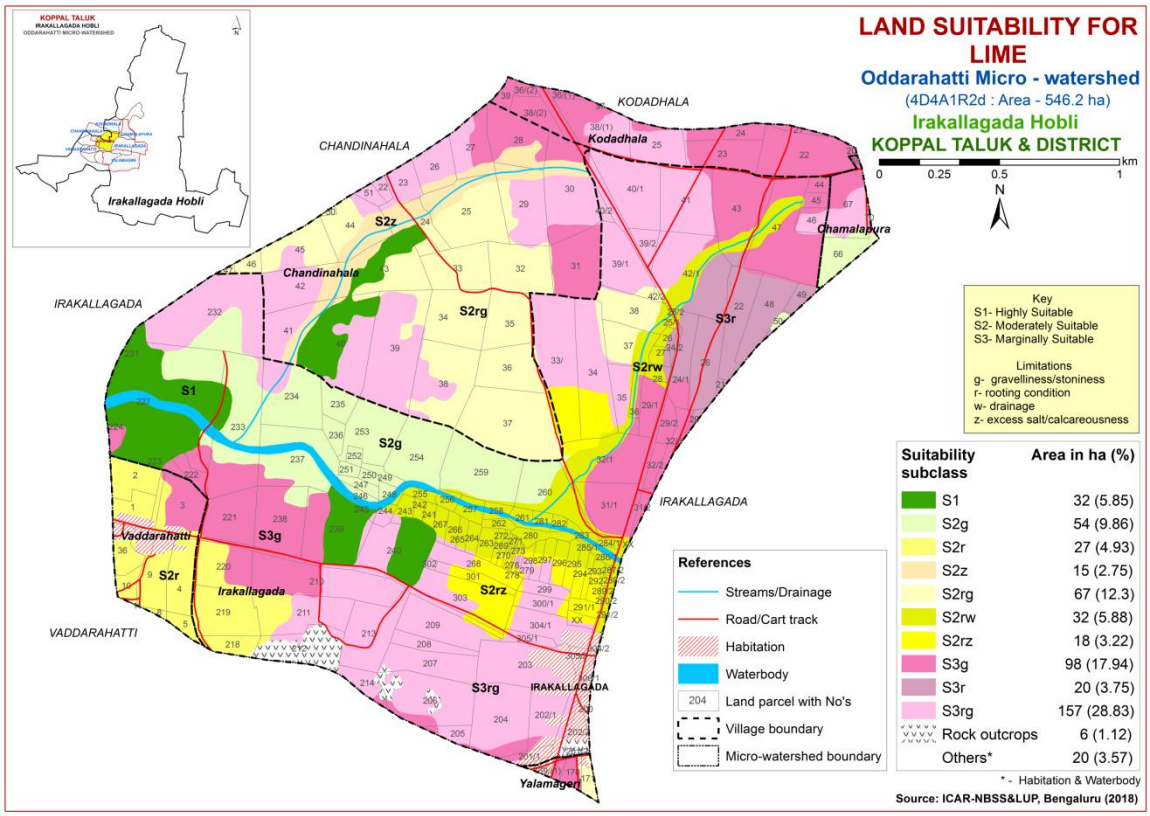


Fig. 7.20 Land Suitability map of Lime

7.21 Land Suitability for Amla (*Phyllanthus emblica*)

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

An area of 97 ha (18%) is highly suitable (Class S1) for growing amla and are distributed in the northeastern, southwestern and central part of the microwatershed. Maximum area of 423 ha (78%) has soils that are moderately suitable (Class S2) and are distributed in the major part of the microwatershed. They have minor limitations of rooting condition, texture, gravelliness, drainage and calcareousness.

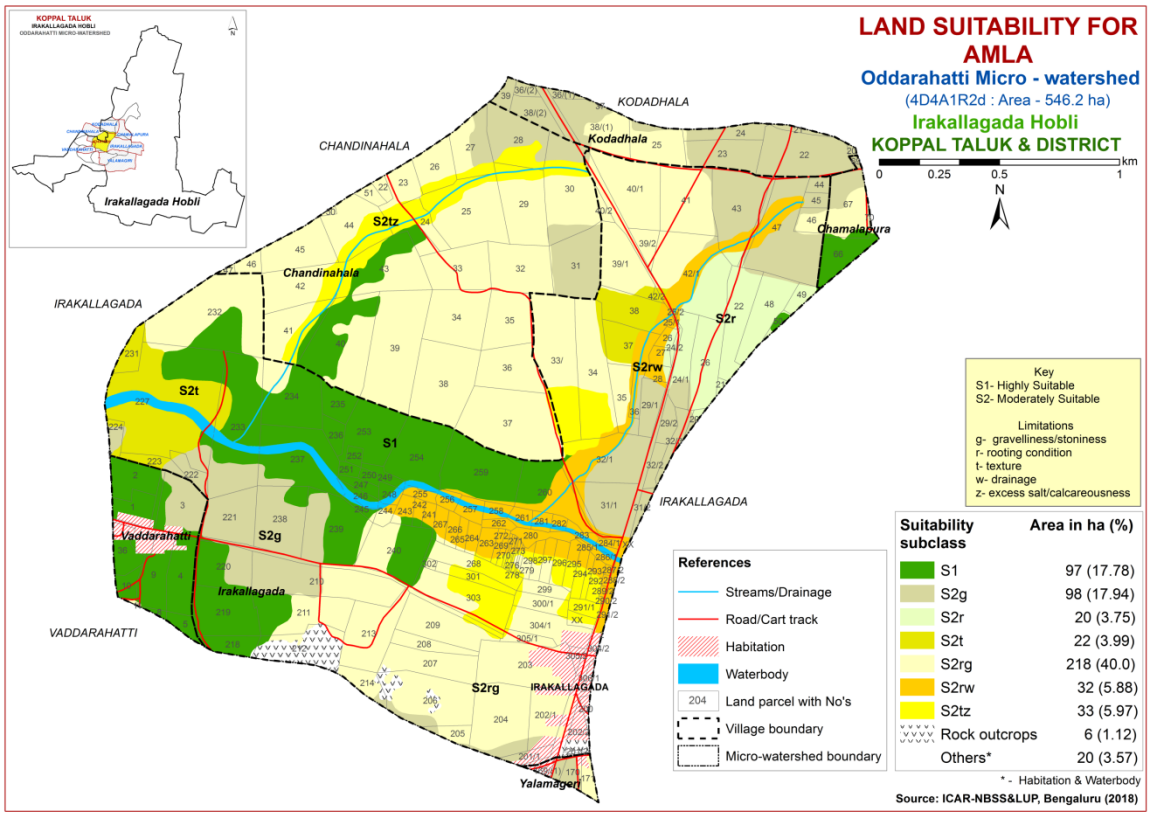


Fig. 7.21 Land Suitability map of Amla

7.22 Land Suitability for Cashew (*Anacardium occidentale)*

Cashew is one of the most important nut crop grown in an area of 1.24 lakh ha in almost all the districts of the State. The crop requirements for growing cashew (Table 7.23) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cashew was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.22.

An area of 5 ha (1%) is highly (Class S1) suitable for growing cashew and are distributed in the southern part of the microwatershed. Moderately (Class S2) suitable lands occur in an area of 179 ha (33%) and are distributed in the northeastern, central, western and southern part of the microwatershed. They have minor limitations of gravelliness, rooting condition and texture. Marginally suitable (Class S3) lands occur in a maximum area of 255 ha (47%) and are distributed in the major part of the microwatershed with moderate limitations of rooting condition and gravelliness. An area of about 81 ha (15%) is currently not suitable (Class N1) for growing cashew and are distributed in the eastern, western and central part of the microwaterhsed with severe limitations of texture, drainage and calcareousness.

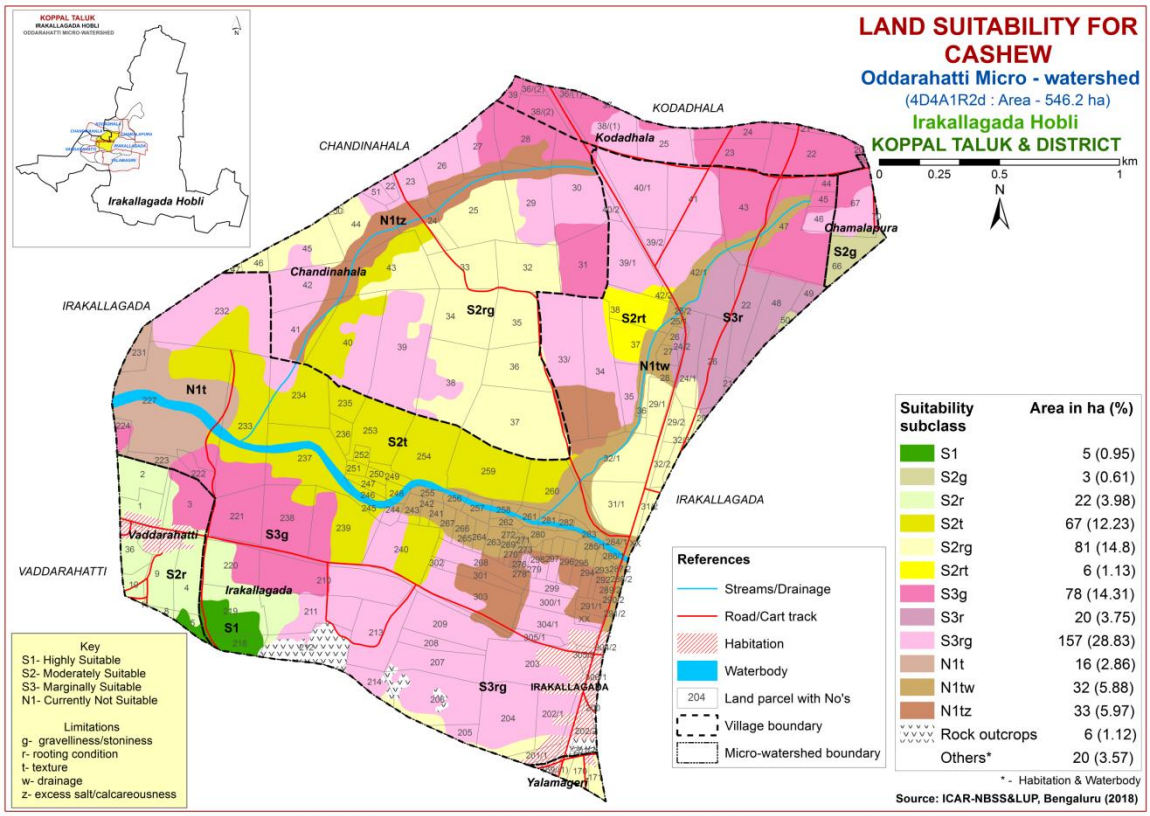


Fig. 7.22 Land Suitability map of Cashew

7.23 Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

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

An area of 16 ha (3%) is highly (Class S1) suitable and are distributed in the central part of the microwatershed. Moderately (Class S2) suitable lands occur in an area of 180 ha (33%) and are distributed in the northeastern, central, western and southern part of the microwatershed. They have minor limitations of gravelliness, rooting condition and drainage. Marginally suitable (Class S3) lands cover a maximum area of 324 ha (59%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting condition, texture, gravelliness and calcareousness.

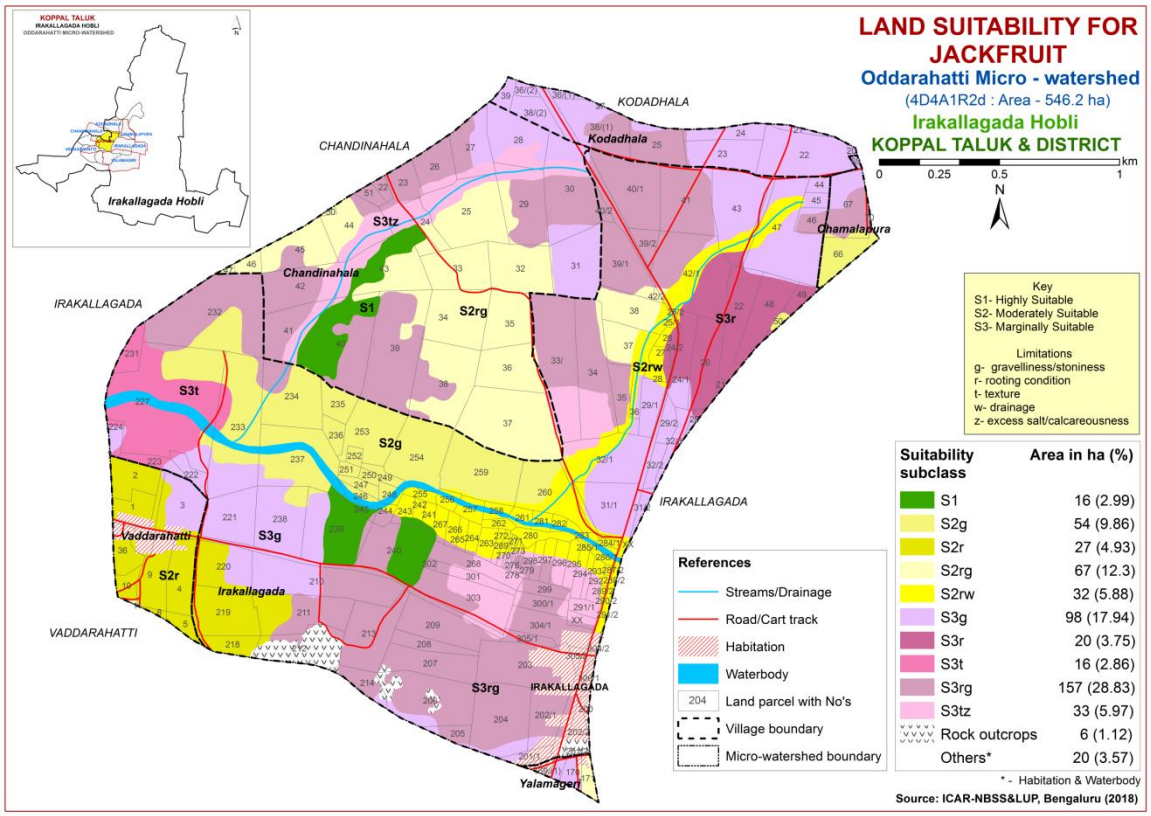


Fig. 7.23 Land Suitability map of Jackfruit

7.24 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the State. The crop requirements for growing jamun (Table 7.25) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jamun was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.24.

There are no highly suitable (Class S1) lands for growing jamun in the microwatershed. An area of 190 ha (35%) is moderately suitable (Class S2) and occur in the northeastern, central, western and southern part of the microwatershed. They have minor limitations of rooting condition, texture, gravelliness and calcareousness. Marginally suitable (Class S3) lands occupy a maximum area of 332 ha (61%) and are distributed in the major part of the microwatershed with moderate limitations of rooting condition, gravelliness, drainage and calcareousness.

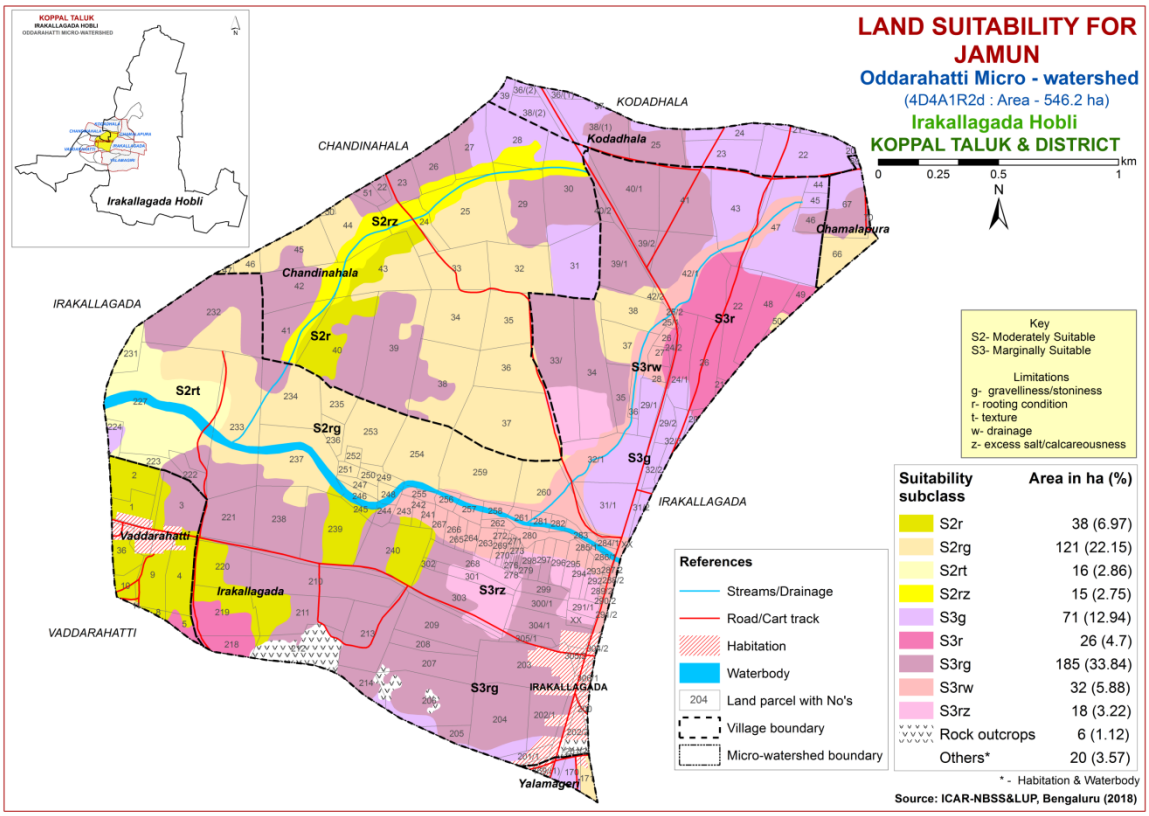


Fig. 7.24 Land Suitability map of Jamun

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

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

An area of 119 ha (22%) is highly (Class S1) suitable for growing custard apple and are distributed in the northeastern, central and western part of the microwatershed. Maximum area of 401 ha (74%) is moderately suitable (Class S2) and are distributed in the major part of the microwatershed. They have minor limitations of rooting condition, gravelliness, drainage and calcareousness.

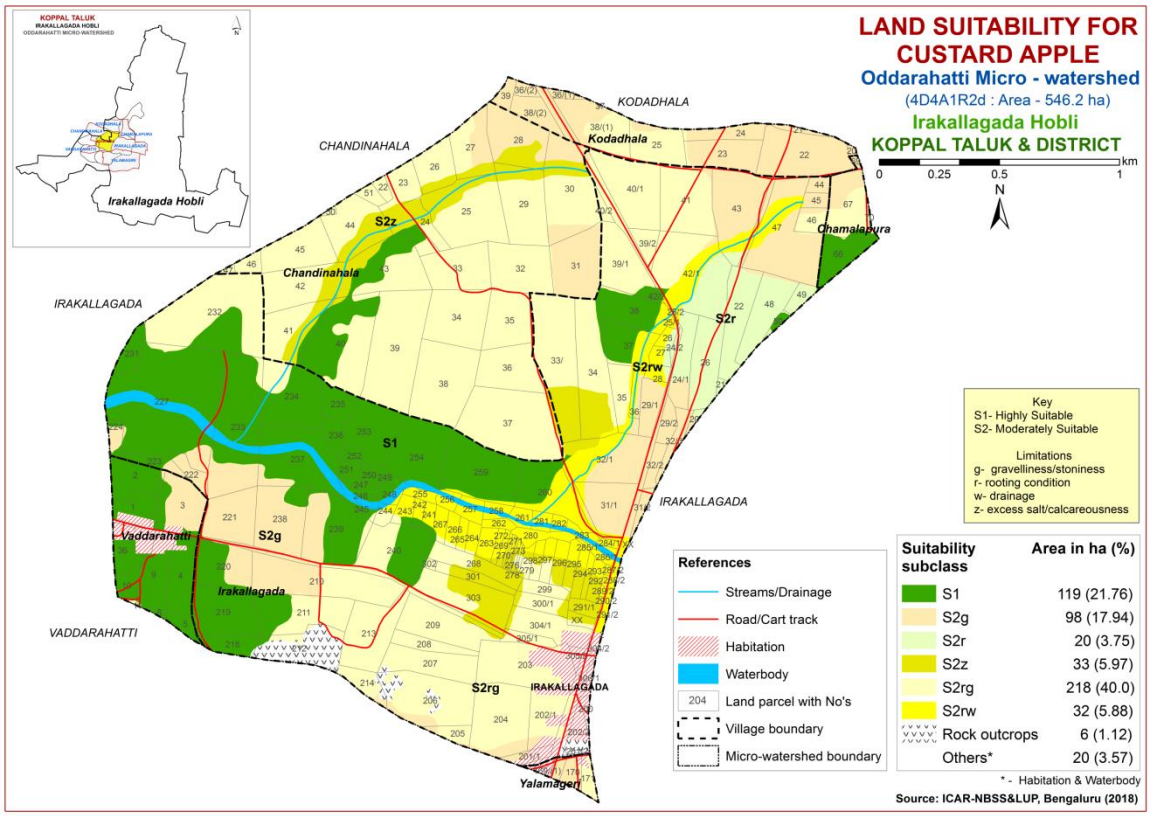


Fig. 7.25 Land Suitability map of Custard Apple

7.26 Land Suitability for Tamarind (*Tamarindus indica*)

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

There are no highly (Class S1) suitable lands for growing tamarind in the microwatershed. An area of 101 ha (18%) is moderately suitable (Class S2) and occur in the northeastern, central and western part of the microwatershed. They have minor limitations of rooting condition, gravelliness and calcareousness. Maximum area of 242 ha (44%) is marginally suitable (Class S3) and occur in major part of the microwatershed with moderate limitations of gravelliness, drainage, calcareousness and rooting condition. An area of 178 ha (33%) is currently not suitable (Class N1) and are distributed in the northeastern, northern, southern and wetsern part of the microwatershed with severe limitations of rooting condition and gravelliness.

