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

HALIGERI-2 (4D5B1J1f) MICROWATERSHED

Yadgir & Balichakra Hobli, Yadgir Taluk and District, Karnataka

Karnataka Watershed Development Project – II

SUJALA – III

World Bank funded Project

ICAR – NATIONAL BUREAU OF SOIL SURVEY AND LAND USE PLANNING

ICAR - NBSS & LUP

WATERSHED DEVELOPMENT DEPARTMENT
GOVT. OF KARNATAKA, BANGALORE

About ICAR - NBSS&LUP

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

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

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

Nagpur
Date:15-07-2019

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

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

The present study covers an area of 749 ha in Yadgir taluk & district, Karnataka. The climate is semiarid and categorized as drought-prone with an average annual rainfall of 866 mm, of which about 652 mm is received during south-west monsoon, 138mm during north-east and the remaining 76 mm during the rest of the year. An area of 645 ha in the microwatershed is covered by soils and about 104 ha by others (habitation and water bodies). The salient findings from the land resource inventory are summarized briefly below.

- *The soils belong to 13 soil series and 20 soil phases (management units) and 7 land management units.*
- *The length of crop growing period is about 120-150 days starting from 1st week of June to 4thweek of October.*
- *From the master soil map, several interpretative and thematic maps like land capability, soil depth, surface soil texture, soil gravelliness, available water capacity, soil slope and soil erosion were generated.*
- *Soil fertility status maps for macro and micronutrients were generated based on the surface soil samples collected at every 320 m grid interval.*
- *Land suitability for growing 29 major agricultural and horticultural crops was assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area in the microwatershed is suitable for agriculture.*
- *About 53 per cent area of the microwatershed has soils that are very shallow to moderately shallow (0 -75 cm) and 33 per cent soils are moderately deep to very deep (75->150 cm).*
- *About 10 per cent area in the microwatershed has sandy soils, 55 per cent of loamy soils and 20 per cent clayey soil1 at the surface.*
- *About 66 per cent area is non gravelly (<15%) and 20 per cent is gravelly (15-35%).*
- *About 14 per cent area of the microwatershed is very high (>200 mm/m) in available water capacity, 59 per cent area low (51-100 mm/m) and 14 per cent area very low (<50 mm/m) in available water capacity.*

- *About 4 per cent area of the microwatershed has nearly level (0-1% slope) lands. 77 per cent area of the microwatershed has very gently sloping (1-3% slope) lands and 5 per cent area is gently sloping lands (3-5% slope).*
- *An area of about 4 per cent is slightly (e1) eroded, 65 per cent area is moderately (e2) eroded and 17 per cent area is severely (e3) eroded.*
- *An area of about 0.37 per cent soils are slightly acid (pH 6-6.5) in soil reaction, 24 per cent soils are neutral (pH 6.5-7.3), 36 per cent soil are slightly to moderately alkaline (pH 7.3-8.4) and 25 per cent soils are strongly to very strongly alkaline (8.4 - >9.0).*
- *The Electrical Conductivity (EC) of the soils in the entire area of the microwatershed is dominantly <2 dsm^{-1} indicating that the soils are non-saline.*
- *About 74 per cent of the soils are medium (0.5-0.75%) in organic carbon and 12 per cent high (>0.75).*
- *About 76 per cent area is low in available phosphorus and 10 per area is medium (23-57 kg/ha)*
- *About 26 per cent is low (145 kg/ha) in available potassium and 60 per cent medium (145-337 kg/ha)*
- *Available sulphur is low (<10 ppm) in an area of about 30 per cent, medium (10 - 20 ppm) in 49 per cent and high in 30 per cent area of the microwatershed.*
- *Available boron is low (<0.5 ppm) in an area of about 76 per cent and medium (0.5-1.0 ppm) in 10 per cent area of the microwatershed.*
- *Available iron is sufficient (>4.5 ppm) in the whole area of the microwatershed.*
- *Available manganese and copper are sufficient in all the soils of the microwatershed.*
- *Available zinc is deficient (<0.6 ppm) in the entire area of the microwatershed.*
- *The land suitability for 29 major crops grown in the microwatershed were assessed and the areas that are highly suitable (S1) and moderately suitable (S2) are given below. It is however to be noted that a given soil may be suitable for various crops but what specific crop to be grown may be decided by the farmer looking to his capacity to invest on various inputs, marketing infrastructure, market price and finally the demand and supply position.*