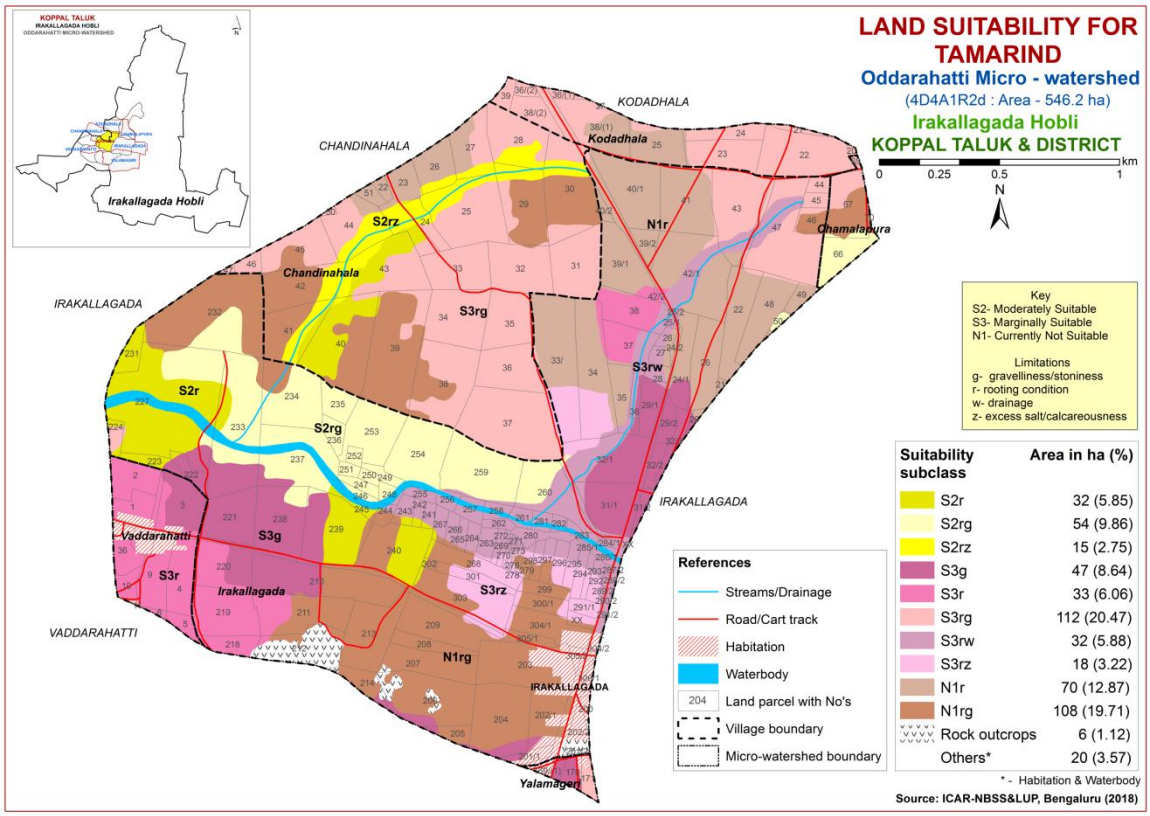


Fig. 7.26 Land Suitability map of Tamarind

7.27 Land Suitability for Mulberry (*Morus nigra*)

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

An area of 70 ha (13%) is highly suitable (Class S1) for growing mulberry and are distributed in the northeastern and central part of the microwatershed. Moderately suitable (Class S2) lands occupy a maximum area of 273 ha (50%) and are distributed in the major part of the microwatershed. They have minor limitations of calcareousness, drainage, gravelliness, rooting condition and texture. Marginally suitable (Class S3) lands cover an area of 177 ha (33%) and are distributed in the northern, northeastern, southern and western part of the microwatershed. They have moderate limitations of rooting condition and gravelliness.

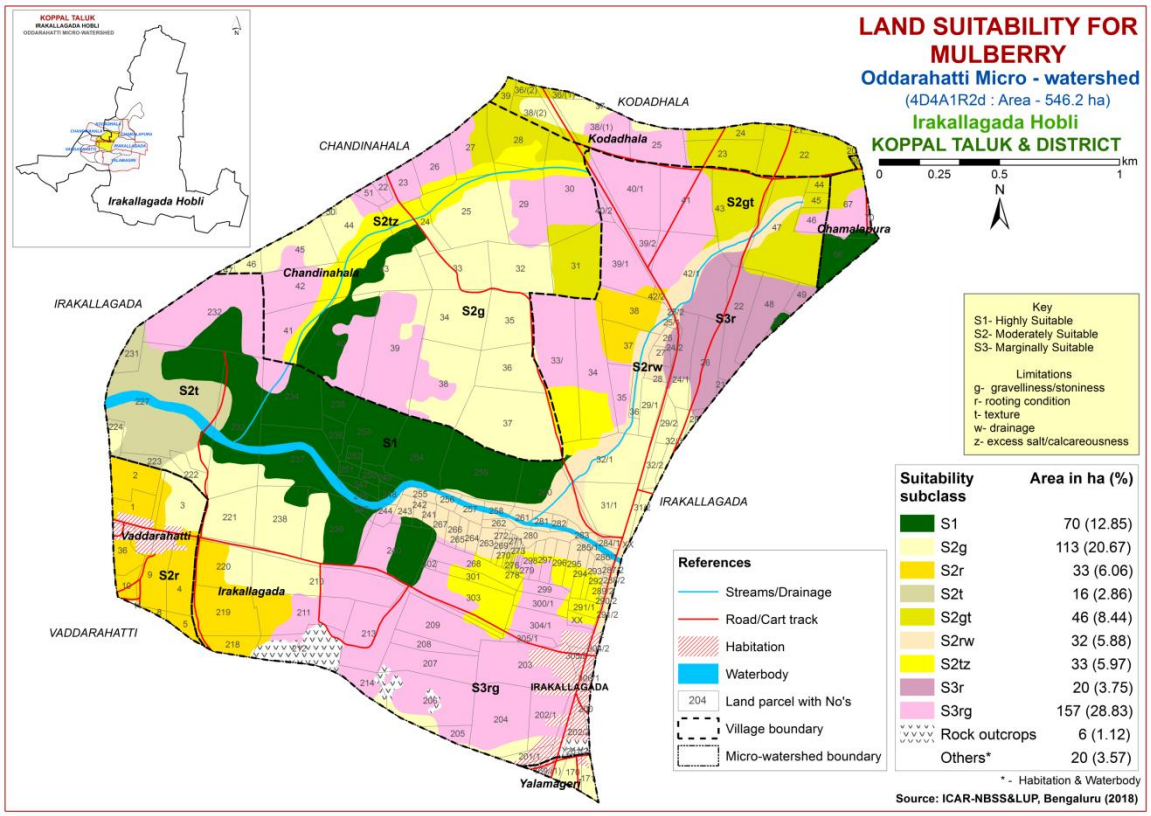


Fig. 7.27 Land Suitability map of Mulberry

7.28 Land Suitability for Marigold (*Tagetes erecta*)

Marigold is one of the most important flower crop grown in an area of 1858 ha in almost all the districts of the State. The crop requirements for growing marigold (Table 7.29) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing marigold was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.28.

An area of 1 ha (<1%) is highly suitable (Class S1) or growing marigold and are distributed in the southern part of the microwatershed. An area of 253 ha (46%) is moderately suitable (Class S2) and are distributed in the northern, eastern, central and southwestern part of the microwatershed. They have minor limitations of texture, gravelliness, rooting condition, drainage and calcareousness. Maximum area of 267 ha (49%) is marginally suitable (Class S3) and are distributed in the major part of the microwatershed. They have moderate limitation of gravelliness.

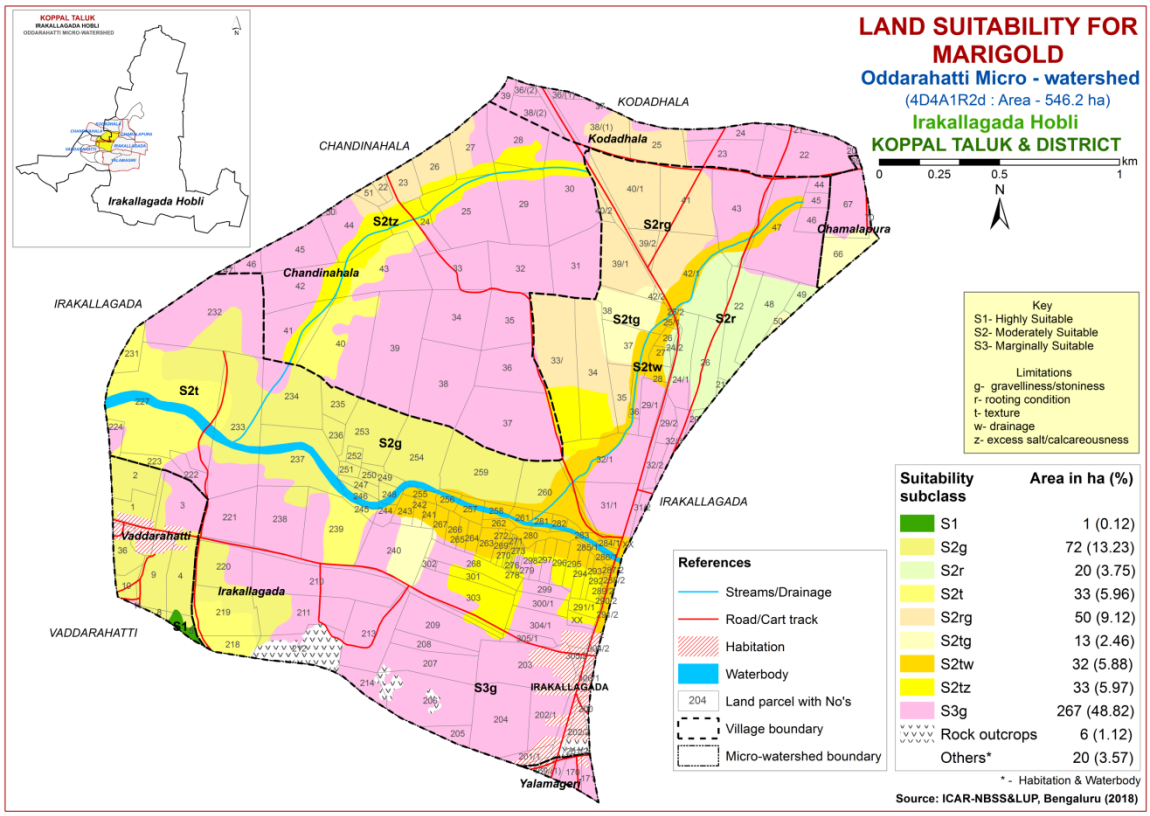


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Chrysanthemum indicum*)

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

An area of 1 ha (<1%) is highly suitable (Class S1) for growing chrysanthemum and are distributed in the southern part of the microwatershed. An area of 253 ha (46%) is moderately suitable (Class S2) and are distributed in the northern, northeastern, central, western and southwestern part of the microwatershed. They have minor limitations of calcareousness, rooting condition, gravelliness, drainage and texture. Maximum area of 267 ha (49%) is marginally suitable (Class S3) for growing chrysanthemum and occur in the major part of the microwatershed. They have moderate limitation of gravelliness.

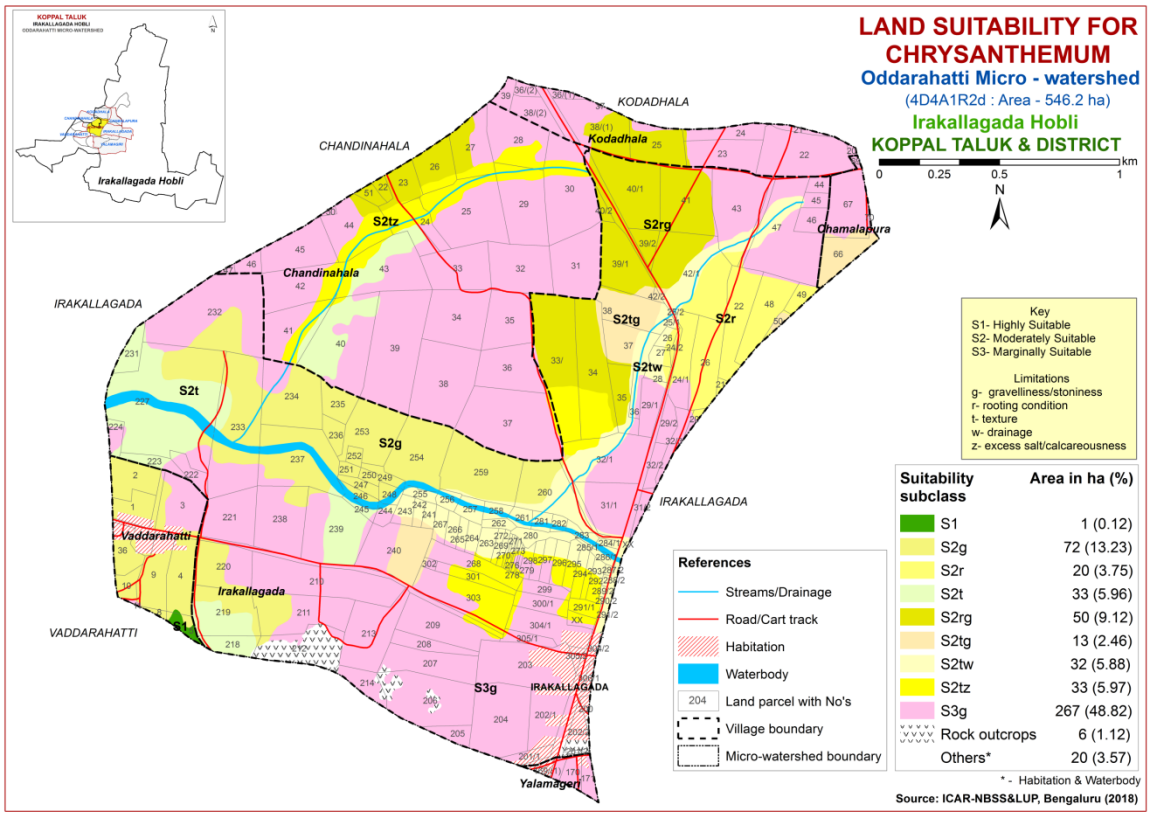


Fig. 7.29 Land Suitability map of Chrysanthemum

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

Jasmine is one of the most important flower crop grown in an area of 6146 ha in almost all the districts of the State. The crop requirements (Table 7.31) for growing jasmine were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jasmine was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.30.

An area of 1 ha (<1%) is highly suitable (Class S1) for growing jasmine and are distributed in the southern part of the microwatershed. An area of 204 ha (38%) is moderately suitable (Class S2) and occur in the northern, northeastern, central, western and southern part of the microwatershed. They have minor limitations of rooting condition, texture, drainage and gravelliness. Maximum area of 316 ha (58%) is marginally suitable (Class S3) for growing jasmine and are distributed in the major part of the microwatershed. They have moderate limitations of texture, gravelliness and calcareousness.

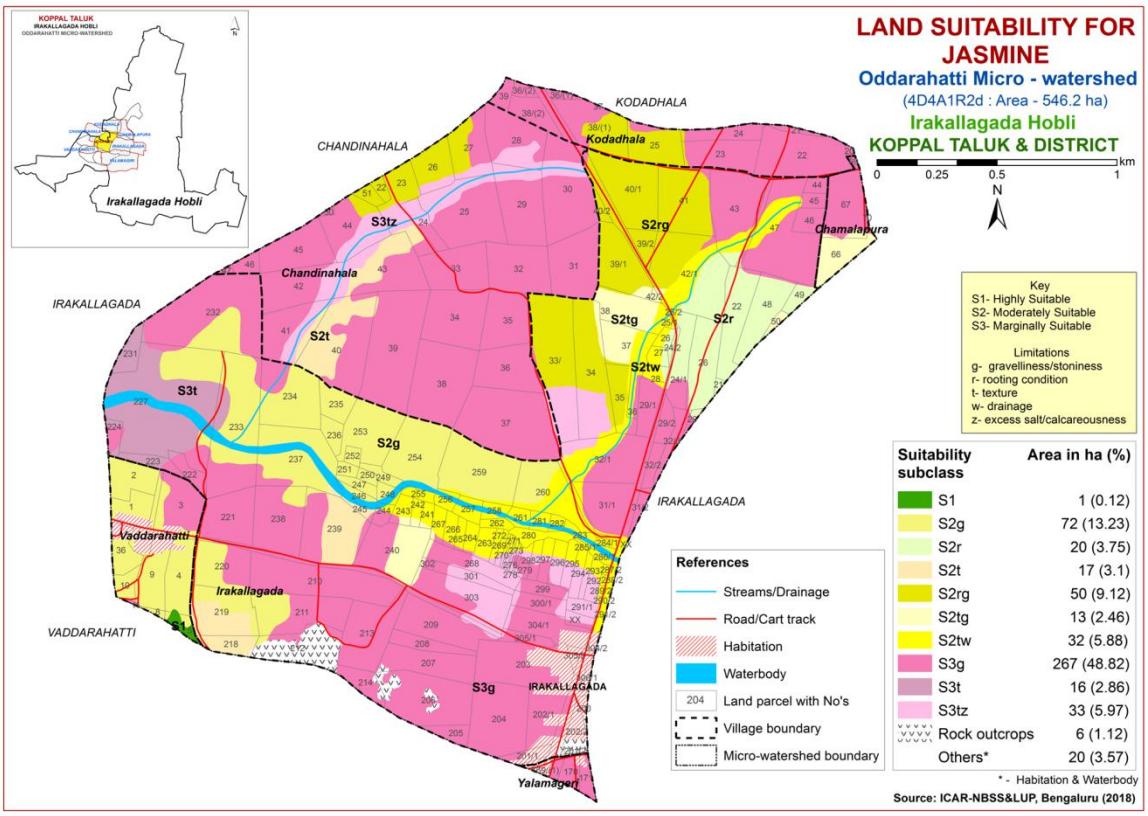


Fig. 7.30 Land Suitability map of Jasmine

7. 31 Land Suitability for Crossandra *(Crossandra in fundibuliformis)*

Crossandra is one of the most important flower crop grown in an area of 6146 ha in almost all the districts of the State. The crop requirements (Table 7.32) for growing crossandra were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing crossandra was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.31.

An area of 1 ha (<1%) is highly suitable (Class S1) for growing crossandra and are distributed in the southern part of the microwatershed. An area of 222 ha (41%) is moderately suitable (Class S2) and occur in the northern, northeastern, central, western and southern part of the microwatershed. They have minor limitations of rooting condition, gravelliness, calcareousness, drainage and texture. Maximum area of 298 ha (54%) is marginally suitable (Class S3) and are distributed in the major part of the microwatershed. They have moderate limitations of texture, gravelliness and calcareousness.

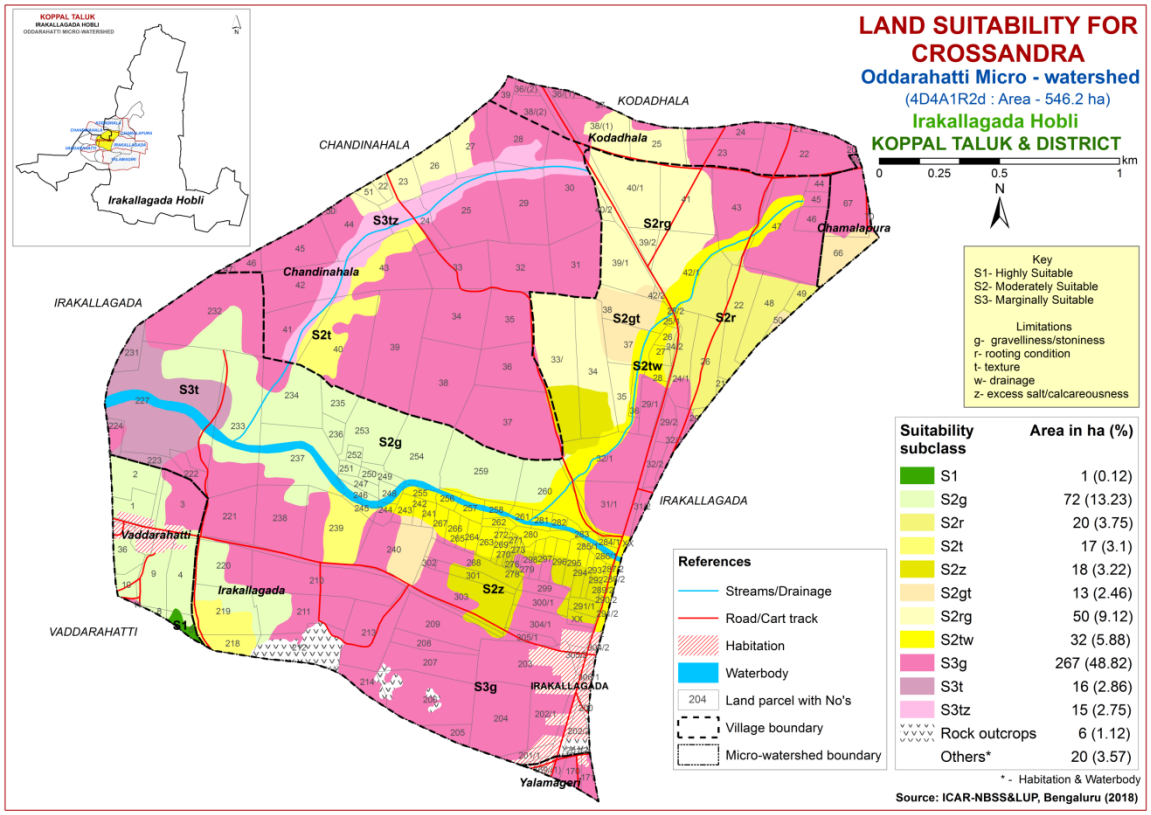


Fig. 7.31 Land Suitability map of Crossandra

Table 7.1 Soil-Site Characteristics of Oddarahatti Microwatershed

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/ m)	Slope (%)	Erosion	pH	EC	ESP	CEC [Cmol (p^+) kg^{-1}]	BS (%)
					Surface	Subsurface	Surface	Subsurface								
LKRcB2g1	662	90	WD	50-75	sl	gsc	15-35	40-60	50-100	1-3	Moderate	8.18	0.30	4.51	12.19	100
LKRiB2g1	662	90	WD	50-75	sc	gsc	15-35	40-60	50-100	1-3	Moderate	8.18	0.30	4.51	12.19	100
MKHcB2g1	662	90	WD	50-75	sl	gsc	15-35	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHhB2g1	662	90	WD	50-75	sc	gsc	15-35	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
MKHiB2g1	662	90	WD	50-75	sc	gsc	15-35	>35	50-100	1-3	Moderate	7.38	0.09	1.49	14.84	93
KTPhB2g1	662	90	WD	50-75	scl	gsc	15-35	15-35	101-150	1-3	Moderate	6.42	0.07	0.05	4.41	100
HDHcB1	662	90	WD	75-100	sl	gsc-gc	-	>35	50-100	1-3	Slight	6.54	0.07	7.11	5.84	6.54
HDHcB2g1	662	90	WD	75-100	sl	gsc-gc	15-35	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	6.54
HDHcB2g2	662	90	WD	75-100	sl	gsc-gc	15-35	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	6.54
HDHiB2g1	662	90	WD	75-100	sc	gsc-gc	15-35	>35	50-100	1-3	Moderate	6.54	0.07	7.11	5.84	6.54
BDGcB1g1	662	90	WD	75-100	sl	gc	15-35	35-60	<50	1-3	Slight	6.24	0.06	0.35	3.76	6.24
BDGiB1g1	662	90	WD	75-100	sc	gc	15-35	35-60	<50	1-3	Slight	6.24	0.06	0.35	3.76	6.24
GHTbB2g1	662	90	WD	75-100	ls	gscl	15-35	15-35	100-150	1-3	Moderate	5.70	0.06	4.10	3.17	5.70
GHTcB2	662	90	WD	75-100	sl	gscl	-	15-35	100-150	1-3	Moderate	5.70	0.06	4.10	3.17	5.70
GHThB2g1	662	90	WD	75-100	sc	gscl	15-35	15-35	100-150	1-3	Moderate	5.70	0.06	4.10	3.17	5.70
BSRbB2g1	662	90	WD	75-100	ls	gsc	15-35	15-35	50-100	1-3	Moderate	6.59	0.12	6.00	8.80	6.59
BSRhB2	662	90	WD	75-100	scl	gsc	-	15-35	50-100	1-3	Moderate	6.59	0.12	6.00	8.80	6.59
BSRiB1	662	90	WD	75-100	sc	gsc	-	15-35	50-100	1-3	Slight	6.59	0.12	6.00	8.80	6.59
HLPmA1	662	90	WD	75-100	c	scl	-	-	50-100	0-1	Slight	-	-	-	-	-
JDGiB2g1	662	90	WD	100-150	sc	sc-c	15-35	<15	>200	1-3	Moderate	6.11	0.07	2.06	9.41	6.11

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drainage Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/ m)	Slope (%)	Erosion	pH	EC	ESP	CEC [Cmol (p^+) kg^{-1}]	BS (%)
					Surf-ace	Sub-surface	Sur-face	Sub-surface								
JDGcB2	662	90	WD	100-150	sl	sc-c	-	<15	>200	1-3	Moderate	6.11	0.07	2.06	9.41	6.11
JDGcB2g1	662	90	WD	100-150	sl	sc-c	15-35	<15	>200	1-3	Moderate	6.11	0.07	2.06	9.41	6.11
VDHhB2g1	662	90	WD	100-150	scl	sc-c	15-35	-	151-200	1-3	Moderate	-	-	-	-	-
BPRbB2g1	662	90	WD	100-150	ls	gsc-gc	15-35	>35	51-100	1-3	Moderate	6.64	0.03	0.51	5.45	6.64
BPRcB2	662	90	WD	100-150	sl	gsc-gc	-	>35	51-100	1-3	Moderate	6.64	0.03	0.51	5.45	6.64
BPRhB1g1	662	90	WD	100-150	scl	gsc-gc	15-35	>35	51-100	1-3	Slight	6.64	0.03	0.51	5.45	6.64
NGPhB1g1	662	90	WD	100-150	scl	gsc	15-35	>35	51-100	1-3	Slight	6.77	0.09	1.40	7.10	82.7
DRLmB2	662	90	WD	75-100	c	c	-	<15	151-200	1-3	Moderate	8.78	0.42	5.62	49.7	8.78
GRHmB2	662	90	WD	100-150	c	c	-	<15	>200	1-3	Moderate	9.08	0.23	7.11	63.21	9.08
KVRiB2g1	662	90	WD	100-150	sc	c	15-35	-	>200	1-3	Moderate	8.4	0.26	0.60	43.25	8.4

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

Table 7.2 Land suitability criteria for Sorghum

Land use requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable (S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable (N1)**
Climatic regime1	Mean temperature in growing season	°C	26–30	30–34; 24–26	34–40; 20–24	>40; <20
	Mean max. temp. in growing season	°C				
	Mean min. tempt. in growing season	°C				
	Mean RH in growing season	%				
	Total rainfall	mm				
	Rainfall in growing season	mm				
Land quality	Soil-site characteristics					
Moisture availability	Length of growing period for short duration	Days				
	Length of growing period for long duration					
	AWC	mm/m				
Oxygen availability to roots	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V.poorly drained
	Water logging in growing season	Days				
Nutrient availability	Texture	Class	sc, c (red), c (black)	scl, cl	ls, sl	-
	pH	1:2.5	5.5-7.8	5.0-5.5 7.8-9.0	>9.0	-
	CEC	C mol (p+)/Kg				
	BS	%				
	CaCO3 in root zone	%		<5	5-10	10-15
	OC	%				
Rooting conditions	Effective soil depth	cm	>75	50-75	25-50	<25
	Stoniness	%				
	Coarse fragments	Vol %	<15	15-35	35-60	60-80
Soil toxicity	Salinity (EC saturation extract)	dS/m	<2	2-4	4-8	>8
	Sodicity (ESP)	%	5-10	10-15	>15	
Erosion hazard	Slope	%	0-3	3-5	5-10	>10

Table 7.3 Land suitability criteria for Maize

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

Table 7.4 Land suitability criteria for Bajra

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

Table 7.5 Land suitability criteria for Groundnut

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

Table 7.6 Land suitability criteria for Sunflower

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

Table 7.7 Land suitability criteria for Red gram

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

Table 7.8 Land suitability criteria for Bengal gram

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

Table 7.9 Land suitability criteria for Cotton

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

Table 7.10 Land suitability criteria for Chilli

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

Table 7.11 Land suitability criteria for Tomato

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

Table 7.12 Land suitability criteria for Brinjal

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

Table 7.13 Land suitability criteria for Onion

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

Table 7.14 Land suitability criteria for Bhendi

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

Table 7.15 Land suitability criteria for Drumstick

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

Table 7.16 Land suitability criteria for Mango

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

Table 7.17 Land suitability criteria for Guava

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

Table 7.18 Land suitability criteria for Sapota

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

Table 7.19 Land suitability criteria for Pomegranate

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

Table 7.20 Land suitability criteria for Musambi

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

Table 7.21 Land suitability criteria for Lime

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

Table 7.22 Land suitability criteria for Amla

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

Table 7.23 Land suitability criteria for Cashew

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

Table 7.24 Land suitability criteria for Jackfruit

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

Table 7.25 Land suitability criteria for Jamun

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

Table 7.26 Land suitability criteria for Custard apple

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

Table 7.27 Land suitability criteria for Tamarind

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

Table 7.28 Land suitability criteria for Mulberry

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

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

Table 7.29 Land suitability criteria for Marigold

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

Table 7.30 Land suitability criteria for Chrysanthemum

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

Table 7.31 Land suitability criteria for Jasmine (irrigated)

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

7.32 Land suitability criteria for Crossandra

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

7.32 Land Management Units (LMUs)

The 30 soil map units identified in Oddarahatti Microwatershed have been grouped into 6 Land Management Units (LMUs) for the purpose of preparing a Proposed Crop Plan. Land Management Units are grouped based on the similarities in respect of the type of soil, the depth of the soil, the surface soil texture, gravel content, AWC, slope, erosion etc. and a Land Management Units map (Fig. 7.32) has been generated. These Land Management Units are expected to behave similarly for a given level of management.

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

LMU	Mapping unit	Soil and site characteristics
1	DRLmB2, GRHmB2, KVRiB2g1	Moderately deep to deep, black calcareous clay soils with slopes of (1-3%), moderate erosion, gravelly (15-35%)
2	GHTbB2g1, GHTcB2, GHThB2g1, BSRbB2g1, BSRhB2, BSRiB1, JDGiB2g1, VDHhB2g1, JDGcB2, JDGcB2g1	Moderately deep to deep red sandy clay to sandy clay loam soils with slopes of 1-3%, slight to moderate erosion, gravelly (15-35%)
3	HDHcB1, HDHcB2g1, HDHcB2g2, HDHiB2g1, BDGcB1g1, BDGiB1g1, BDGiB1g1, BPRbB2g1, BPRcB2, BPRhB1g1, NGPhB1g1	Moderately deep to deep, red gravelly sandy clay to clay soils with slopes of 1-3%, slight to moderate erosion, gravelly to very gravelly (15-60%)
4	HLPmA1	Moderately deep, lowland sandy clay soils with slopes of 0-1%, slight erosion
5	LKRcB2g1, LKRiB2g1, MKHcB2g1, MKHhB2g1, MKHiB2g1	Moderately shallow, red gravelly sandy clay to sandy clay loam soils with slopes of 1-3%, moderate erosion, gravelly (15-35%)
6	KTPhB2g1	Moderately shallow, red loamy soils with slopes of 1-3%, moderate erosion, gravelly (15-35%)

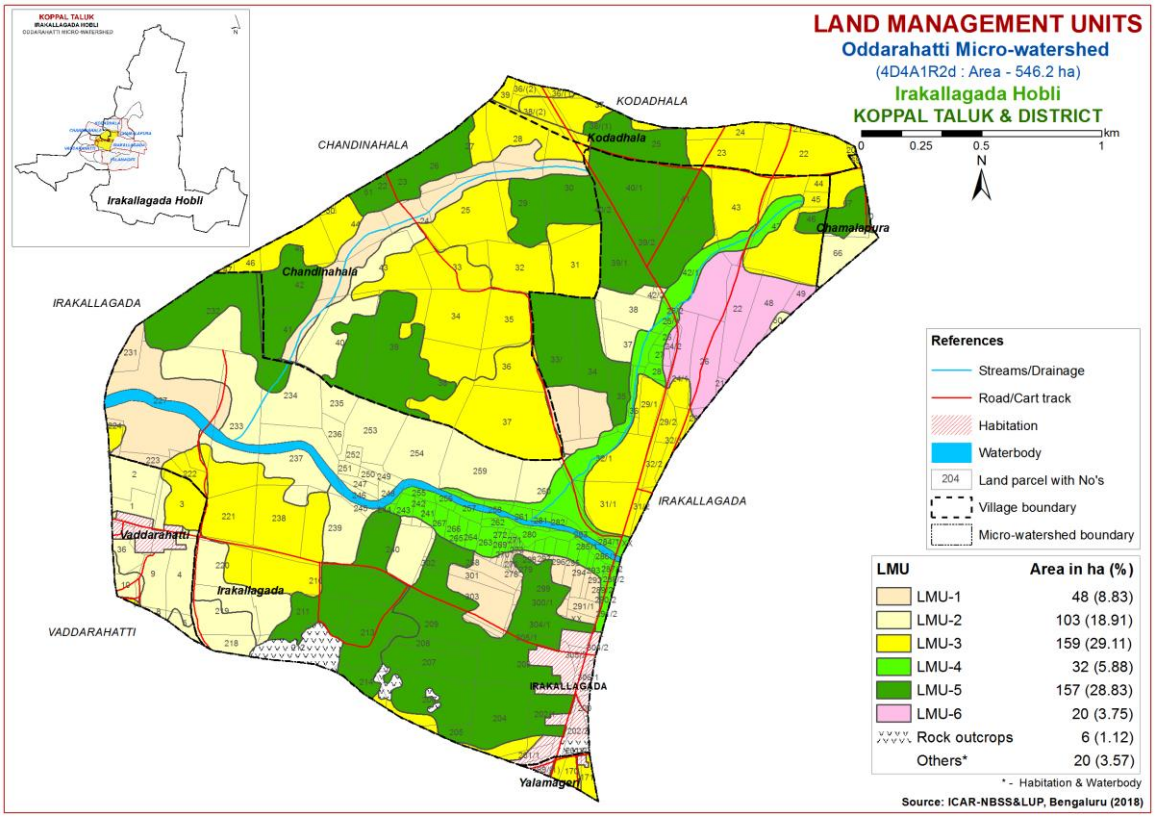


Fig 7.32 Land Management Units map of Oddarahatti Microwatershed

7.33 Proposed Crop Plan for Oddarahatti Microwatershed

After assessing the land suitability for the 31 crops, the proposed crop plan has been prepared for the 6 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 31 crops. The resultant proposed crop plan is presented in Table 7.3

Table 7.33 Proposed Crop Plan for Oddarahatti Microwatershed

LMU	Soil Map Units	Survey Number	Soil characters	Field Crops	Horticulture Crops	Suitable Interventions
LMU 1	350.DRLmB2 373.GRHmB2 385.KVRiB2g1	**Chandinahala:** 24 **Irakallagada:**223,224,227, 231,268,273,274,275,276,291/1,292,293,294,295,296,301,303	Moderately deep to deep, black calcareous clay soils	Maize, Sorghum, Sunflower, Cotton, Bengal gram, Safflower, Linseed, Bajra, Soybean	**Fruit crops:** Mango, Sapota, Pomegranate, Jamun, Lime, Musambi, Tamarind, Amla, Custard apple **Vegetables:** Drumstick, Chilli, Coriander, Tomato, Bhendi **Flowers:** Marigold, Jasmine, Chrysanthemum, Crossandra	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices
LMU 2	134.GHTbB2g1 137.GHTcB2 142.GHThB2g1 158.BSRbB2g1 161.BSRhB2 164.BSRiB1 213.JDGiB2g1 246.VDHhB2g1 456.JDGcB2 457.JDGcB2g1	**Chamalapura :** 66 **Chandinahala :** 40 **Irakallagada:**,37,38,40,42/2,50,218,219,220,233,234,235, 236,237,239,240,245, 247,248,249,250,251,252,253,254,259 **Vaddarahatti:**1,2,4,5,8,9,10,36	Moderately deep to deep red sandy clay to sandy clay loam soils	Maize, Sorghum, Sunflower, Bajra, Finger millet, Groundnut, Red gram, Cowpea, Field bean, Castor, Mulberry	**Fruit crops:** Mango, Sapota, Pomegranate, Guava, Jackfruit, Jamun, Tamarind, Custard apple ,Lime, Musambi, Amla, Cashew **Vegetable crops:** Drumstick, Tomato, Bhendi, Chilli, Brinjal, Onion, Curry leaves **Flower crops:** Marigold, Chrysanthemum, Jasmine, Crossandra	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
LMU 3	108.HDHcB1 111.HDHcB2g1 112.HDHcB2g2 128.HDHiB2g1 180.BDGcB1g1 192.BDGiB1g1 217.BPRbB2g1 224.BPRcB2 229.BPRhB1g1	**Chamalapura :** 69 **Chandinahala:**25,28,31,32, 32/1,33,33/,34,35,36,37,38, 38/(1),38/(2),40/1,43,44,45, 46, 47,50 **Hanamanahalli :**224,227,7 **Irakallagada:**20,29/1,29/2, 31/1,31/2,32/1,32/2,32/3,43, 44,45,47, 210,221,222,238	Moderately deep to deep, red gravelly sandy clay to clay soils	Groundnut, Bajra, Horse gram, Castor, Mulberry	**Fruit crops:** Musambi, Lime, Jamun, Jackfruit Amla, Custard apple, Tamarind **Vegetable crops:** Drumstick, Curry leaves	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)

LMU	Soil Map Units	Survey Number	Soil characters	Field Crops	Horticulture Crops	Suitable Interventions
	258.NGPhB1g1	**Kodadhala:**20,21,22,23,24, 36/(1),36/(2),37,38/(2),39 **Vaddarahatti :** 3,11 **Yalamageri :** 170,171				
LMU 4	466.HLPmA1	**Irakallagada:**36,25/1,25/2, 27,28,241,242,243,255,256, 257,258,260,261,262,263,2 64,265,266,267,269,270,27 1,272,280,281,282,283,284/ 1,286/1,287/2,288/2,289/2,2 90/1, 290/2,291/2	Moderately deep, lowland sandy clay soils	Lowland Paddy, Maize, cotton	**Fruit crops:** Custard Apple, Amla **Vegetable crops:** Brinjal, Tomato, Chillies, Drumstick, Coriander **Flower crops:** Marigold, Chrysanthemum, Jasmine	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practices
LMU 5	43.LKRcB2g1 54.LKRiB2g1 77.MKHcB2g1 85.MKHhB2g1 90.MKHiB2g1	**Chamalapura :** 67,70 **Chandinahala:**22,23,26,27, 29,30,39,41,42,51,232,234, **Irakallagada:**33/,34,35,39/ 1,39/2,40/1,40/2,41,42/1,46, 202/1,203,204,205,206,207, 208,209,211,213,214,232,2 44,277,278,279,297,298,29 9,300/1,302,304/1,305/1 **Kodadhala :** 25,38/(1)	Moderately shallow, red gravelly sandy clay to sandy clay loam soils	Sorghum, Groundnut, Bajra, Castor	**Fruit crops:** Lime, Musambi, Amla, Cashew, Custard apple,	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)
LMU 6	72.KTPhB2g1	**Irakallagada:**21,22,24/1,24 /2,26,48,49	Moderately shallow, red loamy soils	Sorghum, Groundnut, Bajra, Green gram, Black gram, Cowpea, Horse gram, Castor,	**Fruit crops:** Lime, Musambi, Amla, Custard apple, Cashew **Flower crops:** Marigold, Chrysanthemum, Crossandra, Jasmine	Drip irrigation, Mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)

Chapter 8

SOIL HEALTH MANAGEMENT

8.1 Soil Health

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

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

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

The most important characteristics of a healthy soil are

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

Characteristics of Oddarahatti Microwatershed

- The soil phases with sizeable area identified in the microwatershed belonged to the soil series of Lakkur (LKR) 108 ha (20%)**,** Jedigere (JDG) 66 ha (12%), Hooradhahalli (HDH) 61 ha (11%)**,** Balapur (BPR) 51 ha (9%), Mukhadahalli (MKH) 50 ha (9%), Huliyapura (HLP) 32 ha (6%), Nagalapur (NGP) 27 ha (5%), Gollarahatti (GHT) 21 ha (4%), Kethanapura (KTP) 20 ha (4%), Bidanagere (BDG) 20 ha (4%), Dambarahalli (DRL) 18 ha (3%), Gatareddihal (GRH) 16 ha (3%), Kavalur (KVR) 15 ha (3%), Bisarahalli (BSR) 12 ha (2%) and Vaddarahalli (VDH) 3 ha (1%) in the microwatershed.

- As per land capability classification, entire area in the microwatershed falls under arable land category (Class II & III). The major limitations identified in the arable lands were soil, drainage and erosion.
- On the basis of soil reaction, an area of 158 ha (29%) is moderately acid (pH 5.5-6.0), 134 ha (25%) is slightly acid (pH 6.0-6.5) and about 228 ha (42%) is neutral (pH 6.5-7.3) in the microwatershed. Entire area in the microwatershed is acid and neutral in reaction.

Soil Health Management

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

Acid soils

Moderately to slightly acid soils cover an area of 292 ha (53%).

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

Liming materials:

1. $CaCO_3$ (Calcium Carbonate). More than 90% use in India.
2. Dolomite [Ca Mg $(Co_3)_2$]
3. Quick lime (Cao)
4. Slaked lime [Ca $(OH)_2$]

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

Neutral soils

Neutral soils cover about 228 ha (42%) area in the microwatershed.

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

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

Soil Degradation

Soil erosion is one of the major factor affecting the soil health in the microwatershed. Out of total 546 ha area in the microwatershed, an area of about 84 ha (15%) is suffering from slight erosion and 436 ha (80%) is suffering from moderate erosion. The areas suffering from moderate erosion need immediate soil and water

conservation and, other land development and land husbandry practices for restoring soil health.

Dissemination of Information and Communication of Benefits

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

Inputs for Net Planning (Saturation Plan) and Interventions needed

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

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

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

- **Soil Depth:** The depth of a soil decides the amount of moisture and nutrients it can hold, what crops can be taken up or not, depending on the rooting depth and the length of growing period available for raising any crop. Deeper the soil, better for a wide variety of crops. If sufficient depth is not available for growing deep rooted crops, either choose medium or short duration crops or deeper planting pits need to be opened and additional good quality soil brought from outside has to be filled into the planting pits.
- **Surface Soil Texture:** Lighter soil texture in the top soil means, better rain water infiltration, less run-off and soil moisture conservation, less capillary rise and less evaporation losses. Lighter surface textured soils are amenable to good soil tilth and are highly suitable for crops like groundnut, root vegetables (carrot, raddish, potato etc) but not ideal for crops that need stagnant water like lowland paddy. Heavy textured soils are poor in water infiltration and percolation. They are prone for sheet erosion; such soils can be improved by sand mulching. The technology that is developed by the AICRP-Dryland Agriculture, Vijayapura, Karnataka can be adopted.
- **Gravelliness:** More gravel content is favorable for run-off harvesting but poor in soil moisture storage and nutrient availability. It is a significant parameter that decides the kind of crop to be raised.

- **Land Capability Classification:** The land capability map shows the areas suitable and not suitable for agriculture and the major constraints in each of the plot/survey number. Hence, one can decide what kind of enterprise is possible in each of these units. In general, erosion and soil are the major constraints in Oddarahatti Microwatershed.
- **Organic Carbon:** The OC content (an index of available Nitrogen) is medium (0.5-0.75%) in 162 ha (30%) and high (>0.75%) in 359 ha(66%). The areas that are medium in OC needs to be further improved by applying farmyard manure and rotating crops with cereals and legumes or mixed cropping.
- **Promoting green manuring:** Growing of green manuring crops costs Rs. 1250/ha (green manuring seeds) and about Rs. 2000/ha towards cultivation that totals to Rs. 3250/- per ha. On the other hand, application of organic manure @ 10 tons/ha costs Rs. 5000/ha. The practice needs to be continued for 2-3 years or more. Nitrogen fertilizer needs to be supplemented by 25% in addition to the recommended level in the 162 ha area where OC is medium. 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:** Entire area of about 521 ha (95%) is high (>57 kg/ha) in available phosphorus. Hence for all the crops, 25% additional P-needs to be applied where it is low and medium.
- **Available Potassium:** Available potassium is medium (145-337 kg/ha) in 425 (78%) and high (>337 kg/ha) in 95 ha (17%) in the microwatershed. Additional 25% potassium needs to be applied in areas where it is medium.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops. Available sulphur is low (<10 ppm) in 265 ha (49%), medium (10-20 ppm) in 250 ha (46%) and high (>20 ppm) in about 5 ha (1%) in the microwatershed. These low and medium areas need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertitilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Boron:** An area of about 487 ha (89%) is low (<0.5 ppm) and 34 ha (6%) is medium (0.5-1.0 ppm) in available boron content. The areas that are low and medium need to be applied with sodium borate @ 10 kg/ha as soil application or 0.2% borax as foliar spray to correct the deficiency.
- **Available Iron:** Entire area of 521 ha (95%) is sufficient (>4.5 ppm) in available iron in the microwatershed. To manage iron deficiency, iron sulphate@25 kg/ha needs to be applied for 2-3 years in the deficient areas.
- **Available Manganese:** Entire area in the microwatershed is sufficient (>1.0 ppm) in available manganese.
- **Available Copper:** Entire area is sufficient (>0.2 ppm) in available copper in the microwatershed.

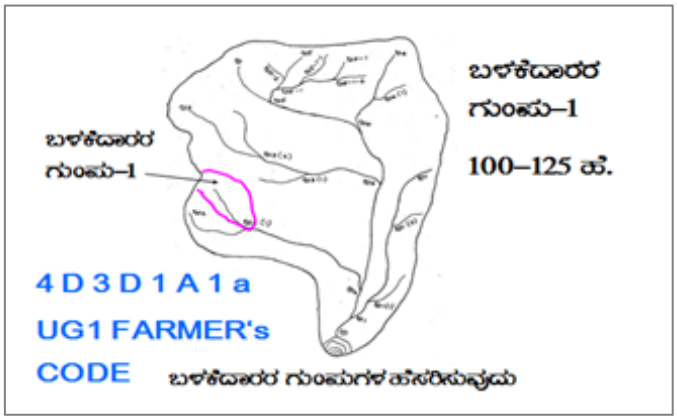
- **Available Zinc:** An area of 138 ha (25%) deficient (<0.6 ppm) and sufficient (>0.6 ppm) in 382 ha (70%) in available zinc in the microwatershed.
- **Soil Acidity:** The microwatershed has 292 ha (53%) area with soils that are moderately to slightly acid. These areas need application of lime (Calcium Carbonate).
- **Land suitability for various crops:** Areas that are highly, moderately and marginally suitable and not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, rooting depth and salinity/alkalinity are the major constraints in various plots. With suitable management interventions, the productivity can be enhanced. In order to increase water holding capacity of light textured soils, growing of green manure crops and application of organic manure is recommended.