Land suitability for various crops in the Microwatershed

Crop	Suitability Area in ha (%)			Crop	Suitability Area in ha (%)	
	Highly suitable (S1)	Moderately suitable (S2)			Highly suitable (S1)	Moderately suitable (S2)
Sorghum	*116 (16)*	*424 (57)*		*Guava*	-	*114 (15)*
Maize	-	*540 (72)*		*Sapota*	-	*114(15)*
Bajra	-	*556 (74)*		*Pomegranate*	-	*230(31)*
Groundnut	-	*382 (51)*		*Musambi*	*34(5)*	*196(26)*
Sunflower	*64 (9)*	*166(22)*		*Lime*	*34 (5)*	*196 (26)*
Redgram	-	*192 (26)*		*Amla*	*34 (5)*	*522 (70)*
Bengal gram	*116(16)*	*310 (42)*		*Cashew*	-	-
Cotton	*68 (9)*	*358 (49)*		*Jackfruit*	-	*114 (15)*
Chilli	-	*540 (73)*		*Jamun*	-	*116(16)*
Tomato	-	*458(63)*		*Custard apple*	*231(31)*	*326 (44)*
Brinjal	*66 (9)*	*491 (65)*		*Tamarind*	-	*116 (15)*
Bhendi	*181 (24)*	*10(2)*		*Mulberry*	-	*131 (17)*
Onion	*197 (26)*	*343(46)*		*Marigold*	-	*540 (72)*
Drumstick	-	*247 (33)*		*Chrysanthemum*	-	*540 (72)*
Mango	-	-				

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the identified LMUs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and horticulture crops.*
- *Maintaining soil-health is vital to crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested to these problematic soils like saline/alkali, highly eroded, sandy soils etc.,*
- *Soil and water conservation treatment plan has been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. This would help in not only supplementing the farm income but also provide fodder and fuel and generate lot of biomass which would help in maintaining an ecological balance and also contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

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

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

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

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

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

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

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

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

Chapter 2

GEOGRAPHICAL SETTING

2.1 Location and Extent

The Haligeri-2 microwatershed is located in the northern part of Karnataka in Yadgir Taluk & District, Karnataka State (Fig.2.1). It comprises parts of Varkanahalli, Kuyyalur, Halagera, Pogalapur and Mustur villages. It lies between $16^0$42' – $16^0$44' North latitudes and $77^0$11' – $77^0$14' East longitudes covering an area of about 748.80 ha. It is about 14 km east of Yadgir town and is surrounded by Varkanahalli on the north and northwest, Kuyyalur on the west, Pogalapur and Mustur on the south, Halagera on the eastern and Jintera villages on the southeastern part.