Chapter 9

SOIL AND WATER CONSERVATION TREATMENT PLAN

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

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



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

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

Steps for Survey and Preparation of Treatment Plan

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

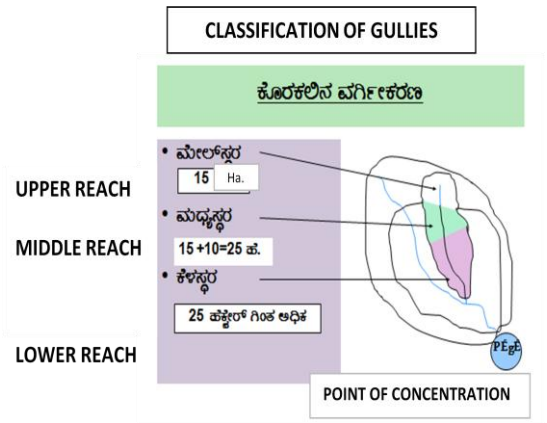
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge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

9.1 Treatment Plan

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

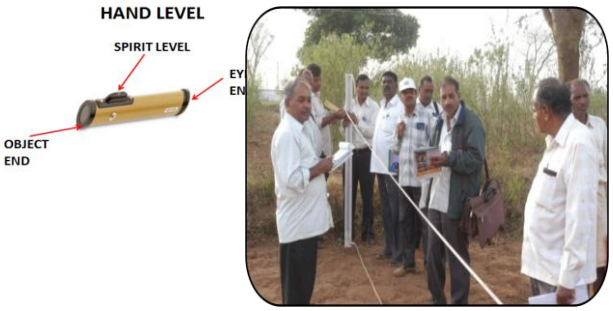
9.1.1 Arable Land Treatment

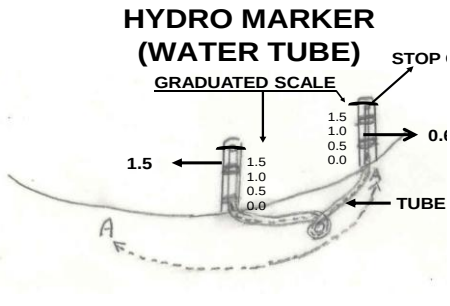
A. BUNDING

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

Measurement of Land Slope

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





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

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

Note: i) The above intervals are maximum.

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

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

Section of the Bund

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

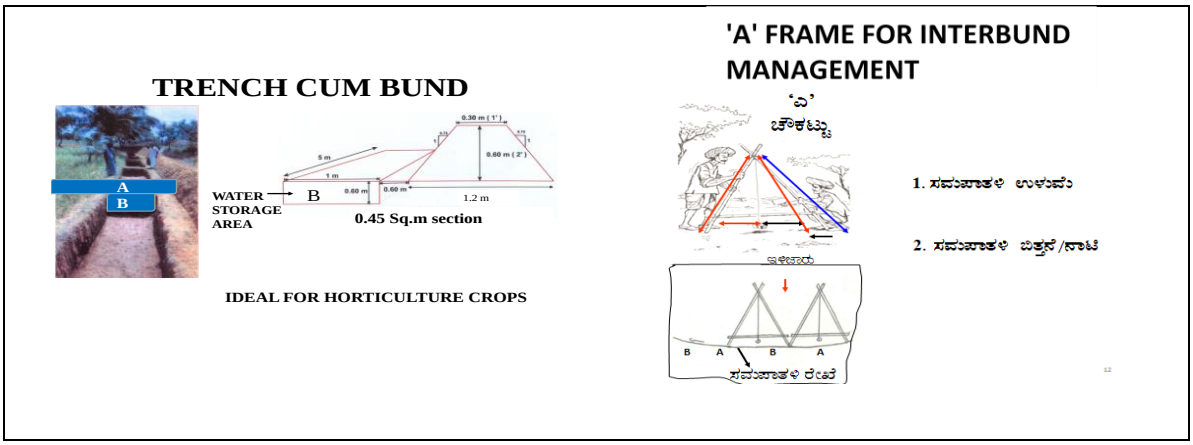
Recommended Bund Section

Top width (m)	Base width (m)	Height (m)	Side slope (Z:1;H:V)	Cross section (sq m)	Soil Texture	Remarks
0.3	0.9	0.3	01:01	0.18	Sandy loam	Vegetative bund
0.3	1.2	0.3	1.5:1	0.225	Sandy clay	
0.3	1.2	0.5	0.9:1	0.375	Red gravelly soils	
0.3	1.2	0.6	0.75:1	0.45		
0.3	1.5	0.6	01:01	0.54	Red sandy loam	
0.3	2.1	0.6	1.5:1	0.72	Very shallow 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. Waterways

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

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

c) The design details are given in the Manual.

C. Farm Ponds

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

D. Diversion channel

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

9.1.2 Non-Arable Land Treatment

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

9.1.3 Treatment of Natural Water Course/ Drainage Lines

a) The cadastral map has to be updated as regards the network of drainage lines (gullies/ *nalas/hallas*) and existing structures are marked to the scale and storage capacity of the existing water bodies are documented.
b) The drainage line will be demarcated into Upper Reach, Middle Reach and Lower Reach.
c) Considering the Catchment, *Nala* bed and bank conditions, suitable structures are decided.
d) Number of storage structures (Check dam/ *Nala* bund/ Percolation tank) will be decided considering the commitments and available runoff in water budgeting and quality of water in the wells and site suitability.
e) Detailed Leveling Survey using Dumpy Level / Total Station has to be carried out to arrive at the site-specific designs as shown in the Manual.
f) The location of ground water recharge structures are decided by examining the lineaments and fracture zones from geological maps.
g) Rainfall intensity data of the nearest Rain Gauge Station is considered for Hydrologic Designs.
h) Silt load to the Storage/Recharge Structures is reduced by providing vegetative, boulder and 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. Maximum area of about 440 ha (81%) requires Trench cum Bunding, an area of about 48 ha (9%) requires Graded Bunding and 32 ha (6%) requires Strengthening of existing bunds in the microwatershed. The conservation plan prepared may be presented to all the stakeholders including farmers and after including their suggestions, the conservation plan for the microwatershed may be finalised in a participatory approach.

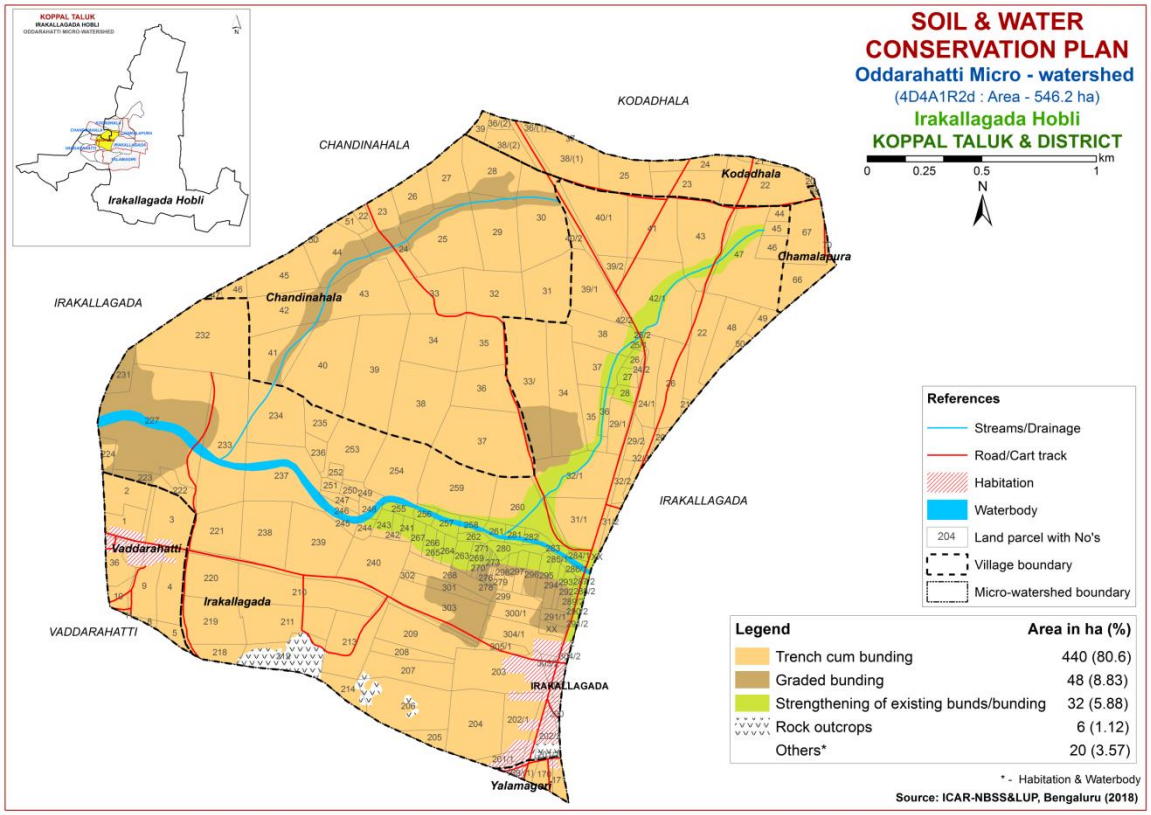


Fig. 9.1 Soil and Water Conservation Plan map of Oddarahatti Microwatershed

9.3 Greening of Microwatershed

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

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

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

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

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Appendix I

Oddarahatti (1R1d) 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
Chamalapura	66	2.76	VDHhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Horsegram+Maize (Hg+Mz)	Not Available	IIes	Trench cum bunding
Chamalapura	67	4.49	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Horsegram (Hg)	Not Available	IIes	Trench cum bunding
Chamalapura	69	0.16	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Pearmillet+Redgram (Pm+Rg)	Not Available	IIIes	Trench cum bunding
Chamalapura	70	0.05	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Pearmillet+Redgram (Pm+Rg)	Not Available	IIes	Trench cum bunding
Chandinahala	22	0.48	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Chandinahala	23	4.03	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Chandinahala	24	1.38	KVRiB2g1	LMU-1	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Mango (Cf+Mn)	Not Available	IIIes	Graded bunding
Chandinahala	25	7.96	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chandinahala	26	2.88	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Chandinahala	27	3.85	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	1 Borewell	IIIes	Trench cum bunding
Chandinahala	28	5.11	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Chandinahala	29	5.96	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Chandinahala	30	7.93	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Chandinahala	31	5.37	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Chandinahala	32	5.14	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Chandinahala	33	4.66	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+Mango (Cf+Mn)	Not Available	IIes	Trench cum bunding
Chandinahala	34	5.73	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Current fallow (Mz+Cf)	1 Borewell	IIes	Trench cum bunding
Chandinahala	35	4.35	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Chandinahala	36	4.6	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chandinahala	37	10.39	HDHiB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	2 Borewell	IIes	Trench cum bunding
Chandinahala	38	7.88	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Sugarcane (Mz+Sc)	Not Available	IIes	Trench cum bunding
Chandinahala	39	10.17	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Chandinahala	40	8.95	JDGcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Mango+Ridge guard (Mn+Rdg)	3 Borewell	IIes	Trench cum bunding
Chandinahala	41	4.94	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chandinahala	42	5.09	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Ridge guard (Mz+Rdg)	Not Available	IIes	Trench cum bunding
Chandinahala	43	6.8	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chandinahala	44	5.06	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Chandinahala	45	4.48	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Ridge guard (Rdg)	Not Available	IIes	Trench cum bunding
Chandinahala	46	0.79	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chandinahala	47	0.17	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIes	Trench cum bunding
Chandinahala	50	0.14	HDHcB2g2	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Very gravelly (35-60%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIes	Trench cum bunding
Chandinahala	51	0.62	MKHcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Hanamanahalli	7	0.0003	BPRcB2	LMU-3	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Pearl millet (Pm)	Not Available	IIIes	Trench cum bunding
Irakallagada	2	0.002	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Irakallagada	20	0.3	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Vegetables+Paddy (Rg+Vg+Pd)	Not Available	IIIs	Trench cum bunding
Irakallagada	21	0.18	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	22	4.44	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	24/1	2.83	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Paddy (Rg+Pd)	1 Borewell	IIes	Trench cum bunding
Irakallagada	24/2	0.18	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Trench cum bunding
Irakallagada	25/1	0.19	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	25/2	0.06	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	26	4.85	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Trench cum bunding
Irakallagada	27	0.67	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIsw	Graded bunding
Irakallagada	28	0.63	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIsw	Graded bunding
Irakallagada	29/1	1.94	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Paddy (Rg+Pd)	Not Available	IIIs	Trench cum bunding
Irakallagada	29/2	1.07	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Vegetables (Rg+Vg)	Not Available	IIIs	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Irakallagada	31/1	4.13	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Redgram+Groundnut+Vegetables (Mz+Rg+Gn+Vg)	Not Available	IIIs	Trench cum bunding
Irakallagada	31/2	0.65	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Currentfallow+Subabulu (Cf+Su)	Not Available	IIIs	Trench cum bunding
Irakallagada	32/1	6.29	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize+Redgram+Fallow land (Mz+Rg+Fl)	Not Available	IIIs	Trench cum bunding
Irakallagada	32/2	0.92	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Current fallow (Cf)	Not Available	IIIs	Trench cum bunding
Irakallagada	32/3	1.02	BDGiB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Currentfallow+Fallow land (Cf+Fl)	Not Available	IIIs	Trench cum bunding
Irakallagada	33/	8.9	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Groundnut (Rg+Mz+Gn)	Not Available	IIIes	Trench cum bunding
Irakallagada	34	7.53	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Groundnut+Maize (Rg+Gn+Mz)	Not Available	IIIes	Trench cum bunding
Irakallagada	35	2.38	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Subabulu+Eucalyptus (Su+Eu)	Not Available	IIIes	Trench cum bunding
Irakallagada	36	0.92	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Bajra+Fallow land (Bj+Fl)	Not Available	IIsw	Graded bunding
Irakallagada	37	3.28	BSRbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Eucalyptus+Redgram (Eu+Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	38	3.81	BSRbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	39/1	4.59	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	39/2	1.15	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	Trench cum bunding
Irakallagada	40/1	6.19	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	40/2	0.45	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	Trench cum bunding
Irakallagada	41	6.18	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	42/1	9.43	MKHiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Currentfallow+Horsegram (Cf+Hg)	Not Available	IIIes	Trench cum bunding
Irakallagada	42/2	0.16	BSRbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	43	6.66	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Eucalyptus+Fallow land (Eu+Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	44	0.64	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	45	0.69	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	46	1.25	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	47	8.96	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIIes	Trench cum bunding
Irakallagada	48	4.04	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Irakallagada	49	0.89	KTPhB2g1	LMU-6	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	50	0.38	VDHhB2g1	LMU-2	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	High (151-200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram+Paddy (Fl+Rg+Pd)	Not Available	IIes	Trench cum bunding
Irakallagada	200	0.33	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Irakallagada	201/1	0.91	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Irakallagada	201/2	0.14	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Habitation	Not Available	Ro	Ro
Irakallagada	202/1	3.44	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIes	Trench cum bunding
Irakallagada	202/2	1.3	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Irakallagada	203	6.95	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	204	6.86	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	205	1.07	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram+Vegetables (Mz+Rg+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	206	7.34	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	207	4.2	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Bajra (Rg+Bj)	Not Available	IIes	Trench cum bunding
Irakallagada	208	1.62	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	209	4.82	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	210	8.03	NGPhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Maize (Rg+Mz)	Not Available	IIIs	Trench cum bunding
Irakallagada	211	5.84	LKRiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Horsegram+Redgram (Hg+Rg)	1 Borewell	IIes	Trench cum bunding
Irakallagada	212	4.82	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Granite Outcrop	Not Available	Ro	Ro
Irakallagada	213	5.57	LKRiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	214	1.68	LKRiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	218	1.68	BSRhB2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Paddy (Rg+Pd)	Not Available	IIes	Trench cum bunding
Irakallagada	219	5.21	BSRhB2	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Eucalyptus+Redgram (Eu+Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	220	4.36	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	221	4.35	NGPhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Maize (Rg+Mz)	Not Available	IIIs	Trench cum bunding
Irakallagada	222	1.11	NGPhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIIs	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Irakallagada	223	1.14	GRHmB2	LMU-1	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
Irakallagada	224	0.86	BPRcB2	LMU-3	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Maize (Mz)	Not Available	IIIes	Trench cum bunding
Irakallagada	227	19.06	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Paddy (Fl+Pd)	Not Available	IIes	Graded bunding
Irakallagada	231	1.43	GRHmB2	LMU-1	Deep (100-150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram+Fallow land (Mz+Rg+Fl)	1 Borewell	IIes	Graded bunding
Irakallagada	232	12.68	LKRiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables+Paddy (Rg+Vg+Pd)	2 Borewell	IIes	Trench cum bunding
Irakallagada	233	10.78	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Redgram+Fallow land (Mz+Rg+Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	234	6.34	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables+Fallow land (Rg+Vg+Fl)	2 Borewell	IIes	Trench cum bunding
Irakallagada	235	1.77	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	Trench cum bunding
Irakallagada	236	1.04	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra (Bj)	Not Available	IIes	Trench cum bunding
Irakallagada	237	8.05	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallowland+Maize+Redgram (Fl+Mz+Rg)	1 Borewell	IIes	Trench cum bunding
Irakallagada	238	5.73	NGPhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Maize (Rg+Mz)	Not Available	IIIs	Trench cum bunding
Irakallagada	239	6.89	JDGcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Pomegranate (Rg+Mz+Pm)	Not Available	IIes	Trench cum bunding
Irakallagada	240	5.54	JDGcB2g1	LMU-2	Deep (100-150 cm)	Sandy loam	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	Trench cum bunding
Irakallagada	241	0.52	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Eucalyptus (Eu)	Not Available	IIsw	Graded bunding
Irakallagada	242	0.49	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Eucalyptus (Eu)	Not Available	IIsw	Graded bunding
Irakallagada	243	0.91	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Eucalyptus (Eu)	Not Available	IIsw	Graded bunding
Irakallagada	244	0.65	LKRiB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	245	0.5	JDGcB2	LMU-2	Deep (100-150 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	246	0.79	Waterbody	Others	Others	Others	Others	Others	Others	Others	Fallow land (Fl)	Not Available	Others	Others
Irakallagada	247	0.71	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	248	0.73	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	249	0.72	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Irakallagada	250	0.41	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Irakallagada	251	0.47	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	252	0.47	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	253	4.89	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	254	6.01	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Vegetables (Rg+Mz+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	255	0.6	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	256	0.68	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	257	1.03	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	258	0.72	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	259	7.11	JDGiB2g1	LMU-2	Deep (100-150 cm)	Sandy clay	Gravelly (15-35%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Maize+Groundnut+Vegetables (Mz+Gn+Vg)	2 Borewell	IIes	Trench cum bunding
Irakallagada	260	5.2	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land+Vegetables (Fl+Vg)	Not Available	IIsw	Graded bunding
Irakallagada	261	0.71	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	262	0.53	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	263	0.92	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Current fallow (Cf)	1 Borewell	IIsw	Graded bunding
Irakallagada	264	0.68	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	265	0.51	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	266	0.72	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	267	0.78	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	268	2.69	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	Graded bunding
Irakallagada	269	0.41	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	270	0.36	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	271	0.15	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	272	0.12	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	273	0.18	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Irakallagada	274	0.08	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	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
Irakallagada	275	0.1	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Irakallagada	276	0.17	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Irakallagada	277	0.12	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Trench cum bunding
Irakallagada	278	0.15	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Trench cum bunding
Irakallagada	279	0.58	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	280	1.24	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIsw	Graded bunding
Irakallagada	281	0.64	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	282	0.42	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	283	0.6	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Fallow land (Fl)	Not Available	IIsw	Graded bunding
Irakallagada	284/1	0.3	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	285/1	0.27	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Irakallagada	286/1	0.41	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	287/2	0.14	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	288/2	0.14	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	289/2	0.11	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	290/1	0.0007	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	290/2	0.06	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	291/1	0.79	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Irakallagada	291/2	0.001	HLPmA1	LMU-4	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Nearly level (0-1%)	Slight	Not Available (NA)	Not Available	IIsw	Graded bunding
Irakallagada	292	0.89	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Irakallagada	293	0.48	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Irakallagada	294	0.88	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane (Sc)	Not Available	IIes	Graded bunding
Irakallagada	295	0.94	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Irakallagada	296	1.04	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Sugarcane (Sc)	Not Available	IIes	Graded bunding

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Irakallagada	297	0.83	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Vegetables (Rg+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	298	0.69	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Bajra+Vegetables (Bj+Vg)	Not Available	IIes	Trench cum bunding
Irakallagada	299	1.12	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	300/1	1.52	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	301	1.34	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	Graded bunding
Irakallagada	302	0.24	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	303	5.64	DRLmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Bajra (Rg+Mz+Bj)	Not Available	IIes	Graded bunding
Irakallagada	304/1	3.38	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Irakallagada	304/2	0.03	Habitation	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Irakallagada	305/1	0.97	LKRcB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Trench cum bunding
Irakallagada	305/2	0.37	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Irakallagada	306/1	0.38	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Kodadhala	20	0.15	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Horsegram+Currentfallow+Eucalyptus (Hg+Cf+Eu)	Not Available	IIIes	Trench cum bunding
Kodadhala	21	0.41	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Tomato(Rg+Mz+Tm)	Not Available	IIIes	Trench cum bunding
Kodadhala	22	6.59	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Mesta+Eucalyptus(Rg+Mst+Eu)	Not Available	IIIes	Trench cum bunding
Kodadhala	23	3.72	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Habitation (Rg+Mz+Hb)	Not Available	IIIes	Trench cum bunding
Kodadhala	24	1.89	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Groundnut+Habitation (Rg+Gn+Hb)	Not Available	IIIes	Trench cum bunding
Kodadhala	25	3.59	MKHhB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Eucalyptus+Current fallow(Rg+Mz+Eu+Cf)	Not Available	IIIes	Trench cum bunding
Kodadhala	36/(1)	0.41	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Horsegram (Rg+Mz+Hg)	Not Available	IIIes	Trench cum bunding
Kodadhala	36/(2)	0.51	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIIes	Trench cum bunding
Kodadhala	37	0.02	BPRhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Maize (Rg+Mz)	Not Available	IIIs	Trench cum bunding
Kodadhala	38/(1)	4.97	MKHhB2g1	LMU-5	Moderately shallow (50-75 cm)	Sandy clay loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize+Guava (Rg+Mz+Gv)	1 Borewell	IIIes	Trench cum bunding
Kodadhala	38/(2)	1.86	BPRhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Eucalyptus (Eu)	Not Available	IIIs	Trench cum bunding

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Kodadhala	39	0.77	BPRbB2g1	LMU-3	Deep (100-150 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Pearl millet+Mango+Current fallow+Tomato (Rg+Pm+Mn+Cf+Tm)	Not Available	IIIes	Trench cum bunding
Vaddarahatti	1	1.98	GHTcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Vaddarahatti	2	2.75	GHTcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Tomato+Pearl millet (Tm+Pm)	1 Borewell	IIes	Trench cum bunding
Vaddarahatti	3	4.19	NGPhB1g1	LMU-3	Deep (100-150 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Maize (Rg+Mz)	Not Available	IIIs	Trench cum bunding
Vaddarahatti	4	3.35	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Maize (Rg+Mz)	Not Available	IIes	Trench cum bunding
Vaddarahatti	5	0.89	BSRiB1	LMU-2	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIs	Trench cum bunding
Vaddarahatti	8	0.21	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Vaddarahatti	9	3.3	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Trench cum bunding
Vaddarahatti	10	1.07	GHTbB2g1	LMU-2	Moderately deep (75-100 cm)	Loamy sand	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Fallow land (Rg+Fl)	Not Available	IIes	Trench cum bunding
Vaddarahatti	11	0.00002	HDHcB1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram+Maize+Fallow land (Rg+Mz+Fl)	Not Available	IIs	Trench cum bunding
Vaddarahatti	36	1.93	GHThB2g1	LMU-2	Moderately deep (75-100 cm)	Sandy clay loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Neiger (Rg+Ng)	Not Available	IIes	Trench cum bunding
Yalamageri	169/(1)	0.2	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Yalamageri	170	0.97	BDGcB1g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Maize (Mz)	Not Available	IIIs	Trench cum bunding
Yalamageri	171	0.89	HDHcB2g1	LMU-3	Moderately deep (75-100 cm)	Sandy loam	Gravelly (15-35%)	Very Low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIes	Trench cum bunding

Appendix II

Oddarahatti (1R1d) Microwatershed

Soil Fertility Information

Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	High (> 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro
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Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
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Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
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Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Moderately acid (pH 5.5 – 6.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)

Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Slightly acid (pH 6.0 – 6.5)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Sufficient (> 0.6 ppm)
Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	High (> 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Appendix III

Oddarahatti (1R1d) Microwatershed

Soil Suitability Information

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Chamalapura	66	S2rg	S2g	S2g	S2g	S2g	S2tg	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2g	S2rg	S2g	S2g	S2g	S2g	S2tg	S2tg	S2g	S2g	S2tg	S2t	S1	S2gt	S1	S1	S2t
Chamalapura	67	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Chamalapura	69	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Chamalapura	70	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Chandinahala	22	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Chandinahala	23	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Chandinahala	24	S2rz	S2tz	S3tz	S2z	S3tz	S2z	S2rz	S2z	S2gz	S2z	S2gt	S2tz	S3tz	S2z	N1tz	S2rz	S2z	S3tz	S3tz	S3tz	S2tz	S2tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz	S2tz	S2tz	S3tz
Chandinahala	25	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	26	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Chandinahala	27	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Chandinahala	28	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Chandinahala	29	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Chandinahala	30	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Chandinahala	31	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Chandinahala	32	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	33	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	34	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	35	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	36	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	37	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	38	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	39	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Chandinahala	40	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Chandinahala	41	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Chandinahala	42	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Chandinahala	43	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	44	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	45	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	46	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	47	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	50	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Chandinahala	51	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Hanamanahalli	7	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Irakallagada	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	Others	Others	Others	Others	Others
Irakallagada	20	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	21	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r	S2r
Irakallagada	22	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r	S2r
Irakallagada	24/1	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r	S2r
Irakallagada	24/2	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r	S2r
Irakallagada	25/1	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	25/2	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	26	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S3r	S2r
Irakallagada	27	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	28	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	29/1	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	29/2	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	31/1	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	31/2	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	32/1	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Irakallagada	32/2	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	32/3	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Irakallagada	33/	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	34	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	35	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	36	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	37	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Irakallagada	38	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Irakallagada	39/1	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	39/2	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	40/1	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	40/2	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	41	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	42/1	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Irakallagada	42/2	S3r	S2tg	S2rg	S2g	S2rt	S2rg	S3r	S2rg	S2gt	S2r	S2gt	S2t	S2rg	S1	S2rt	S2rg	S2rg	S2t	S2t	S2t	S2tg	S2tg	S2rg	S2t	S2tg	S2t	S1	S2gt	S2r	S2r	S2t
Irakallagada	43	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Irakallagada	44	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Irakallagada	45	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Irakallagada	46	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	47	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Irakallagada	48	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r
Irakallagada	49	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S3t	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S2r	S2r	S3r	S2r
Irakallagada	50	S2rg	S2g	S2g	S2g	S2g	S2tg	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2g	S2rg	S2g	S2g	S2g	S2g	S2tg	S2tg	S2g	S2g	S2tg	S2t	S1	S2gt	S1	S1	S2t
Irakallagada	200	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Irakallagada	201/1	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Irakallagada	201/2	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro
Irakallagada	202/1	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	202/2	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	Others	Others	Others	Others	Others
Irakallagada	203	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	204	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	205	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	206	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	207	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	208	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	209	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	210	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Irakallagada	211	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	212	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro	Ro
Irakallagada	213	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	214	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	218	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Irakallagada	219	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S2t	S2t	S2r	S1	S2t	S2t	S1	S2t	S2r	S2r	S2t
Irakallagada	220	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Irakallagada	221	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Irakallagada	222	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Irakallagada	223	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Irakallagada	224	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Irakallagada	227	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Irakallagada	231	S3t	S2t	S3t	S1	S3t	S1	S2r	S1	S1	S1	S2t	S2t	S3t	S1	N1t	S2rt	S1	S3t	S3t	S3t	S2t	S2t	S2t	S2t	S3t	S2t	S2t	S3t	S2t	S2t	S3t
Irakallagada	232	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	233	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Irakallagada	234	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	235	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	236	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	237	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	238	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Irakallagada	239	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Irakallagada	240	S2r	S2tg	S1	S2tg	S2t	S2g	S2r	S1	S2gt	S2g	S2g	S1	S1	S1	S2t	S2r	S1	S2t	S2g	S2g	S2tg	S2tg	S1	S2g	S2tg	S2t	S2t	S2gt	S1	S1	S2t
Irakallagada	241	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	242	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	243	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	244	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	245	S2r	S2t	S1	S2t	S2t	S1	S2r	S1	S2t	S1	S1	S1	S1	S1	S2t	S2r	S1	S2t	S1	S1	S2t	S2t	S1	S1	S2t	S2t	S2t	S2t	S1	S1	S2t
Irakallagada	246	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Irakallagada	247	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	248	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	249	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	250	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	251	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	252	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	253	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	254	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	255	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	256	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	257	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	258	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	259	S2rg	S2tg	S2g	S2tg	S2tg	S2g	S2rg	S2g	S2gt	S2g	S2g	S1	S2g	S1	S2t	S2rg	S2g	S2t	S2g	S2g	S2g	S2g	S2g	S1	S2g	S2t	S1	S2g	S1	S1	S2t
Irakallagada	260	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Irakallagada	261	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	262	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	263	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	264	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	265	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	266	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	267	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	268	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	269	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	270	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	271	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	272	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	273	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	274	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	275	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	276	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	277	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	278	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	279	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	280	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	281	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	282	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	283	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	284/1	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	285/1	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Irakallagada	286/1	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Irakallagada	287/2	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	288/2	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	289/2	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	290/1	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	290/2	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	291/1	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	291/2	S3rw	S1	S2rw	S1	S2rw	S2w	S3rw	S2rw	S1	S2rw	S2rw	S2rw	S2rw	S2rw	N1tw	S3rw	S2rw	S2tw	S2w	S1	S2tw	S2tw	S2rw	S1	S2tw	S2rw	S2rw	S2tw	S2rw	S2rw	S2rw
Irakallagada	292	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	293	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	294	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	295	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	296	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	297	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	298	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	299	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	300/1	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	301	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	302	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	303	S3rz	S2tz	S3tz	S2nz	S3tz	S2rz	S3rz	S2rz	S2rz	S2rz	S3rz	S2tz	S3tz	S2z	N1tz	S3rz	S2rz	S3tz	S3tz	S3tz	S2tz	S2tz	S2rt	S2tz	S3tz	S2tz	S2tz	S2z	S2rz	S2tz	S3tz
Irakallagada	304/1	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	304/2	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	Others	Others	Others	Others	Others
Irakallagada	305/1	N1rg	S3rg	S3rg	S3rg	S3rg	S3g	N1rg	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S3rg	S3g	S3g	S3g	S3g	S3rg	S2rg	S3g	S3g	S3g	S3g	S3rg	S3rg	S3g
Irakallagada	305/2	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	Others	Others	Others	Others	Others
Irakallagada	306/1	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others

Village	Survey Number	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Jasmine	Bhendi	Brinjal	Crossandra	Drumstick	Mulberry	Onion
Kodadhala	20	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	21	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	22	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	23	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	24	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	25	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Kodadhala	36/(1)	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	36/(2)	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Kodadhala	37	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Kodadhala	38/(1)	N1r	S2rg	S3rg	S2rg	S3rg	S2rg	N1r	S3rg	S2rt	S3rg	S3rg	S2rg	S3rg	S2rg	S3rg	S3rg	S3rg	S2rg	S2rg	S2rg	S2rg	S2rg	S3rg	S2rg	S2rg	S3g	S3g	S2rg	S3rg	S3rg	S3g
Kodadhala	38/(2)	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Kodadhala	39	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3g	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2gt	S2g
Vaddarahatti	1	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Vaddarahatti	2	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Vaddarahatti	3	S3rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S3g	S2g	S2g	S2g
Vaddarahatti	4	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Vaddarahatti	5	S3r	S1	S2r	S1	S2r	S2rt	S3r	S2r	S2t	S2r	S2r	S1	S2r	S1	S1	S3r	S2r	S2t	S1	S1	S1	S1	S2r	S1	S1	S2t	S1	S1	S2r	S2r	S2t
Vaddarahatti	8	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Vaddarahatti	9	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Vaddarahatti	10	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Vaddarahatti	11	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g
Vaddarahatti	36	S3r	S2g	S2r	S2g	S2r	S2rg	S3r	S2r	S2g	S2rg	S2rg	S1	S2r	S1	S2r	S2r	S2r	S1	S2g	S2g	S2g	S2g	S2r	S1	S2g	S1	S1	S2g	S2rg	S2r	S1
Yalamageri	169/(1)	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Yalamageri	170	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S2rg	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S3g	S2tg	S2tg	S3g	S3g	S2g	S2tg
Yalamageri	171	S3rg	S3g	S2rg	S3g	S2rg	S3rg	S3rg	S2rg	S3g	S3rg	S3g	S2rg	S2rg	S2rg	S2rg	S2rg	S2rg	S2g	S3g	S3g	S3g	S3g	S2rg	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S3g

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

CONTENTS

LIST OF TABLES

Chapter 1

SILENT FINDINGS OF THE STUDY

- *The results indicated that among 35 farmers, 17 (48.57%) were marginal farmers, 10 (28.57 %) were small farmers, 2 (5.71 %) were semi medium farmers, 1 (2.86%) medium farmers and 5 (14.29 %) landless farmers were also interviewed for the survey.*
- *The data indicated that there were 128 population households were there in the studied micro-watershed. Among them 64 (50 %) men and 64 (50 %) were women. The average family size of marginal farmers was 4, small farmer was 4, semi medium farmer was 4 and for landless farmers it was 4.*
- *The data indicated that 22 (17.19 %) people were in 0-15 years of age, 49 (38.28 %) were in 16-35 years of age, 40 (31.25 %) were in 36-60 years of age and 17 (13.28 %) were above 61 years of age.*
- *The results indicated that the Oddarahatti had 27.34 per cent illiterates, 35.16 per cent of them had primary school education, 10.16 per cent of them had both middle school and high school education, 6.25 per cent of them had PUC education, 0.78 per cent them had Diploma education, 7.81 per cent of them had degree education and 0.78 per cent of them had masters education.*
- *The results indicated with reference to occupation of the household showed that, 54.29 per cent of households practicing agriculture and 2.86 per cent of the household heads were agricultural labourers, general labour, in Government service and in private service respectively. 8.57 per cent of the households were doing trade and business and 11.43 per cent of them were housewives.*
- *The results indicated that agriculture was the major occupation for 50.78 per cent of the household members, 1.56 per cent were agricultural labourers, 3.13 per cent were general labours, 1.56 percent were in government service, 1.56 per cent of them were in private sector, 4.69 per cent of them were trade and business, 19.53 per cent of them were students and 9.38 per cent were housewives.*
- *In case of landless households 10.53 per cent were agricultural labourers, 15.79 per cent were general labour, 5.26 per cent in government service, 15.79 per cent were in trade& business, 21.05 per cent ware housewife and 26.32 per cent were students. In case of marginal farmers 60.94 per cent were agriculturist, 1.56 percent was in government service, 3.13 per cent were in trade and business and 18.75 per cent were students. In case of small farmers 55.88 per cent of them were agriculturist and 20.59 per cent of them were students. In case of semi medium farmers 50 per cent of the family members were agriculturist and 12.50 per cent of them were students.*
- *The results showed that 3.13 per cent of them participated in self help groups, 0.78 per cent of them participated in cooperative bank. Landless, semi medium farmers and medium farmers were found to have no participation in any local institutions.*

Marginal farmers and small farmers were found to participate in one or the other local institutions.

- *The results indicated that 97.14 per cent of the households possess Katcha house and 2.86 per cent of them possess Thatched house. 100 percent of the landless, marginal and small farmers possess Katcha house.*
- *The results showed that 88.57 per cent of the households possess TV, 54.29 per cent of the households possess Mixer grinder, 5.71 per cent of the households possess refrigerator, 28.57 per cent of the households possess bicycle, 45.71 per cent of the households possess motor cycle and 85.71 per cent of the households possess mobile phones.*
- *The results showed that the average value of television was Rs. 2112, mixer grinder was Rs.1121, refrigerator Rs.13500, bicycle Rs.1000, motor cycle was Rs.29250 and mobile phone was Rs.800.*
- *The results indicated that about 22.86 per cent of the households possess plough, 14.29 per cent of them possess bullock cart, 14.29 per cent of the households possess sprayer, 5.71 per cent of them possess chaff cutter and 62.86 per cent of the households possess weeder.*
- *The results show that the average value of plough was Rs.660; the average value of bullock cart was Rs. 22000, the average value of sprayer Rs.2480, the average value of weeder Rs. 39 and the average value of chaff cutter Rs.3000.*
- *The results indicated that, 22.86 per cent of the households possess bullocks and 5.71 per cent of the households possess local cow. In case of marginal farmers, 29.41 per cent of the households possess bullock and 5.88 per cent of the households possess local cow. In case of small farmers, 20 per cent of households possess bullock. In case of semi medium farmers, 50 per cent of the households possess bullock and local low respectively.*
- *The results indicated that, average own labour men available in the micro-watershed was 1.23, average own labour (women) available was 1.03, average hired labour (men) available was 7.53 and average hired labour (women) available was 8.37.*
- *In case of marginal farmers, average own labour men available was 1.24, average own labour (women) was 1.12, average hired labour (men) was 4.94 and average hired labour (women) available was 5.82. In case of small farmers, average own labour men available was 1.10, average own labour (women) was 0.90, average hired labour (men) was 10.70 and average hired labour (women) available was 12.20. In case of semi medium farmers, average own labour men available was 1.50, average own labour (women) was 1, average hired labour (men) was 12.50 and average hired labour (women) available was 10. In medium farmers average own labour men available was 2, average own labour (women) was 1, average hired labour (men) was 10 and average hired labour (women) available was 10.*

- *The results indicated that, 85.71 per cent of the household opined that hired labour was adequate About 100 per cent of the marginal farmers, 100 per cent of small, 100 per cent of semi medium and medium farmers have opined that the hired labour was adequate.*
- *The results indicated that, households of the Oddarahatti micro-watershed possess 21.17 ha (71.84 %) of dry land and 8.26 ha (28.06 %) of irrigated land. Marginal farmers possess 8.45 ha (91.25 %) of dry land and 0.81 ha (8.75%) of irrigated land. Small farmers possess 10.70 ha (86.01%) of dry land and 1.74 ha (13.99 %) of irrigated land. Semi medium farmers possess 2.02 ha (66.67%) of dry land and 1.01 ha (33.33%) of irrigated land. Medium farmers possess 4.69 ha (100%) of irrigated land.*
- *The results indicated that, the average value of dry land was Rs. 318724.91 and average value of irrigated was Rs. 363235.29. In case of marginal famers, the average land value was Rs. 408313.36 for dry land and Rs. 494000 for irrigated land. In case of small famers, the average land value was Rs. 261573.37 for dry land Rs. 746744.19 for irrigated land. In case of semi medium famers, the average land value was Rs. 247000 for dry land and Rs. 494000 for irrigated land. In case of medium famers, the average land value was Rs. 170344.82 for irrigated land.*
- *The results indicated that, there were 6 functioning and 7 defunctioning bore wells in the micro-watershed. The results indicated that, there were 2 functioning open wells in the micro-watershed.*
- *The results indicated that, bore well was the irrigation source for 17.14 per cent of the farmers and open well was the source for 5.71 per cent of the farmers. The results indicated that, in case of semi medium farmers there was 1.01 ha of irrigated land.*
- *The results indicated that, farmers have grown bajra (3.94ha), cotton (1.77ha), crossandra (0.81ha), horse gram (1.32ha), maize (9.72 ha), navane (1.21 ha), papaya (0.91 ha),red gram (3.78 ha), sorghum(0.45 ha) and sugarcane (1.01 ha). Marginal farmers have grown Maize, Bajra, sorghum, crossandra and Redgram. Small farmers have grown Maize, cotton, horse gram, navane and red gram. Semi medium farmers have grown Maize, bajra, and red gram.. Medium farmers have grown papaya.*
- *The results indicated that, the cropping intensity in Oddarahatti micro-watershed was found to be 100 per cent in marginal farmers, small farmers, semi medium farmers and medium farmers respectively.*
- *The results indicated that, 85.71 per cent of the households have bank account and savings respectively. Among marginal farmers 60 percent of them possess both bank account and savings. 88.24 per cent of small farmers possess both bank account and savings correspondingly. Semi medium farmers possess 50 per cent of both bank account and savings respectively and medium category of farmers possess 100 per cent of bank account and also savings.*

- *The results indicated that, 60 per cent of landless, 88.24 per cent of marginal, 100 per cent of small, 50 per cent semi medium and 100 per cent of medium farmers have borrowed credit from different sources.*
- *The results indicated that, 56.67 per cent have availed loan in Grameena bank, 16.67 per cent have availed loan from money lender and 3.33 per cent have availed loan from commercial bank, input dealers/ suppliers and SHGs/CBOs respectively.*
- *The results indicated that,, marginal, small, semi medium and medium have availed Rs.62666.67, Rs. 80500, Rs50,000, and Rs. 100000 respectively. Overall average credit amount availed by households in the micro-watershed is 63166.67.*
- *The results indicated that, 100 per cent of the households have borrowed loan for agriculture production. The results indicated that, agriculture production, Construction-house, Construction-cattle shed and other reasons were the main purpose for which marginal, small farmers, semi medium farmers borrowed loan. About 71.43 percent of loan was taken for agriculture production and 14.29 per cent of the farmers taken loan for construction-house, Construction-cattle shed and other purpose respectively.*
- *Results indicated that 38.89 per cent of the households have repaid their institutional credit partially and 55.56 percent of the households have unpaid their loan and 5.56 per cent of the households were fully paid their loan.*
- *Results indicated that 28.57 per cent of the households have repaid their private credit partially, 57.14 percent of the households have unpaid their loan and 14.29 per cent of them fully paid their loan.*
- *The results indicated that, the total cost of cultivation for bajra was Rs. 16072.05. The gross income realized by the farmers was Rs. 21880.63. The net income from bajra cultivation was Rs. 5808.58, thus the benefit cost ratio was found to be 1:1.36. The results indicated that, the total cost of cultivation for maize was Rs. 18362.79. The gross income realized by the farmers was Rs. 35368.63. The net income from maize cultivation was Rs. 17005.84. Thus the benefit cost ratio was found to be 1:1.93.*
- *The results indicated that, the total cost of cultivation for navane was Rs. 10533.31. The gross income realized by the farmers was Rs. 31122. The net income from navane cultivation was Rs. 20588.69. Thus the benefit cost ratio was found to be 1:2.95. The results indicated that, the total cost of cultivation for sorghum was Rs. 18020.16. The gross income realized by the farmers was Rs. 26596.61. The net income from sorghum cultivation was Rs. 8576.44. Thus the benefit cost ratio was found to be 1:1.48.*
- *The results indicated that, the total cost of cultivation for redgram was Rs. 17906.59. The gross income realized by the farmers was Rs. 31578.54. The net income from redgram cultivation was Rs. 13671.95. Thus the benefit cost ratio was found to be 1:1.76. The results indicated that, the total cost of cultivation for Horse gram was Rs. 12039.19. The gross income realized by the farmers was Rs. 31271.56. The net income*

from Horse gram cultivation was Rs. 19232.37. Thus the benefit cost ratio was found to be 1:2.60.

- *The results indicated that, the total cost of cultivation for Sugarcane was Rs. 220236.14. The gross income realized by the farmers was Rs. 978120.00. The net income from Sugarcane cultivation was Rs. 757883.86. Thus the benefit cost ratio was found to be 1:4.44. The results indicated that, the total cost of cultivation for cotton was Rs. 20286.97. The gross income realized by the farmers was Rs. 48946.79. The net income from cotton cultivation was Rs. 28659.82. Thus the benefit cost ratio was found to be 1:2.41. The results indicated that, the total cost of cultivation for crossandra was Rs. 41401.74. The gross income realized by the farmers was Rs. 97330.35. The net income from crossandra cultivation was Rs. 55928.61. Thus the benefit cost ratio was found to be 1:2.35.*
- *The results indicated that, 22.86 per cent of the households opined that dry fodder was adequate. Among overall households 23.56 per cent of the marginal farmers, 30 per cent of small farmers and 50 per cent of semi medium farmers were opined that dry fodder was adequate.*
- *The results indicated that the average income from service/salary was Rs. 16514.29, business Rs. 17571.43, wage Rs. 23971.43, agriculture Rs. 81182.86, farm income Rs. 3,800 and dairy farm Rs. 414.*
- *The results indicated that, 74.29 per cent of the households are interested in growing horticultural crops which include 76.47 per cent marginal farmers, 100 per cent small farmers, semi medium farmers and medium farmers respectively. The results indicated that for 68.57 per cent of the households were dependent on government subsidy for land development. Similarly for the dependency was for irrigation facility was 77.14 percent and 20 percent for improved crop production.*
- *The results indicated that, chilly, cotton, Horse gram, Kanakambara flower, maize, navane, papaya, red gram, sorghum and sugar cane crops were sold to the extent of 100 per cent. Only bajra was sold to the extent of 98.15 per cent.*
- *The results indicated that, 11.43 percent of the households have sold their produce to local/village merchants and 77.14 percent of the households sold their produce in regulated markets. The results indicated that 75.51 per cent of the households have used cart as a mode of transport and 28.57 per cent have used tractor.*
- *The results indicated that, 85.71 per cent of the households have shown interest in soil testing. The results indicated that, 25.71 per cent of the households have adopted field bunding which includes 11.76 per cent of marginal, 60 per cent of small farmers, and 50 per cent of semi medium farmers.*
- *Results showed that summer ploughing was adopted by 82.86 per cent of the households i.e. 94.12 per cent of the marginal farmers and 100 per cent of the small and semi medium farmers respectively. Form pond was adopted by the farmers was 2.86 per cent.*

- *The results indicated that 14.29 per cent of soil conservation structure is constructed by the government, 2.86 per cent of soil conservation structure is constructed by the farmer's organization and another 5.71 per cent is constructed by others.*
- *The results indicated that, 74.29 percent used fire wood as a source of fuel, and 25.71 percent of the households used LPG. The results indicated that, piped supply was the major source for drinking water for 97.14 per cent which includes 100 per cent of landless, 94.12 per cent of marginal, 100 per cent of small farmers, semi medium and medium farmers respectively.*
- *The results indicated that, electricity was the major source of light which was found to be 97.14 per cent and 2.86 per cent of the households were used kerosene lamp as a source of light.*
- *The results indicated that, 48.57 per cent of the households possess sanitary toilet i.e. 40 per cent of landless, 41.18 per cent of marginal, 50 per cent of small, 100 per cent of semi medium and 100 per cent of medium had sanitary toilet facility.*
- *The results indicated that, 88.57 per cent of the sampled households possessed BPL card and 11.43 per cent of the sampled households not possessed BPL card.*
- *The results indicated that, 51.43 per cent of the households participated in NREGA programme which included 8 per cent of the landless, 47.06 percent of the marginal, 30 per cent of the small, 100 per cent of the semi medium and 100 percent of the medium farmers.*
- *The results indicated that, 100 per cent of cereals, pulses, milk and egg were adequate for the households. Vegetables and fruits were adequate only for 5.71 per cent and meat was adequate for only 2.86 per cent for the households respectively.*
- *The results indicated that, both vegetables and fruits were inadequate for 94.29 per cent, of the households. Oilseed was inadequate for 5.71 per cent. Meat was inadequate for 97.14 per cent of the households.*
- *The results indicated that, Lower fertility status of the soil was the constraint experienced by 60 per cent of the households, wild animal menace on farm field and frequent incidence of pest and diseases (77.14%), inadequacy of irrigation water (74.29%), high cost of fertilizers and plant protection chemicals and high rate of interest on credit (85.71%), low price for the agricultural commodities (82.86 %), lack of marketing facilities in the area (85.71%), inadequate extension services and lack of transport for safe transport of the agricultural produce to the market (82.86%) and Source of Agri-technology information(Newspaper/TV/Mobile) (2.86).*

Chapter 2

INTRODUCTION

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

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

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

Scope and importance of survey

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

Chapter 3

METHODOLOGY

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

Description of the study area

Koppal district is an administrative district in the state of Karnataka in India. In the past Koppal was referred to as 'Kopana Nagara'. Koppal, now a district headquarters is ancient Kopana a major holy place of the Jainas. The district occupies an area of 7,190 km² and has a population of 1,196,089, which 16.58% were urban as of 2001.[2] The Koppal district was formed after split of Raichur district.