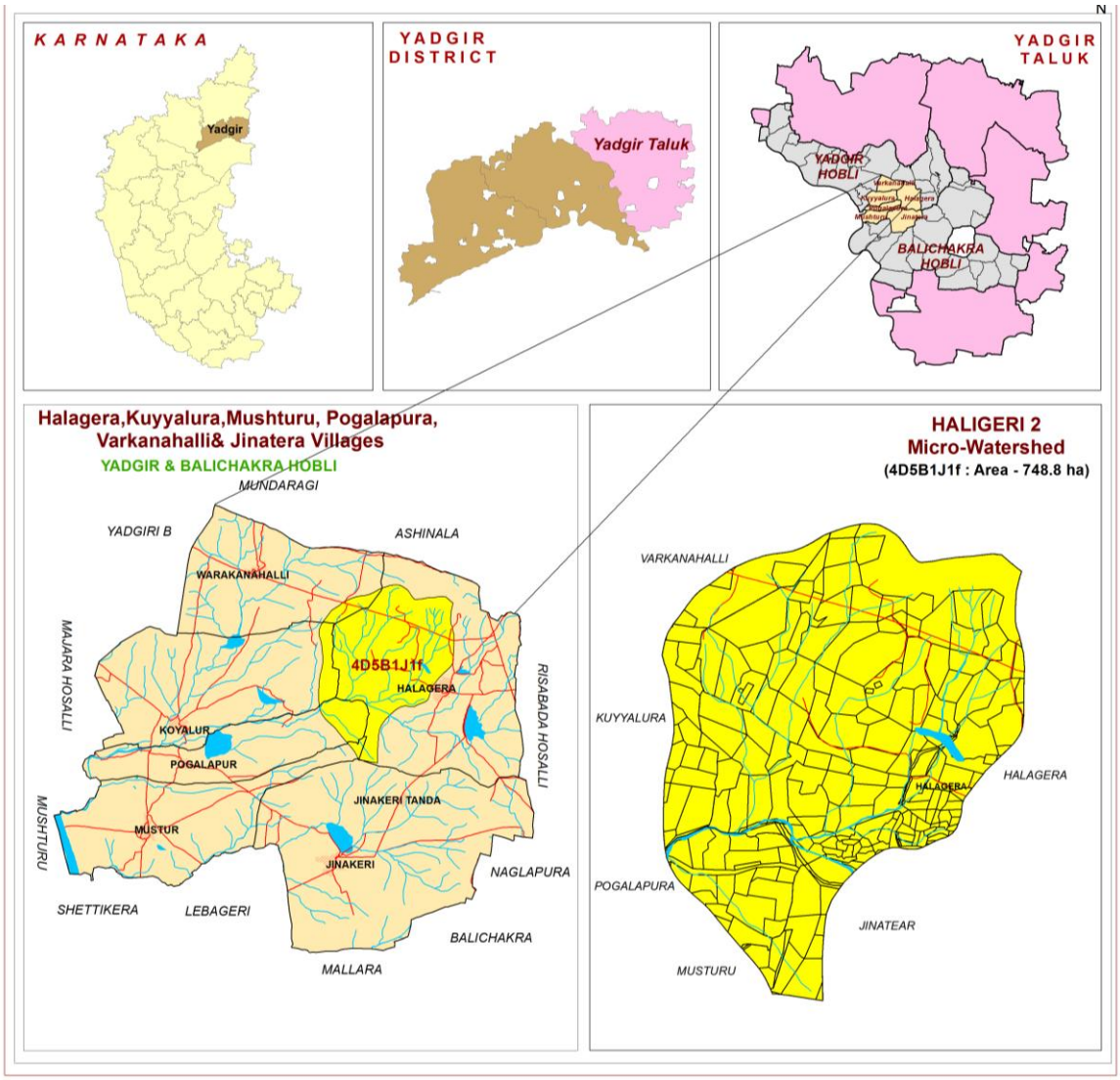


Fig.2.1 Location map of Haligeri-2 microwatershed

2.2 Geology

Major rock formations observed in the microwatershed are granite gneiss (Figs.2.2a). 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 Haligeri-2 microwatershed. Underlying formation is gneiss over limestone and shale.

Fig.2.2a Granite and granite gneiss rocks

2.3 Physiography

Physiographically, the area has been identified as granite gneiss landscape based on geology. The area has been further subdivided into five landforms, *viz;* mounds/ridges, summits, side slopes and very gently sloping uplands, plains and valleys based on slope and its relief features. The elevation ranges from 383-401 m above MSL. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