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

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

Description of the micro-watershed

Oddarahatti micro-watershed (Irakallaguda sub-watershed, Koppal Taluk and District) is located at North latitude 15^0 28’ 12.116” and 15^0 29’ 27.686” and East longitude 76^0 10’ 44.958” and 76^0 12’ 58.91” covering an area of 416.97 ha and spread across Odarahatti, Chennahalu and Kodadahalu villages.

Methodology followed in assessing socio-economic status of households

In order to assess the socio-economic condition of the farmers in the watershed a comprehensive questionnaire was prepared. Major components such as demographic conditions, migration details, food consumption and family expenditure pattern, material possession, land holding, land use management, cropping pattern, cost of cultivation of crops, livestock management. The statistical components such as frequency and percentage were used to analyze the data. About 35 households located in the micro-watershed were interviewed for the survey.

Chapter 4

SALIENT FEATURES OF THE SURVEY

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Oddarahatti micro-watershed is presented in Table 1 and it indicated that 35 farmers were sampled in Oddarahatti micro-watershed among them 17 (48.57%) were marginal farmers, 10 (28.57 %) were small farmers, 2 (5.71 %) were semi medium farmers, 1 (2.86%) medium farmers and 5 (14.29 %) landless farmers were also interviewed for the survey.

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

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	5	14.29	17	48.57	10	28.57	2	5.71	1	2.86	35	100

Population characteristics: The population characteristics of households sampled for socio-economic survey in Oddarahatti micro-watershed is presented in Table 2. The data indicated that there were 128 population households were there in the studied micro-watershed. Among them 64 (50 %) men and 64 (50 %) were women. The average family size of marginal farmers, small farmer, landless and semi medium farmer was 4 and in medium farmers it was 3.

Table 2: Population characteristics of Oddarahatti micro-watershed

Sl. No.	Particulars	LL (19)		MF (64)		SF (34)		SMF (8)		MDF (3)		All (128)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Male	9	47.37	34	53.13	14	41.18	5	62.50	2	66.67	64	50
2	Female	10	52.63	30	46.88	20	58.82	3	37.50	1	33.33	64	50
Total		19	100	64	100	34	100	8	100	3	100	128	100
Average family size		4		4		4		4		3		3	

Age wise classification of population: The age wise classification of household members in Oddarahatti micro-watershed is presented in Table 3. The data indicated that 22 (17.19 %) people were in 0-15 years of age, 49 (38.28 %) were in 16-35 years of age, 40 (31.25 %) were in 36-60 years of age and 17 (13.28 %) were above 61 years of age.

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

Sl. No.	Particulars	LL (19)		MF (64)		SF (34)		SMF (8)		MDF (3)		All (128)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years	5	26.32	11	17.19	4	11.76	2	25	0	0	22	17.19
2	16-35 years	5	26.32	26	40.63	13	38.24	4	50	1	33.33	49	38.28
3	36-60 years	6	31.58	19	29.69	11	32.35	2	25	2	66.67	40	31.25
4	> 61 years	3	15.79	8	12.50	6	17.65	0	0	0	0	17	13.28
Total		19	100	64	100	34	100	8	100	3	100	128	100

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

Oddarahatti had 27.34 per cent illiterates, 35.16 per cent of them had primary school education, 10.16 per cent of them had both middle school and high school education, 6.25 per cent of them had PUC education, 0.78 per cent them had Diploma education, 7.81 per cent of them had degree education and 0.78 per cent of them had masters education.

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

S. N.	Particulars	LL (19)		MF (64)		SF (34)		SMF (8)		MDF (3)		All (128)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	4	21.05	17	26.56	14	41.18	0	0	0	0	35	27.34
2	Primary School	10	52.63	24	37.50	7	20.59	4	50	0	0	45	35.16
3	Middle School	1	5.26	9	14.06	2	5.88	1	12.50	0	0	13	10.16
4	High School	2	10.53	4	6.25	4	11.76	1	12.50	2	66.67	13	10.16
5	PUC	1	5.26	4	6.25	3	8.82	0	0	0	0	8	6.25
6	Diploma	0	0	0	0	0	0	0	0	1	33.33	1	0.78
7	Degree	1	5.26	4	6.25	4	11.76	1	12.50	0	0	10	7.81
8	Masters	0	0	1	1.56	0	0	0	0	0	0	1	0.78
9	Others	0	0	1	1.56	0	0	1	12.50	0	0	2	1.56
Total		19	100	64	100	34	100	8	100	3	100	128	100

Occupation of household heads: The data regarding the occupation of the household heads in Oddarahatti micro-watershed is presented in Table 5. The results indicated that, 54.29 per cent of households practicing agriculture and 2.86 per cent of the household heads were agricultural labourers, general labour, in government service and in private service respectively. 8.57 per cent of the households were doing trade and business and 11.43 per cent of them were housewives.

Table 5: Occupation of household heads in Oddarahatti micro-watershed

S. N.	Particulars	LL (5)		MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	11	64.71	6	60	1	50	1	100	19	54.29
2	Agricultural Labour	1	20	0	0	0	0	0	0	0	0	1	2.86
3	General Labour	1	20	0	0	0	0	0	0	0	0	1	2.86
4	Government Service	1	20	0	0	0	0	0	0	0	0	1	2.86
5	Private Service	0	0	1	5.88	0	0	0	0	0	0	1	2.86
6	Trade & Business	1	20	2	11.76	0	0	0	0	0	0	3	8.57
7	Others	0	0	4	23.53	2	20	0	0	0	0	6	17.14
8	Housewife	1	20	0	0	2	20	1	50	0	0	4	11.43
Total		5	100	18	100	10	100	2	100	1	100	36	100

Occupation of the household members: The data regarding the occupation of the household members in Oddarahatti micro-watershed is presented in Table 6. The results indicated that agriculture was the major occupation for 50.78 per cent of the household members, 1.56 per cent were agricultural labourers, 3.13 per cent were general labours, 1.56 percent were in government service, 1.56 per cent of them were in private sector, 4.69 per cent of them were trade and business, 19.53 per cent of them were students and 9.38 per cent were housewives. In case of landless households 10.53 per cent were

agricultural labourers, 15.79 per cent were general labour, 5.26 per cent in government service, 15.79 per cent were in trade& business, 21.05 per cent ware housewife and 26.32 per cent were students. In case of marginal farmers 60.94 per cent were agriculturist, 1.56 percent was in government service, 3.13 per cent were in trade and business and 18.75 per cent were students. In case of small farmers 55.88 per cent of them were agriculturist and 20.59 per cent of them were students. In case of semi medium farmers 50 per cent of the family members were agriculturist and 12.50 per cent of them were students.

Table 6: Occupation of family members in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (19)		MF (64)		SF (34)		SMF (8)		MDF (3)		All (128)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0.00	39	60.94	19	55.88	4	50.00	3	100.00	65	50.78
2	Agricultural Labour	2	10.53	0	0.00	0	0.00	0	0.00	0	0.00	2	1.56
3	General Labour	4	21.05	0	0.00	0	0.00	0	0.00	0	0.00	4	3.13
4	Government Service	1	5.26	1	1.56	0	0.00	0	0.00	0	0.00	2	1.56
5	Private Service	0	0.00	1	1.56	0	0.00	1	12.50	0	0.00	2	1.56
6	Trade & Business	3	15.79	2	3.13	1	2.94	0	0.00	0	0.00	6	4.69
7	Student	5	26.32	12	18.75	7	20.59	1	12.50	0	0.00	25	19.53
8	Others	0	0.00	5	7.81	4	11.76	0	0.00	0	0.00	9	7.03
9	Housewife	4	21.05	4	6.25	3	8.82	1	12.50	0	0.00	12	9.38
10	Children	0	0.00	0	0.00	0	0.00	1	12.50	0	0.00	1	0.78
Total		19	100.00	64	100.00	34	100.00	8	100.00	3	100.00	128	100.00

Institutional participation of the household members: The data regarding the institutional participation of the household members in Oddarahatti micro-watershed is presented in Table 7. The results showed that 3.13 per cent of them participated in self help groups, 0.78 per cent of them participated in cooperative bank and 96.09 per cent of them have not participated in any local institutions Landless, semi medium farmers and medium farmers were found to have no participation in any local institutions. Marginal farmers and small farmers were found to participate in one or the other local institutions.

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

S. N.	Particulars	LL (19)		MF (64)		SF (34)		SMF(8)		MDF(3)		All (128)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Self Help Group	0	0	3	4.69	1	2.94	0	0	0	0	4	3.13
2	No Participation	19	100	60	93.75	33	97.06	8	100	3	100	123	96.09
3	Cooperative bank	0	0	1	1.56	0	0	0	0	0	0	1	0.78
Total		19	100	64	100	34	100	8	100	3	100	128	100

Type of house owned: The data regarding the type of house owned by the households in Oddarahatti micro-watershed is presented in Table 8. The results indicated that 97.14 per cent of the households possess Katcha house and 2.86 per cent of them possess Thatched house. 100 percent of the landless, marginal and small farmers possess Katcha house.

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

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	0	0	0	0	1	10	0	0	0	0	1	2.86
2	Katcha	5	100	17	100	9	90	2	100	1	100	34	97.14
Total		5	100	17	100	10	100	2	100	1	100	35	100

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Oddarahatti micro-watershed is presented in Table 9. The results showed that 88.57 per cent of the households possess TV, 54.29 per cent of the households possess Mixer grinder, 5.71 per cent of the households possess refrigerator, 28.57 per cent of the households possess bicycle, 45.71 per cent of the households possess motor cycle and 85.71 per cent of the households possess mobile phones.

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

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	4	80	16	94.12	10	100	1	50	0	0	31	88.57
2	Mixer/Grinder	2	40	9	52.94	7	70	1	50	0	0	19	54.29
3	Refrigerator	0	0	0	0	2	20	0	0	0	0	2	5.71
4	Bicycle	0	0	6	35.29	4	40	0	0	0	0	10	28.57
5	Motor Cycle	2	40	8	47.06	5	50	1	50	0	0	16	45.71
6	Mobile Phone	3	60	14	82.35	10	100	2	100	1	100	30	85.71
7	Blank	1	20	2	11.76	0	0	0	0	0	0	3	8.57

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Oddarahatti micro-watershed is presented in Table 10. The results showed that the average value of television was Rs. 2112, mixer grinder was Rs.1121, refrigerator Rs.13500, bicycle Rs.1000, motor cycle was Rs.29250 and mobile phone was Rs.800.

Table 10: Average value of durable assets owned by households in Oddarahatti micro-watershed **Average Value (Rs.)**

S.N.	Particulars	LL (5)	MF (17)	SF (10)	SMF (2)	MDF(1)	All (35)
1	Television	2,250	2,125	2,050	2,000	0	2,112
2	Mixer/Grinder	1,100	1,111	1,157	1,000	0	1,121
3	Refrigerator	0	0	13,500	0	0	13,500
4	Bicycle	0	1,000	1,000	0	0	1,000
5	Motor Cycle	32,500	24,375	35,600	30,000	0	29,250
6	Mobile Phone	700	695	882	733	2,500	800

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

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	4	23.53	0	0	1	50	0	0	5	14.29
2	Plough	5	29.41	2	20	1	50	0		8	22.86
3	Sprayer	3	17.65	1	10	1	50	0	0	5	14.29
4	Weeder	14	82.35	5	50	2	100	1	100	22	62.86
5	Chaff Cutter	1	5.88	1	10	0	0	0	0	2	5.71
6	Blank	3	17.65	5	50	0	0	0	0	13	37.14

Farm Implements owned: The data regarding the farm implements owned by the households in Oddarahatti micro-watershed is presented in Table 11. About 22.86 per cent of the households possess plough, 14.29 per cent of them possess bullock cart, 14.29 per cent of the households possess sprayer, 5.71 per cent of them possess chaff cutter and 62.86 per cent of the households possess weeder.

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Oddarahatti micro-watershed is presented in Table 12. The results show that the average value of plough was Rs.660; the average value of bullock cart was Rs. 22000, the average value of sprayer Rs.2480, the average value of weeder Rs. 39 and the average value of chaff cutter Rs.3000.

Table 12: Average value of farm implements owned by households in Oddarahatti micro-watershed **Average Value (Rs.)**

Sl. No.	Particulars	MF (17)	SF (10)	SMF (2)	MDF (1)	All (35)
1	Bullock Cart	22,500		20,000	0	22,000
2	Plough	625	750	666	0	660
3	Sprayer	2,466	3,000	2,000	0	2,480
4	Weeder	45	27	33	50	39
5	Chaff Cutter	3,000	3,000	0	0	3,000

Livestock possession by the households: The data regarding the Livestock possession by the households in Oddarahatti micro-watershed is presented in Table 13. The results indicated that, 22.86 per cent of the households possess bullocks and 5.71 per cent of the households possess local cow.

In case of marginal farmers, 29.41 per cent of the households possess bullock and 5.88 per cent of the households possess local cow. In case of small farmers, 20 per cent of households possess bullock. In case of semi medium farmers, 50 per cent of the households possess bullock and local low respectively.

Table 13: Livestock possession by households in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Bullock	5	29.41	2	20.00	1	50.00	0	0.00	8	22.86
2	Local cow	1	5.88	0	0.00	1	50.00	0	0.00	2	5.71
3	blank	12	70.59	8	80.00	1	50.00	1	100.00	27	77.14

Average Labour availability: The data regarding the average labour availability in Oddarahatti micro-watershed is presented in Table 14. The results indicated that, average own labour men available in the micro-watershed was 1.23, average own labour (women) available was 1.03, average hired labour (men) available was 7.53 and average hired labour (women) available was 8.37.

In case of marginal farmers, average own labour men available was 1.24, average own labour (women) was 1.12, average hired labour (men) was 4.94 and average hired labour (women) available was 5.82. In case of small farmers, average own labour men available

was 1.10, average own labour (women) was 0.90, average hired labour (men) was 10.70 and average hired labour (women) available was 12.20. In case of semi medium farmers, average own labour men available was 1.50, average own labour (women) was 1, average hired labour (men) was 12.50 and average hired labour (women) available was 10. In medium farmers average own labour men available was 2, average own labour (women) was 1, average hired labour (men) was 10 and average hired labour (women) available was 10.

Table 14: Average Labour availability in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)	SF (10)	SMF (2)	MDF (1)	All (35)
		N	N	N	N	N
1	Own labour Male	1.24	1.10	1.50	2.00	1.23
2	Own Labour Female	1.12	0.90	1.00	1.00	1.03
3	Hired labour Male	4.94	10.70	12.50	10.00	7.53
4	Hired labour Female	5.82	12.20	10.00	10.00	8.37

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Oddarahatti micro-watershed is presented in Table 15. The results indicated that, 85.71 per cent of the household opined that hired labour was adequate About 100 per cent of the marginal farmers, 100 per cent of small, 100 per cent of semi medium and medium farmers have opined that the hired labour was adequate.

Table 15: Adequacy of Hired Labour in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Adequate	17	100	10	100	2	100	1	100	30	85.71

Distribution of land (ha): The data regarding the distribution of land (ha) in Oddarahatti micro-watershed is presented in Table 16. The results indicated that, households of the Oddarahatti micro-watershed possess 21.17 ha (71.84 %) of dry land and 8.26 ha (28.06 %) of irrigated land. Marginal farmers possess 8.45 ha (91.25 %) of dry land and 0.81 ha (8.75%) of irrigated land. Small farmers possess 10.70 ha (86.01%) of dry land and 1.74 ha (13.99 %) of irrigated land. Semi medium farmers possess 2.02 ha (66.67%) of dry land and 1.01 ha (33.33%) of irrigated land. Medium farmers possess 4.69 ha (100%) of irrigated land.

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

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	8.45	91.25	10.70	86.01	2.02	66.67	0.00	0	21.17	71.94
2	Irrigated	0.81	8.75	1.74	13.99	1.01	33.33	4.69	100	8.26	28.06
Total		9.26	100	12.44	100	3.04	100	4.69	10	29.43	100

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Oddarahatti micro-watershed is presented in Table 17. The results indicated that, the average value of dry land was Rs. 318724.91 and average value of irrigated was Rs. 363235.29. In case of marginal famers, the average land value was Rs. 408313.36 for dry

land and Rs. 494000 for irrigated land. In case of small famers, the average land value was Rs. 261573.37 for dry land Rs. 746744.19 for irrigated land. In case of semi medium famers, the average land value was Rs. 247000 for dry land and Rs. 494000 for irrigated land. In case of medium famers, the average land value was Rs. 170344.82 for irrigated land.

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

Sl. No.	Particulars	MF (17)	SF (10)	SMF (2)	MDF (1)	All (35)
		N	N	N	N	N
1	Dry	408313.36	261573.37	247000	0.00	318724.91
2	Irrigated	494000	746744.19	494000	170344.82	363235.29

Status of bore wells: The data regarding the status of bore wells in Oddarahatti micro-watershed is presented in Table 18. The results indicated that, there were 6 functioning and 7 de-functioning bore wells in the micro-watershed.

Table 18: Status of bore wells in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)	SF (10)	SMF (2)	MDF (1)	All (35)
		N	N	N	N	N
1	De-functioning	3	3	0	1	7
2	Functioning	2	3	0	1	6

Status of open wells: The data regarding the status of open wells in Oddarahatti micro-watershed is presented in Table 19. The results indicated that, there were 2 functioning open wells in the micro-watershed.

Table 19: Status of open wells in Oddarahatti micro-watershed

Sl.No.	Particulars	SMF (2)	All (35)
		N	N
1	Functioning	2	2

Source of irrigation: The data regarding the source of irrigation in Oddarahatti micro-watershed is presented in Table 20. The results indicated that, bore well was the irrigation source for 17.14 per cent of the farmers and open well was the irrigation source for 5.71 per cent of the farmers.

Table 20: Source of irrigation in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Bore Well	2	11.76	3	30.00	0	0.00	1	100.00	6	17.14
2	Open Well	0	0.00	0	0.00	2	100.00	0	0.00	2	5.71

Irrigated Area (ha): The results (Table 21) indicated that, in case of semi medium farmers there were 2.02 ha of irrigated land.

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

Sl.No.	Particulars	SMF (2)	All (35)
1	Kharif	1.01	1.01
2	Rabi	1.01	1.01
Total		2.02	2.02

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

S.N.	Particulars	MF (17)	SF (10)	SMF (2)	MDF (1)	All (35)
1	Kharif - Bajra	2.72	0.00	1.21	0.00	3.94
2	Kharif - Cotton	0.00	1.77	0.00	0.00	1.77
3	Kharif - Crossandra	0.81	0.00	0.00	0.00	0.81
4	Kharif - Horse gram	0.00	1.32	0.00	0.00	1.32
5	Kharif - Maize	3.57	5.13	1.01	0.00	9.72
6	Kharif -Navane (Fox Millet)	0.00	1.21	0.00	0.00	1.21
7	Kharif - papaya	0.00	0.00	0.00	0.91	0.91
8	Kharif - Red gram (Togari)	1.70	1.27	0.81	0.00	3.78
9	Kharif - Sorghum	0.45	0.00	0.00	0.00	0.45
10	Kharif - Sugarcane	0.00	1.01	0.00	0.00	1.01
Total		9.26	12.61	3.04	0.91	25.82

Cropping pattern: The data regarding the cropping pattern in Oddarahatti micro-watershed is presented in Table 22. The results indicated that, farmers have grown bajra (3.94ha), cotton (1.77ha), crossandra (0.81ha), horse gram (1.32ha), maize (9.72 ha), navane (1.21 ha), papaya (0.91 ha), red gram (3.78 ha), sorghum (0.45 ha) and sugarcane (1.01 ha). Marginal farmers have grown Maize, Bajra, sorghum, crossandra and Redgram. Small farmers have grown Maize, cotton, horse gram, navane and red gram. Semi medium farmers have grown Maize, bajra, and red gram. Medium farmers have grown papaya.

Cropping intensity: The data regarding the cropping intensity in Oddarahatti micro-watershed is presented in Table 23. The results indicated that, the cropping intensity in Oddarahatti micro-watershed was found to be 100 per cent in marginal farmers, small farmers, semi medium farmers and medium farmers respectively.

Table 23: Cropping intensity in Oddarahatti micro-watershed

Sl.No.	Particulars	MF (17)	SF (10)	SMF(2)	MDF(1)	All 35)
1	Cropping Intensity	100	100	100	100	100

Possession of Bank account: The data regarding the possession of Bank account and savings in Oddarahatti micro-watershed is presented in Table 24. The results indicated that, 85.71 per cent of the households have bank account and savings respectively. Among marginal farmers 60 percent of them possess both bank account and savings. 88.24 per cent of small farmers possess both bank account and savings correspondingly. Semi medium farmers possess 50 per cent of both bank account and savings respectively and medium category of farmers possess 100 per cent of bank account and also savings.

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

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Account	3	60.00	15	88.24	10	100	1	50	1	100	30	85.71
2	Savings	3	60.00	15	88.24	10	100	1	50	1	100	30	85.71

Borrowing status: The data regarding the possession of borrowing status in Oddarahatti micro-watershed is presented in Table 25. The results indicated that, 60 per cent of

landless, 88.24 per cent of marginal, 100 per cent of small, 50 per cent semi medium and 100 per cent of medium farmers have borrowed credit from different sources.

Table 25: Borrowing status in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Credit Availed	3	60	15	88.24	10	100	1	50	1	100	30	85.71

Source of credit: The data regarding the source of credit availed by households in Oddarahatti micro-watershed is presented in Table 26. The results indicated that, 56.67 per cent have availed loan in Grameena bank, 16.67 per cent have availed loan from money lender and 3.33 per cent have availed loan from commercial bank, input dealers/ suppliers and SHGs/CBOs respectively.

Table 26: Source of credit availed by households in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (15)		SF (10)		SMF (1)		MDF (1)		All (30)	
		N	%	N	%	N	%	N	%	N	%
1	Commercial Bank	0	0.00	0	0.00	0	0.00	1	100	1	3.33
2	Grameena Bank	10	66.67	6	60.00	1	100	0	0.00	17	56.67
3	Input Dealers/ Suppliers	1	6.67	0	0.00	0	0.00	0	0.00	1	3.33
4	Money Lender	4	26.67	1	10.00	0	0.00	0	0.00	5	16.67
5	SHGs/CBOs	1	6.67	0	0.00	0	0.00	0	0.00	1	3.33

Average credit amount: The data regarding the average credit amount availed by households in Oddarahatti micro-watershed is presented in Table 27. The results indicated that,, marginal, small, semi medium and medium have availed Rs.62666.67, Rs. 80500, Rs.50,000, and Rs. 100000 respectively. Overall average credit amount availed by households in the micro-watershed is 63166.67.