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

2.5 Climate

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

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

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

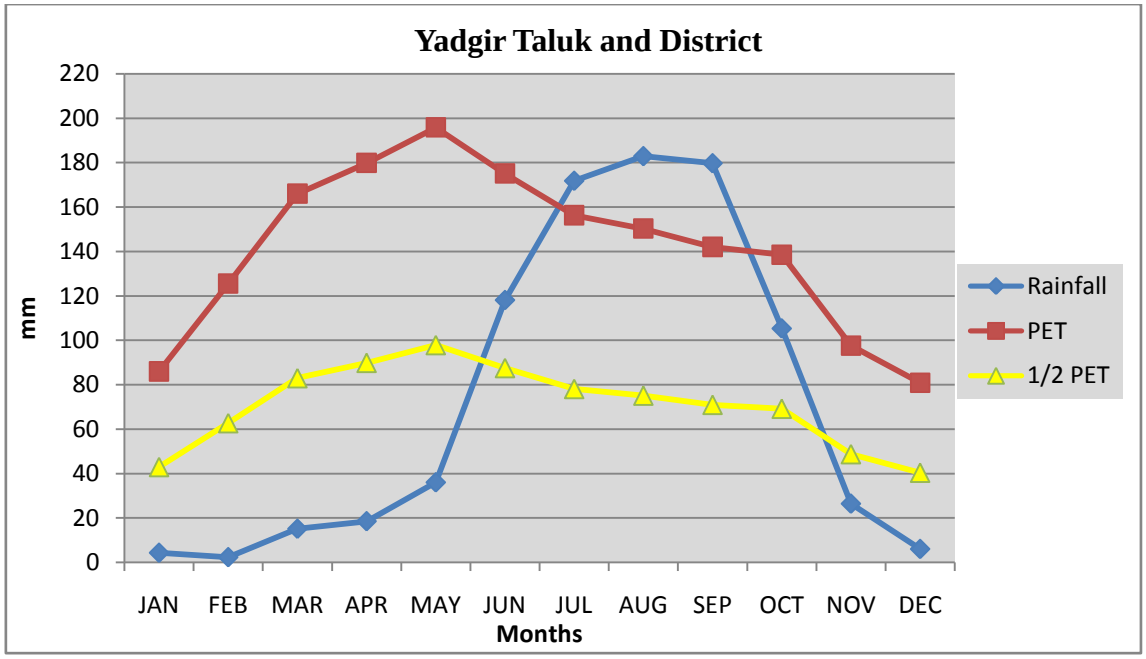


Fig 2.3 Rainfall distribution in Yadgir Taluk, Yadgir District

2.6 Natural Vegetation

The natural vegetation is sparse comprising few tree species, shrubs and herbs. The mounds, ridges and boulders occupy very sizeable area which is under thin to moderately thick forest vegetation. Still, there are some remnants of the past forest cover which can be seen in patches in some ridges and hillocks in the microwatershed (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 that eventually result in the heavy siltation of tanks and reservoirs in the microwatershed.

Fig 2.4 Natural vegetation of Haligeri-2 microwatershed

2.7 Land Utilization

About 72 per cent area (Table 2.2) in Yadgir district is cultivated at present. An area of about 2 per cent is permanently under pasture, 20 per cent under current fallows and 6 per cent under non-agricultural land and 5 per cent under currently barren. Forests occupy an area of about 7 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and bouldery areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, cotton, sunflower, groundnut, red gram, mango, pomegranate, marigold and sapota. 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 Haligeri-2 microwatershed is presented in Fig.2.5. The different crops and cropping systems adopted in the microwatershed is presented in the Figures 2.6a & b.

Table 2.2 Land Utilization in Yadgir District

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

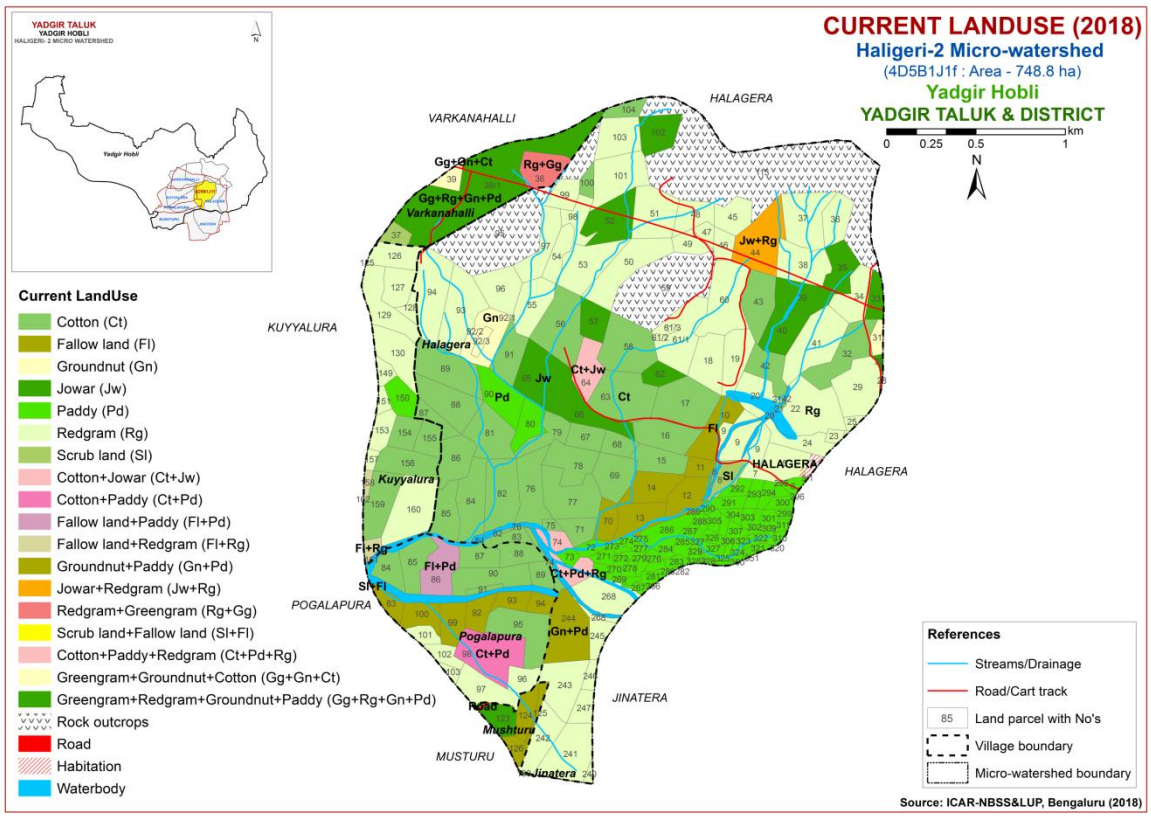


Fig.2.5 Current Land Use map of Haligeri-2 microwatershed

Fig. 2.6 a. Different Crops and Cropping Systems in Haligeri-2 microwatershed

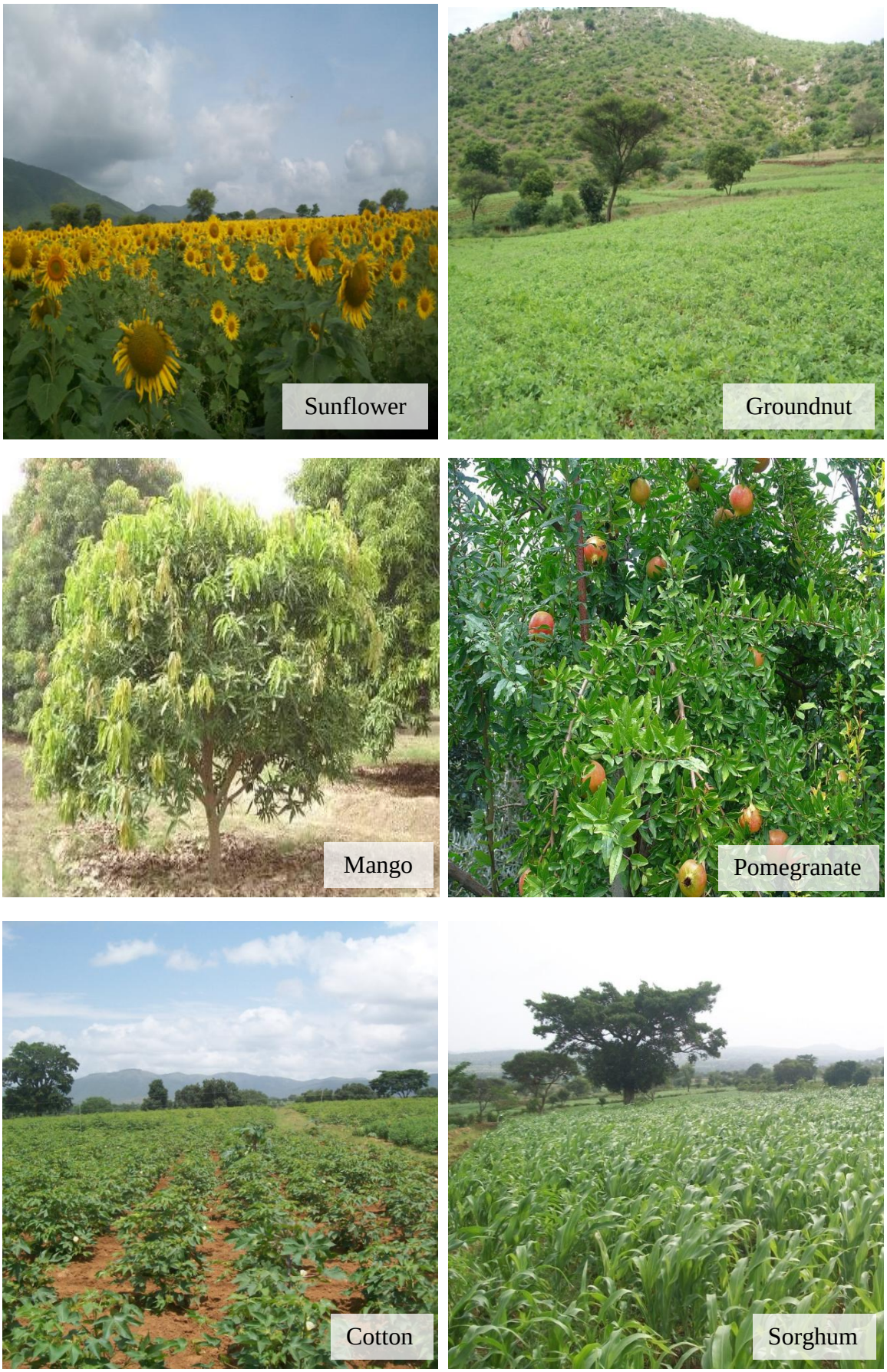


Fig. 2.6b. Different Crops and Cropping Systems in Haligeri-2 microwatershed

Chapter 3

SURVEY METHODOLOGY

The purpose of land resource inventory is to delineate similar areas (soil series and phases), which respond or expected to respond similarly to a given level of management. This was achieved in Haligeri-2 microwatershed by the detailed study of all the soil characteristics (depth, texture, colour, structure, consistence, coarse fragments, porosity, soil reaction, soil horizons etc.) and site characteristics (slope of the land, erosion, drainage, occurrence of rock fragments etc.) followed by grouping of similar areas based on soil-site characteristics into homogeneous (management units) units, and showing the area extent and their geographic distribution on the microwatershed cadastral map. The detailed survey at 1:7920 scale was carried out in an area of 641 ha. The methodology followed for carrying out land resource inventory was as per the guidelines given in Soil Survey Manual (IARI, 1971; Soil Survey Staff, 2006; Natarajan *et al.*, 2015) which is briefly described below.

3.1 Base Maps

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

3.2 Image Interpretation for Physiography

False Colour Composites (FCCs) of Cartosat-I and LISS-IV merged satellite data covering microwatershed area was visually interpreted using image interpretation elements and all the available collateral data with local knowledge. The delineated physiographic boundaries were transferred on to a cadastral map overlaid on satellite imagery. Physiographically, the area has been identified as granite and granite gneiss landscape. It was divided into five landforms, *viz;* ridges and mounds, gently and very gently sloping uplands and lowlands 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)
	G24	Valleys/ lowlands
		G241 Valleys, pink tones
		G242 Valleys gray mixed with pink tones