Table 27: Average Credit amount availed by households in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (15)	SF (10)	SMF (1)	MDF (1)	All (30)
		N	N	N	N	N
1	Average Credit	62666.67	80500	50000	100000	63166.67

Purpose of credit borrowed (institutional Source): The data regarding the purpose of credit borrowed from institutional sources by households in Oddarahatti micro-watershed is presented in Table 28. The results indicated that, 100 per cent of the households have borrowed loan for agriculture production.

Table 28: Purpose of credit borrowed (institutional Source) by households in Oddarahatti micro-watershed

Sl.No.	Particulars	MF (10)		SF (6)		SMF (1)		MDF (1)		All (18)	
		N	%	N	%	N	%	N	%	N	%
1	Agriculture production	10	100	6	100	1	100	1	100	18	100

Purpose of credit borrowed (Private Credit): The data regarding the purpose of credit borrowed from private sources by households in Oddarahatti micro-watershed is presented in Table 29. The results indicated that, agriculture production, Construction-house, Construction-cattle shed and other reasons were the main purpose for which marginal, small farmers, semi medium farmers borrowed loan. About 71.43 percent of loan was taken for agriculture production and 14.29 per cent of the farmers taken loan for construction-house, Construction-cattle shed and other purpose respectively.

Table 29: Purpose of credit borrowed (Private Credit) by households in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (6)		SF (1)		All (7)	
		N	%	N	%	N	%
1	Agriculture production	5	83.33	0	0	5	71.43
2	Construction-house, Construction-cattle shed	0	0.00	1	100	1	14.29
3	Other	1	16.67	0	0	1	14.29

Repayment status of households (Institutional): The data regarding the repayment status of credit borrowed from institutional sources by households in Oddarahatti micro-watershed is presented in Table 30. Results indicated that 38.89 per cent of the households have repaid their institutional credit partially and 55.56 percent of the households have unpaid their loan and 5.56 per cent of the households were fully paid their loan.

Table 30: Repayment status of households (Institutional) **in Oddarahatti micro-watershed**

Sl. No.	Particulars	MF (10)		SF (6)		SMF (1)		MDF (1)		All (18)	
		N	%	N	%	N	%	N	%	N	%
1	Partially paid	3	30	3	50	0	0	1	100	7	38.89
2	Un paid	6	60	3	50	1	100	0	0	10	55.56
3	Fully paid	1	10	0	0	0	0	0	0	1	5.56

Repayment status of households (Private): The data regarding the repayment status of credit borrowed from private sources by households in Oddarahatti micro-watershed is presented in Table 31. Results indicated that 28.57 per cent of the households have repaid their private credit partially, 57.14 percent of the households have unpaid their loan and 14.29 per cent of them fully paid their loan.

Table 31: Repayment status of households (Private) in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (6)		SF (1)		All (7)	
		N	%	N	%	N	%
1	Partially paid	2	33.33	0	0	2	28.57
2	Un paid	3	50	1	100	4	57.14
3	Fully paid	1	16.67	0	0	1	14.29

Cost of Cultivation of Bajra: The data regarding the cost of cultivation of groundnut in Oddarahatti micro-watershed is presented in Table 32. The results indicated that, the total cost of cultivation for bajra was Rs. 16072.05. The gross income realized by the farmers was Rs. 21880.63. The net income from bajra cultivation was Rs. 5808.58, thus the benefit cost ratio was found to be 1:1.36.

Table 32: Cost of Cultivation of Bajra in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	20.05	3320.65	20.66
2	Bullock		Pairs/day	0.60	330.47	2.06
3	Tractor		Hours	2.13	1599.68	9.95
4	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	6.26	646.67	4.02
5	Fertilizer + micronutrients		Quintal	5.44	4573.53	28.46
6	Depreciation charges			0.00	207.34	1.29
7	Land revenue and Taxes			0.00	8.23	0.05
II	**Cost B1**					
8	Interest on working capital				626.42	3.90
9	**Cost B1 = (Cost A1 + sum of 15 and 16)**				11312.99	70.39
III	**Cost B2**					
10	Rental Value of Land				166.67	1.04
11	**Cost B2 = (Cost B1 + Rental value)**				11479.66	71.43
IV	**Cost C1**					
12	Family Human Labour			17.22	3131.30	19.48
13	**Cost C1 = (Cost B2 + Family Labour)**				14610.96	90.91
V	**Cost C2**					
14	**Cost C2 = (Cost C1 + Risk Premium)**				14610.96	90.91
VI	**Cost C3**					
15	Managerial Cost				1461.10	9.09
16	**Cost C3 = (Cost C2 + Managerial Cost)**				16072.05	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		13.68	21880.63	
		b) Main Crop Sales Price (Rs.)			1600.00	
b.	Gross Income (Rs.)				21880.63	
c.	Net Income (Rs.)				5808.58	
d.	Cost per Quintal (Rs./q.)				1175.25	
e.	Benefit Cost Ratio (BC Ratio)				1:1.36	

Cost of Cultivation of Maize: The data regarding the cost of cultivation of maize in Oddarahatti micro-watershed is presented in Table 33. The results indicated that, the total cost of cultivation for maize was Rs. 18362.79. The gross income realized by the farmers was Rs. 35368.63. The net income from maize cultivation was Rs. 17005.84. Thus the benefit cost ratio was found to be 1:1.93.

Table 33: Cost of Cultivation of Maize in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	21.15	3571.71	19.45
2	Bullock		Pairs/day	0.41	226.42	1.23
3	Tractor		Hours	1.92	1437.99	7.83
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	15.46	1730.00	9.42
6	Seed Inter Crop		Kgs.	1.95	218.48	1.19
7	Fertilizer + micronutrients		Quintal	6.72	5140.12	27.99
8	Depreciation charges			0.00	2.92	0.02
9	Land revenue and Taxes			0.00	8.23	0.04
II	**Cost B1**					
10	Interest on working capital				850.63	4.63
11	**Cost B1 = (Cost A1 + sum of 15 and 16)**				13186.50	71.81
III	**Cost B2**					
12	Rental Value of Land				166.67	0.91
13	**Cost B2 = (Cost B1 + Rental value)**				13353.17	72.72
IV	**Cost C1**					
14	Family Human Labour			17.40	3340.28	18.19
15	**Cost C1 = (Cost B2 + Family Labour)**				16693.45	90.91
V	**Cost C2**					
16	**Cost C2 = (Cost C1 + Risk Premium)**				16693.45	90.91
VI	**Cost C3**					
17	Managerial Cost				1669.34	9.09
18	**Cost C3 = (Cost C2 + Managerial Cost)**				18362.79	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.16	24604.85	
		b) Main Crop Sales Price (Rs.)			1737.50	
		c) Intercrop (q)		2.45	10476.40	
		d) Intercrop Sales Price (Rs.)			4275.00	
	By Product	e) Main Product (q)		4.79	287.38	
		f) Main Crop Sales Price (Rs.)			60.00	
b.	Gross Income (Rs.)				35368.63	
c.	Net Income (Rs.)				17005.84	
d.	Cost per Quintal (Rs./q.)				1105.41	
e.	Benefit Cost Ratio (BC Ratio)				1:1.93	

Cost of Cultivation of Navane: The data regarding the cost of cultivation of navane in Oddarahatti micro-watershed is presented in Table 34. The results indicated that, the total cost of cultivation for navane was Rs. 10533.31. The gross income realized by the farmers was Rs. 31122. The net income from navane cultivation was Rs. 20588.69. Thus the benefit cost ratio was found to be 1:2.95.

Table 34: Cost of Cultivation of Navane in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	17.29	2758.17	26.19
2	Tractor		Hours	2.47	1852.50	17.59
3	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	8.23	741.00	7.03
4	Fertilizer + micronutrients		Quintal	2.47	2470.00	23.45
5	Land revenue and Taxes			0.00	8.23	0.08
II	**Cost B1**					
6	Interest on working capital				385.32	3.66
7	**Cost B1 = (Cost A1 + sum of 15 and 16)**				8215.24	77.99
III	**Cost B2**					
8	Rental Value of Land				166.67	1.58
9	**Cost B2 = (Cost B1 + Rental value)**				8381.90	79.58
IV	**Cost C1**					
10	Family Human Labour			6.59	1193.83	11.33
11	**Cost C1 = (Cost B2 + Family Labour)**				9575.74	90.91
V	**Cost C2**					
12	**Cost C2 = (Cost C1 + Risk Premium)**				9575.74	90.91
VI	**Cost C3**					
13	Managerial Cost				957.57	9.09
14	**Cost C3 = (Cost C2 + Managerial Cost)**				10533.31	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.82	31122.00	
		b) Main Crop Sales Price (Rs.)			2100.00	
b.	Gross Income (Rs.)				31122.00	
c.	Net Income (Rs.)				20588.69	
d.	Cost per Quintal (Rs./q.)				710.75	
e.	Benefit Cost Ratio (BC Ratio)				1:2.95	

Cost of cultivation of Sorghum: The data regarding the cost of cultivation of sorghum in Oddarahatti micro-watershed is presented in Table 35. The results indicated that, the total cost of cultivation for sorghum was Rs. 18020.16. The gross income realized by the farmers was Rs. 26596.61. The net income from sorghum cultivation was Rs. 8576.44. Thus the benefit cost ratio was found to be 1:1.48.

Table 35: Cost of Cultivation of Sorghum in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	19.85	3308.04	18.36
2	Tractor		Hours	2.21	1654.02	9.18
3	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	6.62	529.29	2.94
4	Fertilizer + micronutrients		Quintal	6.62	5182.59	28.76
5	Land revenue and Taxes			0.00	4.12	0.02
II	**Cost B1**					
6	Interest on working capital				685.42	3.80
7	**Cost B1 = (Cost A1 + sum of 15 and 16)**				11363.51	63.06
III	**Cost B2**					
8	Rental Value of Land				166.67	0.92
9	**Cost B2 = (Cost B1 + Rental value)**				11530.18	63.98
IV	**Cost C1**					
10	Family Human Labour			26.46	4851.79	26.92
11	**Cost C1 = (Cost B2 + Family Labour)**				16381.97	90.91
V	**Cost C2**					
12	**Cost C2 = (Cost C1 + Risk Premium)**				16381.97	90.91
VI	**Cost C3**					
13	Managerial Cost				1638.20	9.09
14	**Cost C3 = (Cost C2 + Managerial Cost)**				18020.16	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		13.23	26464.29	
		b) Main Crop Sales Price (Rs.)			2000.00	
	By Product	e) Main Product (q)		2.21	132.32	
		f) Main Crop Sales Price (Rs.)			60.00	
b.	Gross Income (Rs.)				26596.61	
c.	Net Income (Rs.)				8576.44	
d.	Cost per Quintal (Rs./q.)				1361.85	
e.	Benefit Cost Ratio (BC Ratio)				1:1.48	

Cost of cultivation of Redgram: The data regarding the cost of cultivation of redgram in Oddarahatti micro-watershed is presented in Table 36. The results indicated that, the total cost of cultivation for redgram was Rs. 17906.59. The gross income realized by the farmers was Rs. 31578.54. The net income from redgram cultivation was Rs. 13671.95. Thus the benefit cost ratio was found to be 1:1.76.

Table 36: Cost of Cultivation of Redgram in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	19.79	3313.30	18.50
2	Bullock		Pairs/day	1.15	621.62	3.47
3	Tractor		Hours	0.97	725.61	4.05
4	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	6.27	752.55	4.20
5	Fertilizer + micronutrients		Quintal	7.60	6130.55	34.24
6	Depreciation charges			0.00	465.89	2.60
7	Land revenue and Taxes			0.00	8.23	0.05
II	**Cost B1**					
8	Interest on working capital				825.97	4.61
9	**Cost B1 = (Cost A1 + sum of 15 and 16)**				12843.72	71.73
III	**Cost B2**					
10	Rental Value of Land				166.67	0.93
11	**Cost B2 = (Cost B1 + Rental value)**				13010.39	72.66
IV	**Cost C1**					
12	Family Human Labour			17.39	3268.33	18.25
13	**Cost C1 = (Cost B2 + Family Labour)**				16278.72	90.91
V	**Cost C2**					
14	**Cost C2 = (Cost C1 + Risk Premium)**				16278.72	90.91
VI	**Cost C3**					
15	Managerial Cost				1627.87	9.09
16	**Cost C3 = (Cost C2 + Managerial Cost)**				17906.59	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		7.18	31578.54	
		b) Main Crop Sales Price (Rs.)			4400.00	
b.	Gross Income (Rs.)				31578.54	
c.	Net Income (Rs.)				13671.95	
d.	Cost per Quintal (Rs./q.)				2495.02	
e.	Benefit Cost Ratio (BC Ratio)				1:1.76	

Cost of cultivation of Horse gram: The data regarding the cost of cultivation of Horse gram in Oddarahatti micro-watershed is presented in Table 37. The results indicated that, the total cost of cultivation for Horse gram was Rs. 12039.19. The gross income realized by the farmers was Rs. 31271.56. The net income from Horse gram cultivation was Rs. 19232.37. Thus the benefit cost ratio was found to be 1:2.60.

Table 37: Cost of Cultivation of Horse gram in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	17.37	2832.57	23.53
2	Tractor		Hours	2.27	1699.54	14.12
3	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	9.06	906.42	7.53
4	Fertilizer + micronutrients		Quintal	4.53	3550.15	29.49
5	Land revenue and Taxes			0.00	8.23	0.07
II	**Cost B1**					
6	Interest on working capital				534.79	4.44
7	**Cost B1 = (Cost A1 + sum of 15 and 16)**				9531.72	79.17
III	**Cost B2**					
8	Rental Value of Land				166.67	1.38
9	**Cost B2 = (Cost B1 + Rental value)**				9698.39	80.56
IV	**Cost C1**					
10	Family Human Labour			6.80	1246.33	10.35
11	**Cost C1 = (Cost B2 + Family Labour)**				10944.72	90.91
V	**Cost C2**					
12	**Cost C2 = (Cost C1 + Risk Premium)**				10944.72	90.91
VI	**Cost C3**					
13	Managerial Cost				1094.47	9.09
14	**Cost C3 = (Cost C2 + Managerial Cost)**				12039.19	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		13.60	31271.56	
		b) Main Crop Sales Price (Rs.)			2300.00	
b.	Gross Income (Rs.)				31271.56	
c.	Net Income (Rs.)				19232.37	
d.	Cost per Quintal (Rs./q.)				885.47	
e.	Benefit Cost Ratio (BC Ratio)				1:2.60	

Cost of cultivation of Sugarcane: The data regarding the cost of cultivation of Sugarcane in Oddarahatti micro-watershed is presented in Table 38. The results indicated that, the total cost of cultivation for Sugarcane was Rs. 220236.14. The gross income realized by the farmers was Rs. 978120.00. The net income from Sugarcane cultivation was Rs. 757883.86. Thus the benefit cost ratio was found to be 1:4.44.

Table 38: Cost of Cultivation of Sugarcane in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	50.39	10423.40	4.73
2	Tractor		Hours	3.95	2964.00	1.35
3	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	691.60	152152.00	69.09
4	Fertilizer + micronutrients		Quintal	10.87	8002.80	3.63
5	Pesticides (PPC)		Kgs / liters	1.98	3952.00	1.79
6	Irrigation		Number	88.92	0.00	0.00
7	Land revenue and Taxes			0.00	8.23	0.00
II	**Cost B1**					
8	Interest on working capital				19692.82	8.94
9	**Cost B1 = (Cost A1 + sum of 15 and 16)**				197195.27	89.54
III	**Cost B2**					
10	Rental Value of Land				500.00	0.23
11	**Cost B2 = (Cost B1 + Rental value)**				197695.27	89.77
IV	**Cost C1**					
12	Family Human Labour			10.87	2519.40	1.14
13	**Cost C1 = (Cost B2 + Family Labour)**				200214.67	90.91
V	**Cost C2**					
14	**Cost C2 = (Cost C1 + Risk Premium)**				200214.67	90.91
VI	**Cost C3**					
15	Managerial Cost				20021.47	9.09
	Cost C3 = (Cost C2 + Managerial Cost)				220236.14	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		5928.00	978120.00	
		b) Main Crop Sales Price (Rs.)			165.00	
b.	Gross Income (Rs.)				978120.00	
c.	Net Income (Rs.)				757883.86	
d.	Cost per Quintal (Rs./q.)				37.15	
e.	Benefit Cost Ratio (BC Ratio)				1:4.44	

Cost of cultivation of Cotton: The data regarding the cost of cultivation of cotton in Oddarahatti micro-watershed is presented in Table 39. The results indicated that, the total cost of cultivation for cotton was Rs. 20286.97. The gross income realized by the farmers was Rs. 48946.79. The net income from cotton cultivation was Rs. 28659.82. Thus the benefit cost ratio was found to be 1:2.41.

Table 39: Cost of Cultivation of cotton in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	22.66	3767.32	18.57
2	Bullock		Pairs/day	0.00	0.00	0.00
3	Tractor		Hours	2.83	2124.43	10.47
4	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	2.83	3115.83	15.36
5	Fertilizer + micronutrients		Quintal	7.93	6175.00	30.44
6	Pesticides (PPC)		Kgs / liters	0.57	1302.98	6.42
7	Depreciation charges			0.00	1.13	0.01
8	Land revenue and Taxes			0.00	8.23	0.04
II	**Cost B1**					
9	Interest on working capital				1271.26	6.27
10	**Cost B1 = (Cost A1 + sum of 15 and 16)**				17766.17	87.57
III	**Cost B2**					
11	Rental Value of Land				166.67	0.82
12	**Cost B2 = (Cost B1 + Rental value)**				17932.84	88.40
IV	**Cost C1**					
13	Family Human Labour			3.40	509.86	2.51
14	**Cost C1 = (Cost B2 + Family Labour)**				18442.70	90.91
V	**Cost C2**					
15	**Cost C2 = (Cost C1 + Risk Premium)**				18442.70	90.91
VI	**Cost C3**					
16	Managerial Cost				1844.27	9.09
	Cost C3 = (Cost C2 + Managerial Cost)				20286.97	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		10.20	48946.79	
		b) Main Crop Sales Price (Rs.)			4800.00	
b.	Gross Income (Rs.)				48946.79	
c.	Net Income (Rs.)				28659.82	
d.	Cost per Quintal (Rs. /q.)				1989.46	
e.	Benefit Cost Ratio (BC Ratio)				1:2.41	

Cost of cultivation of Crossandra: The data regarding the cost of cultivation of crossandra in Oddarahatti micro-watershed is presented in Table 40. The results indicated that, the total cost of cultivation for crossandra was Rs. 41401.74. The gross income realized by the farmers was Rs. 97330.35. The net income from crossandra cultivation was Rs. 55928.61. Thus the benefit cost ratio was found to be 1:2.35.

Table 40: Cost of Cultivation of Crossandra in Oddarahatti micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	55.57	8953.75	21.63
2	Tractor		Hours	2.47	1852.50	4.47
3	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	2.47	7410.00	17.90
4	Fertilizer + micronutrients		Quintal	12.35	9571.25	23.12
5	Pesticides (PPC)		Kgs / liters	2.47	2470.00	5.97
6	Depreciation charges			0.00	51.89	0.13
7	Land revenue and Taxes			0.00	8.23	0.02
II	**Cost B1**					
8	Interest on working capital				2334.15	5.64
9	**Cost B1 = (Cost A1 + sum of 15 and 16)**				32651.78	78.87
III	**Cost B2**					
10	Rental Value of Land				416.67	1.01
11	**Cost B2 = (Cost B1 + Rental value)**				33068.44	79.87
IV	**Cost C1**					
12	Family Human Labour			23.46	4569.50	11.04
13	**Cost C1 = (Cost B2 + Family Labour)**				37637.94	90.91
V	**Cost C2**					
14	**Cost C2 = (Cost C1 + Risk Premium)**				37637.94	90.91
VI	**Cost C3**					
15	Managerial Cost				3763.79	9.09
16	**Cost C3 = (Cost C2 + Managerial Cost)**				41401.74	100.00
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		87.69	97330.35	
		b) Main Crop Sales Price (Rs.)			1110.00	
b.	Gross Income (Rs.)				97330.35	
c.	Net Income (Rs.)				55928.61	
d.	Cost per Quintal (Rs./q.)				472.16	
e.	Benefit Cost Ratio (BC Ratio)				1:2.35	

Adequacy of fodder: The data regarding the adequacy of fodder in Oddarahatti micro-watershed is presented in Table 41. The results indicated that, 22.86 per cent of the households opined that dry fodder was adequate. Among overall households 23.53 per cent of the marginal farmers, 30 per cent of small farmers and 50 per cent of semi medium farmers were opined that dry fodder was adequate.

Table 41: Adequacy of fodder in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		All (35)	
		N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	4	23.53	3	30.00	1	50.00	8	22.86

Average Annual gross income of households: The results of the overall average annual gross income of the household in Oddarahatti is presented in table 42. The table indicated that the average income from service/salary was Rs. 16514.29, business Rs. 17571.43, wage Rs. 23971.43, agriculture Rs. 81182.86, farm income Rs. 3,800 and dairy farm Rs. 414.

Table 42: Average Annual gross income of households in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)	MF (17)	SF (10)	SMF(2)	MDF(1)	All (35)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	80000	10470.59	0.00	0	0	16514.29
2	Business	50000	11764.71	16500.00	0	0	17571.43
3	Wage	40600	19882.35	16800.00	65000	0	23971.43
4	Agriculture	0	46473.53	158655.00	50400	364,000	81182.86
5	Farm income	0	4000	6500	0	0	3,800
6	Dairy Farm	0	0	0.00	7245.00	0	414
Income(Rs.)		170600	92591.18	198455	122645	364,000	143454.

Interest towards cultivation of horticulture crops: The data regarding horticulture species grown in Oddarahatti micro-watershed is presented in Table 43. The results indicated that, 74.29 per cent of the households are interested in growing horticultural crops which include 76.47 per cent marginal farmers, 100 per cent small farmers, semi medium farmers and medium farmers respectively.

Table 43: Interest towards cultivation of horticulture crops in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Interested towards cultivation of horticulture crops	13	76.47	10	100	2	100	1	100	26	74.29

Source of funds for additional investment: The data regarding source of funds for additional investment in Oddarahatti micro-watershed is presented in Table 44. The results indicated that for 68.57 per cent of the households were dependent on government subsidy for land development. Similarly for the dependency was for irrigation facility was 77.14 percent and 20 percent for improved crop production.

Table 44: Source of funds for additional investment capacity in Oddarahatti micro-watershed

Sl. No	Item	Land development		Irrigation facility		Improved crop production	
		N	%	N	%	N	%
1	Government subsidy	24	68.57	27	77.14	7	20.0

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Oddarahatti micro-watershed is presented in Table 45. The results indicated that, only chilly, cotton, Horse gram, Kanakambara flower, maize, navane, papaya, red gram, sorghum and sugar cane crops were sold to the extent of 100 per cent. Only bajra was sold to the extent of 98.15 per cent.

Table 45: Marketing of the agricultural produce in Oddarahatti micro-watershed

Sl. No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Bajra	54	1	53	98.15	1600
2	Chilly	65	0.	65	100	4000
3	Cotton	18	0	18	100	4800
4	Horse Gram (Hurali)	18	0	18	100	2300
5	Kanakambara Flower	71	0	71	100	1110
6	Maize	177	0	177	100	1563.64
7	Navane	18	0	18	100	2100
8	Papaya	130	0	130	100	2800
9	Red Gram	27	0	27	100	4400
10	Sorghum	6	0	6	100	2000
11	Sugarcane	6000	0	6000	100	165

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Oddarahatti micro-watershed is presented in Table 46. The results indicated that, 11.43 percent of the households have sold their produce to local/village merchants and 77.14 percent of the households sold their produce in regulated markets.

Table 46: Marketing Channels used for sale of agricultural produce in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Local/village Merchant	2	11.76	0	0	2	100	0	0	4	11.43
2	Regulated Market	15	88.24	10	100	1	50	1	100	27	77.14

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Oddarahatti micro-watershed is presented in Table 47. The results indicated that 74.29 per cent of the households have used cart as a mode of transport and 14.29 per cent have used tractor.

Table 47: Mode of transport of agricultural produce in Oddarahatti micro-watershed

Sl.No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Cart	17	100	6	60	3	150	0	0	26	74.29
2	Tractor	0	0	4	40	0	0	1	100	5	14.29

Interest towards soil testing: The data regarding interest shown towards soil testing in Oddarahatti micro-watershed is presented in Table 48. The results indicated that, 85.71 per cent of the households have shown interest in soil testing.

Table 48: Interest shown towards soil testing in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	17	100	10	100	2	100	1	100	30	85.71

Soil and water conservation practices and structures adopted: The data regarding soil and water conservation practices and structures adopted in Oddarahatti micro-watershed is presented in Table 49. The results indicated that, 25.71 per cent of the households have adopted field bunding which includes 11.76 per cent of marginal, 60 per cent of small farmers, and 50 per cent of semi medium farmers. Summer ploughing was adopted by 82.86 per cent of the households i.e. 94.12 per cent of the marginal farmers and 100 per cent of the small and semi medium farmers respectively. Form pond was adopted by the farmers was 2.86 per cent.

Table 49: Soil and water conservation practices and structures adopted in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Field Bunding	2	11.76	6	60	1	50	0	0	9	25.71
2	Farm Pond	0	0	1	10	0	0	0	0	1	2.86
3	Summer Ploughing	16	94.12	10	100	2	100	1	100	29	82.86

Agencies involved in soil conservation structures: The data regarding agencies involved in soil conservation structures in Oddarahatti micro-watershed is presented in Table 50. The results indicated that 14.29 per cent of soil conservation structure is constructed by the government, 2.86 per cent of soil conservation structure is constructed by the farmer's organisation and another 5.71 per cent is constructed by others.

Table 50: Agencies involved in soil conservation structures in Oddarahatti micro-watershed

Sl. No.	Particulars	MF (17)		SF (10)		All (35)	
		N	%	N	%	N	%
1	Govt.	1	5.88	4	40	5	14.29
2	Farmer organization	0	0	1	10	1	2.86
3	Other	0	0	2	20	2	5.71

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

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	2	40	15	88.24	7	70	2	100	0	0	26	74.29
2	LPG	3	60	2	11.76	3	30	0	0	1	100	9	25.71

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Oddarahatti micro-watershed is presented in Table 51. The results indicated that, 74.29 percent used fire wood as a source of fuel, and 25.71 percent of the households used LPG.

Source of drinking water: The data regarding source of drinking water in Oddarahatti micro-watershed is presented in Table 52. The results indicated that, piped supply was the major source for drinking water for 97.14 per cent which includes 100 per cent of landless, 94.12 per cent of marginal, 100 per cent of small farmers, semi medium and medium farmers respectively.

Table 52: Source of drinking water in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	5	100	16	94.12	10	100	2	100	1	100	34	97.14

Source of light: The data regarding source of light in Oddarahatti micro-watershed is presented in Table 53. The results indicated that, electricity was the major source of light which was found to be 97.14 per cent and 2.86 per cent of the households were used kerosene lamp as a source of light.

Table 53: Source of light in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Kerosene Lamp	1	20	0	0	0	0	0	0	0	0	1	2.86
2	Electricity	4	80	17	100	10	100	2	100	1	100	34	97.14

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facilit**y** in Oddarahatti micro-watershed is presented in Table 54. The results indicated that, 48.57 per cent of the households possess sanitary toilet i.e. 40 per cent of landless, 41.18 per cent of marginal, 50 per cent of small, 100 per cent of semi medium and 100 per cent of medium had sanitary toilet facility.

Table 54: Existence of Sanitary toilet facility in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	2	40	7	41.18	5	50	2	100	1	100	17	48.57

Possession of PDS card: The data regarding possession of PDS card in Oddarahatti micro-watershed is presented in Table 55. The results indicated that, 88.57 per cent of the sampled households possessed BPL card and 11.43 per cent of the sampled households not possessed BPL card.

Table 55: Possession of PDS card in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF (2)		MDF (1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	BPL	5	100	16	94.12	7	70	2	100	1	100	31	88.57
2	Not Possessed	0	0	1	5.88	3	30	0	0	0	0	4	11.43

Participation in NREGA programme: The data regarding participation in NREGA programme in Oddarahatti micro-watershed is presented in Table 56. The results indicated that, 51.43 per cent of the households participated in NREGA programme which included 8 per cent of the landless, 47.06 percent of the marginal, 30 per cent of the small, 100 per cent of the semi medium and 100 percent of the medium farmers.

Table 56: Participation in NREGA programme in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF(10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	4	8	8	47.06	3	30	2	100	1	100	18	51.43

Adequacy of food items: The data regarding adequacy of food items in Oddarahatti micro-watershed is presented in Table 57. The results indicated that, cereals, pulses, milk and egg were adequate for 100 per cent of the households. Vegetables and fruits were adequate only for 5.71 per cent and meat was adequate for only 2.86 per cent for the households respectively.

Table 57: Adequacy of food items in Oddarahatti micro-watershed

Sl. No.	Particulars	LL (5)		MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	5	100	17	100	10	100	2	100	1	100	35	100
2	Pulses	5	100	17	100	10	100	2	100	1	100	35	100
3	Oilseed	3	60	17	100	10	100	2	100	1	100	33	94.29
4	Vegetables	0	0	1	5.88	0	0	1	50	0	0	2	5.71
5	Fruits	0	0	1	5.88	0	0	1	50	0	0	2	5.71
6	Milk	5	100	17	100	10	100	2	100	1	100	35	100
7	Egg	5	100	17	100	10	100	2	100	1	100	35	100
8	Meat	0	0	1	5.88	0	0	0	0	0	0	1	2.86

Table 58: Response on Inadequacy of food items in Oddarahatti micro-watershed

S. N.	Particulars	LL (5)		MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Oilseed	2	40	0	0	0	0	0	0	0	0	2	5.71
2	Vegetables	5	100	16	94.12	10	100	1	50	1	100	33	94.29
3	Fruits	5	100	16	94.12	10	100	1	50	1	100	33	94.29
4	Meat	5	100	16	94.12	10	100	2	100	1	100	34	97.14

Response on Inadequacy of food items: The data regarding inadequacy of food items in Oddarahatti micro-watershed is presented in Table 58. The results indicated that, both vegetables and fruits were inadequate for 94.29 per cent, of the households. Oilseed was inadequate for 5.71 per cent. Meat was inadequate for 97.14 per cent of the households.

Farming constraints: The data regarding farming constraints experienced by households in Oddarahatti micro-watershed is presented in Table 59. The results indicated that, Lower fertility status of the soil was the constraint experienced by 60 per cent of the households, wild animal menace on farm field and frequent incidence of pest and diseases (77.14%), inadequacy of irrigation water (74.29%), high cost of fertilizers and plant protection chemicals and high rate of interest on credit (85.71%), low price for the agricultural commodities (82.86 %), lack of marketing facilities in the area (85.71%), inadequate extension services and lack of transport for safe transport of the agricultural produce to the market (82.86%) and Source of Agri-technology information(Newspaper/TV/Mobile) (2.86).

Table 59: Farming constraints Experienced in Oddarahatti micro-watershed

S. N	Particulars	MF (17)		SF (10)		SMF(2)		MDF(1)		All (35)	
		N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	10	58.82	9	90	2	100	0	0	21	60.00
2	Wild animal menace on farm field	14	82.35	10	100	2	100	1	100	27	77.14
3	Frequent incidence of pest and diseases	15	88.24	10	100	1	50	1	100	27	77.14
4	Inadequacy of irrigation water	14	82.35	10	100	1	50	1	100	26	74.29
5	High cost of Fertilizers and plant protection chemicals	18	105.88	10	100	1	50	1	100	30	85.71
6	High rate of interest on credit	17	100	10	100	2	100	1	100	30	85.71
7	Low price for the agricultural commodities	17	100	10	100	1	50	1	100	29	82.86
8	Lack of marketing facilities in the area	17	100	10	100	2	100	1	100	30	85.71
9	Inadequate extension services	16	94.12	10	100	2	100	1	100	29	82.86
10	Lack of transport for safe transport of the Agril. Produce to the market.	16	94.12	10	100	2	100	1	100	29	82.86
12	Source of Agri-technology information(Newspaper/TV/Mobile)	1	5.88	0	0	0	0	0	0	1	2.86

Chapter 5

SUMMARY

In order to assess the socio-economic condition of the farmers in the watershed a comprehensive questionnaire was prepared. Major components such as demographic conditions, migration details, food consumption and family expenditure pattern, material possession, land holding, land use management, cropping pattern, cost of cultivation of crops, livestock management. The statistical components such as frequency and percentage were used to analyze the data. About 35 households located in the micro-watershed were interviewed for the survey.

The results indicated that among 35 farmers, 17 (48.57%) were marginal farmers, 10 (28.57 %) were small farmers, 2 (5.71 %) were semi medium farmers, 1 (2.86%) medium farmers and 5 (14.29 %) landless farmers were also interviewed for the survey. The data indicated that there were 128 population households were there in the studied micro-watershed. Among them 64 (50 %) men and 64 (50 %) were women. The average family size of marginal farmers was 4, small farmer was 4, semi medium farmer was 4 and for landless farmers it was 4. The data indicated that 22 (17.19 %) people were in 0-15 years of age, 49 (38.28 %) were in 16-35 years of age, 40 (31.25 %) were in 36-60 years of age and 17 (13.28 %) were above 61 years of age. The results indicated that the Oddarahatti had 27.34 per cent illiterates, 35.16 per cent of them had primary school education, 10.16 per cent of them had both middle school and high school education, 6.25 per cent of them had PUC education, 0.78 per cent them had Diploma education, 7.81 per cent of them had degree education and 0.78 per cent of them had masters education.

The results indicated with reference to occupation of the household showed that, 54.29 per cent of households practicing agriculture and 2.86 per cent of the household heads were agricultural labourers, general labour, in Government service and in private service respectively. 8.57 per cent of the households were doing trade and business and 11.43 per cent of them were housewives. The results indicated that agriculture was the major occupation for 50.78 per cent of the household members, 1.56 per cent were agricultural labourers, 3.13 per cent were general labours, 1.56 percent were in government service, 1.56 per cent of them were in private sector, 4.69 per cent of them were trade and business, 19.53 per cent of them were students and 9.38 per cent were housewives.

In case of landless households 10.53 per cent were agricultural labourers, 15.79 per cent were general labour, 5.26 per cent in government service, 15.79 per cent were in trade& business, 21.05 per cent ware housewife and 26.32 per cent were students. In case of marginal farmers 60.94 per cent were agriculturist, 1.56 percent was in government service, 3.13 per cent were in trade and business and 18.75 per cent were students. In case of small farmers 55.88 per cent of them were agriculturist and 20.59 per cent of them

were students. In case of semi medium farmers 50 per cent of the family members were agriculturist and 12.50 per cent of them were students.

The results showed that 3.13 per cent of them participated in self help groups, 0.78 per cent of them participated in cooperative bank. Landless, semi medium farmers and medium farmers were found to have no participation in any local institutions. Marginal farmers and small farmers were found to participate in one or the other local institutions. The results indicated that 97.14 per cent of the households possess Katcha house and 2.86 per cent of them possess Thatched house. 100 percent of the landless, marginal and small farmers possess Katcha house.

The results showed that 88.57 per cent of the households possess TV, 54.29 per cent of the households possess Mixer grinder, 5.71 per cent of the households possess refrigerator, 28.57 per cent of the households possess bicycle, 45.71 per cent of the households possess motor cycle and 85.71 per cent of the households possess mobile phones. The results showed that the average value of television was Rs. 2112, mixer grinder was Rs.1121, refrigerator Rs.13500, bicycle Rs.1000, motor cycle was Rs.29250 and mobile phone was Rs.800.

The results indicated that about 22.86 per cent of the households possess plough, 14.29 per cent of them possess bullock cart, 14.29 per cent of the households possess sprayer, 5.71 per cent of them possess chaff cutter and 62.86 per cent of the households possess weeder. The results show that the average value of plough was Rs.660; the average value of bullock cart was Rs. 22000, the average value of sprayer Rs.2480, the average value of weeder Rs. 39 and the average value of chaff cutter Rs.3000. The results indicated that, 22.86 per cent of the households possess bullocks and 5.71 per cent of the households possess local cow. In case of marginal farmers, 29.41 per cent of the households possess bullock and 5.88 per cent of the households possess local cow. In case of small farmers, 20 per cent of households possess bullock. In case of semi medium farmers, 50 per cent of the households possess bullock and local low respectively.

The results indicated that, average own labour men available in the micro-watershed was 1.23, average own labour (women) available was 1.03, average hired labour (men) available was 7.53 and average hired labour (women) available was 8.37. In case of marginal farmers, average own labour men available was 1.24, average own labour (women) was 1.12, average hired labour (men) was 4.94 and average hired labour (women) available was 5.82. In case of small farmers, average own labour men available was 1.10, average own labour (women) was 0.90, average hired labour (men) was 10.70 and average hired labour (women) available was 12.20. In case of semi medium farmers, average own labour men available was 1.50, average own labour (women) was 1, average hired labour (men) was 12.50 and average hired labour (women) available was 10. In medium farmers average own labour men available was 2, average own labour (women)

was 1, average hired labour (men) was 10 and average hired labour (women) available was 10.

The results indicated that, 85.71 per cent of the household opined that hired labour was adequate About 100 per cent of the marginal farmers, 100 per cent of small, 100 per cent of semi medium and medium farmers have opined that the hired labour was adequate. The results indicated that, households of the Oddarahatti micro-watershed possess 21.17 ha (71.84 %) of dry land and 8.26 ha (28.06 %) of irrigated land. Marginal farmers possess 8.45 ha (91.25 %) of dry land and 0.81 ha (8.75%) of irrigated land. Small farmers possess 10.70 ha (86.01%) of dry land and 1.74 ha (13.99 %) of irrigated land. Semi medium farmers possess 2.02 ha (66.67%) of dry land and 1.01 ha (33.33%) of irrigated land. Medium farmers possess 4.69 ha (100%) of irrigated land.

The results indicated that, the average value of dry land was Rs. 318724.91 and average value of irrigated was Rs. 363235.29. In case of marginal famers, the average land value was Rs. 408313.36 for dry land and Rs. 494000 for irrigated land. In case of small famers, the average land value was Rs. 261573.37 for dry land Rs. 746744.19 for irrigated land. In case of semi medium famers, the average land value was Rs. 247000 for dry land and Rs. 494000 for irrigated land. In case of medium famers, the average land value was Rs. 170344.82 for irrigated land.

The results indicated that, there were 6 functioning and 7 defunctioning bore wells in the micro-watershed. The results indicated that, there were 2 functioning open wells in the micro-watershed. The results indicated that, bore well was the irrigation source for 17.14 per cent of the farmers and open well was the source for 5.71 per cent of the farmers. The results indicated that, in case of semi medium farmers there was 1.01 ha of irrigated land. The results indicated that, farmers have grown bajra (3.94ha), cotton (1.77ha), crossandra (0.81ha), horse gram (1.32ha), maize (9.72 ha), navane (1.21 ha), papaya (0.91 ha),red gram (3.78 ha), sorghum(0.45 ha) and sugarcane (1.01 ha). Marginal farmers have grown Maize, Bajra, sorghum, crossandra and Redgram. Small farmers have grown Maize, cotton, horse gram, navane and red gram. Semi medium farmers have grown Maize, bajra, and red gram.. Medium farmers have grown papaya.

The results indicated that, the cropping intensity in Oddarahatti micro-watershed was found to be 100 per cent in marginal farmers, small farmers, semi medium farmers and medium farmers respectively. The results indicated that, 85.71 per cent of the households have bank account and savings respectively. Among marginal farmers 60 percent of them possess both bank account and savings. 88.24 per cent of small farmers possess both bank account and savings correspondingly. Semi medium farmers possess 50 per cent of both bank account and savings respectively and medium category of farmers possess 100 per cent of bank account and also savings.

The results indicated that, 60 per cent of landless, 88.24 per cent of marginal, 100 per cent of small, 50 per cent semi medium and 100 per cent of medium farmers have borrowed credit from different sources. The results indicated that, 56.67 per cent have availed loan in Grameena bank, 16.67 per cent have availed loan from money lender and 3.33 per cent have availed loan from commercial bank, input dealers/ suppliers and SHGs/CBOs respectively.

The results indicated that,, marginal, small, semi medium and medium have availed Rs.62666.67, Rs. 80500, Rs50,000, and Rs. 100000 respectively. Overall average credit amount availed by households in the micro-watershed is 63166.67. The results indicated that, 100 per cent of the households have borrowed loan for agriculture production. The results indicated that, agriculture production, Construction-house, Construction-cattle shed and other reasons were the main purpose for which marginal, small farmers, semi medium farmers borrowed loan. About 71.43 percent of loan was taken for agriculture production and 14.29 per cent of the farmers taken loan for construction-house, Construction-cattle shed and other purpose respectively.

Results indicated that 38.89 per cent of the households have repaid their institutional credit partially and 55.56 percent of the households have unpaid their loan and 5.56 per cent of the households were fully paid their loan. Results indicated that 28.57 per cent of the households have repaid their private credit partially, 57.14 percent of the households have unpaid their loan and 14.29 per cent of them fully paid their loan.

The results indicated that, the total cost of cultivation for bajra was Rs. 16072.05. The gross income realized by the farmers was Rs. 21880.63. The net income from bajra cultivation was Rs. 5808.58, thus the benefit cost ratio was found to be 1:1.36. The results indicated that, the total cost of cultivation for maize was Rs. 18362.79. The gross income realized by the farmers was Rs. 35368.63. The net income from maize cultivation was Rs. 17005.84. Thus the benefit cost ratio was found to be 1:1.93.

The results indicated that, the total cost of cultivation for navane was Rs. 10533.31. The gross income realized by the farmers was Rs. 31122. The net income from navane cultivation was Rs. 20588.69. Thus the benefit cost ratio was found to be 1:2.95. The results indicated that, the total cost of cultivation for sorghum was Rs. 18020.16. The gross income realized by the farmers was Rs. 26596.61. The net income from sorghum cultivation was Rs. 8576.44. Thus the benefit cost ratio was found to be 1:1.48. The results indicated that, the total cost of cultivation for redgram was Rs. 17906.59. The gross income realized by the farmers was Rs. 31578.54. The net income from redgram cultivation was Rs. 13671.95. Thus the benefit cost ratio was found to be 1:1.76. The results indicated that, the total cost of cultivation for Horse gram was Rs. 12039.19. The gross income realized by the farmers was Rs. 31271.56. The net income from Horse gram cultivation was Rs. 19232.37. Thus the benefit cost ratio was found to be 1:2.60. The results indicated that, the total cost of cultivation for Sugarcane was Rs. 220236.14. The

gross income realized by the farmers was Rs. 978120.00. The net income from Sugarcane cultivation was Rs. 757883.86. Thus the benefit cost ratio was found to be 1:4.44. The results indicated that, the total cost of cultivation for cotton was Rs. 20286.97. The gross income realized by the farmers was Rs. 48946.79. The net income from cotton cultivation was Rs. 28659.82. Thus the benefit cost ratio was found to be 1:2.41. The results indicated that, the total cost of cultivation for crossandra was Rs. 41401.74. The gross income realized by the farmers was Rs. 97330.35. The net income from crossandra cultivation was Rs. 55928.61. Thus the benefit cost ratio was found to be 1:2.35.

The results indicated that, 22.86 per cent of the households opined that dry fodder was adequate. Among overall households 23.56 per cent of the marginal farmers, 30 per cent of small farmers and 50 per cent of semi medium farmers were opined that dry fodder was adequate. The results indicated that the average income from service/salary was Rs. 16514.29, business Rs. 17571.43, wage Rs. 23971.43, agriculture Rs. 81182.86, farm income Rs. 3,800 and dairy farm Rs. 414. The results indicated that, 74.29 per cent of the households are interested in growing horticultural crops which include 76.47 per cent marginal farmers, 100 per cent small farmers, semi medium farmers and medium farmers respectively. The results indicated that for 68.57 per cent of the households were dependent on government subsidy for land development. Similarly for the dependency was for irrigation facility was 77.14 percent and 20 percent for improved crop production. The results indicated that, chilly, cotton, Horse gram, Kanakambara flower, maize, navane, papaya, red gram, sorghum and sugar cane crops were sold to the extent of 100 per cent. Only bajra was sold to the extent of 98.15 per cent.

The results indicated that, 11.43 percent of the households have sold their produce to local/village merchants and 77.14 percent of the households sold their produce in regulated markets. The results indicated that 75.51 per cent of the households have used cart as a mode of transport and 28.57 per cent have used tractor.

The results indicated that, 85.71 per cent of the households have shown interest in soil testing. The results indicated that, 25.71 per cent of the households have adopted field bunding which includes 11.76 per cent of marginal, 60 per cent of small farmers, and 50 per cent of semi medium farmers. Summer ploughing was adopted by 82.86 per cent of the households i.e. 94.12 per cent of the marginal farmers and 100 per cent of the small and semi medium farmers respectively. Form pond was adopted by the farmers was 2.86 per cent.

The results indicated that 14.29 per cent of soil conservation structure is constructed by the government, 2.86 per cent of soil conservation structure is constructed by the farmer's organization and another 5.71 per cent is constructed by others. The results indicated that, 74.29 percent used fire wood as a source of fuel, and 25.71 percent of the households used LPG. The results indicated that, piped supply was the major source for drinking water for 97.14 per cent which includes 100 per cent of landless,

94.12 per cent of marginal, 100 per cent of small farmers, semi medium and medium farmers respectively. The results indicated that, electricity was the major source of light which was found to be 97.14 per cent and 2.86 per cent of the households were used kerosene lamp as a source of light. The results indicated that, 48.57 per cent of the households possess sanitary toilet i.e. 40 per cent of landless, 41.18 per cent of marginal, 50 per cent of small, 100 per cent of semi medium and 100 per cent of medium had sanitary toilet facility. The results indicated that, 88.57 per cent of the sampled households possessed BPL card and 11.43 per cent of the sampled households not possessed BPL card.

The results indicated that, 51.43 per cent of the households participated in NREGA programme which included 8 per cent of the landless, 47.06 percent of the marginal, 30 per cent of the small, 100 per cent of the semi medium and 100 percent of the medium farmers. The results indicated that, 100 per cent of cereals, pulses, milk and egg were adequate for the households. Vegetables and fruits were adequate only for 5.71 per cent and meat was adequate for only 2.86 per cent for the households respectively. The results indicated that, both vegetables and fruits were inadequate for 94.29 per cent, of the households. Oilseed was inadequate for 5.71 per cent. Meat was inadequate for 97.14 per cent of the households.

The results indicated that, Lower fertility status of the soil was the constraint experienced by 60 per cent of the households, wild animal menace on farm field and frequent incidence of pest and diseases (77.14%), inadequacy of irrigation water (74.29%), high cost of fertilizers and plant protection chemicals and high rate of interest on credit (85.71%), low price for the agricultural commodities (82.86 %), lack of marketing facilities in the area (85.71%), inadequate extension services and lack of transport for safe transport of the agricultural produce to the market (82.86%) and Source of Agri-technology information(Newspaper/TV/Mobile) (2.86).