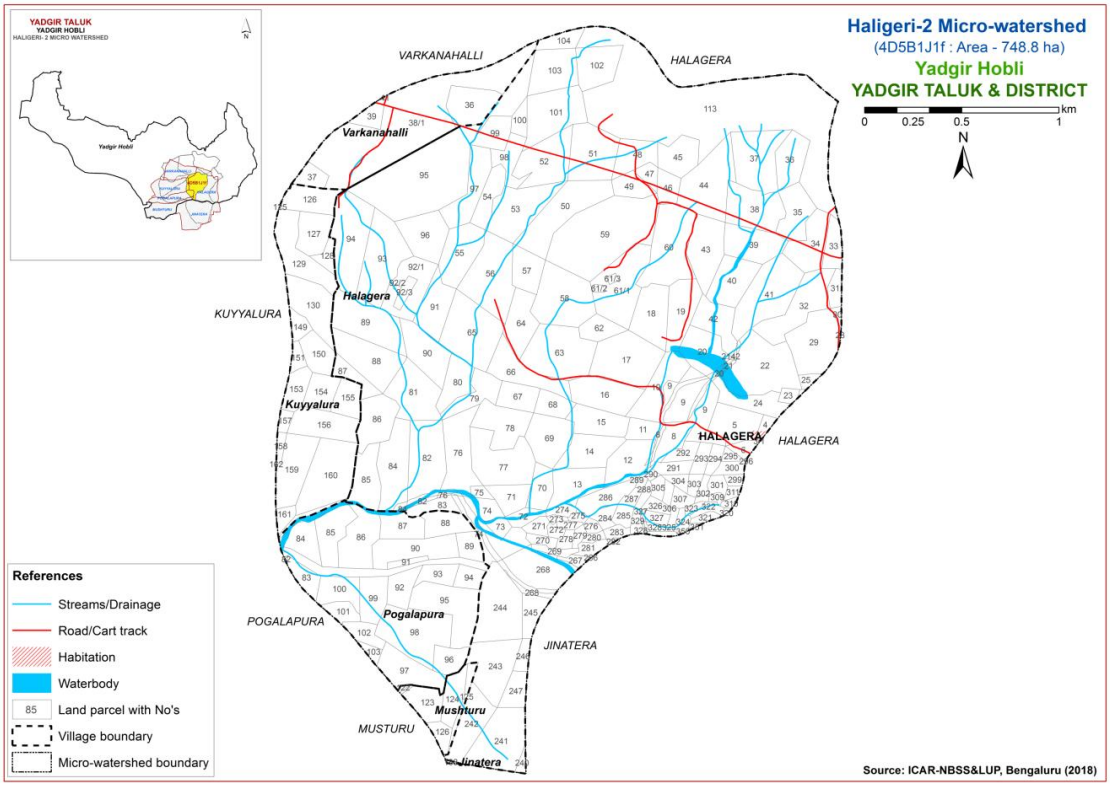


Fig 3.1 Scanned and Digitized Cadastral map of Haligeri-2 microwatershed

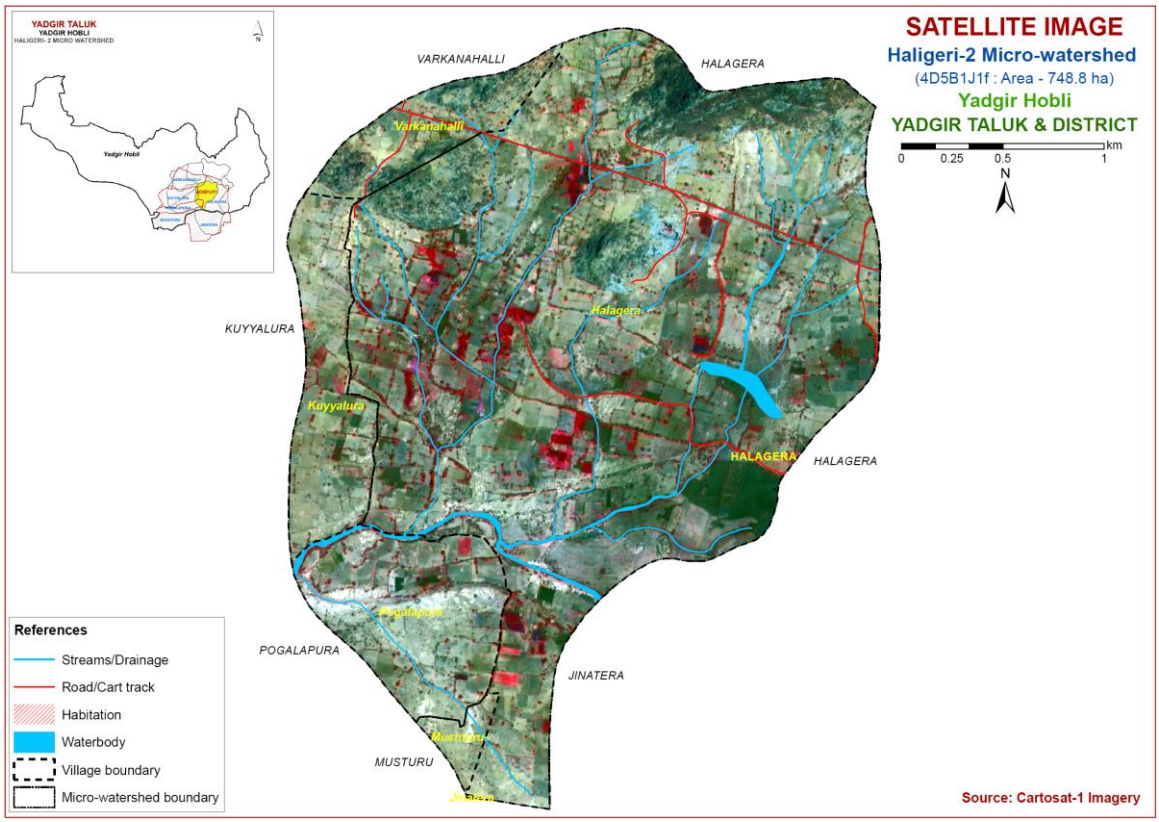


Fig.3.2 Satellite Image of Haligeri-2 microwatershed

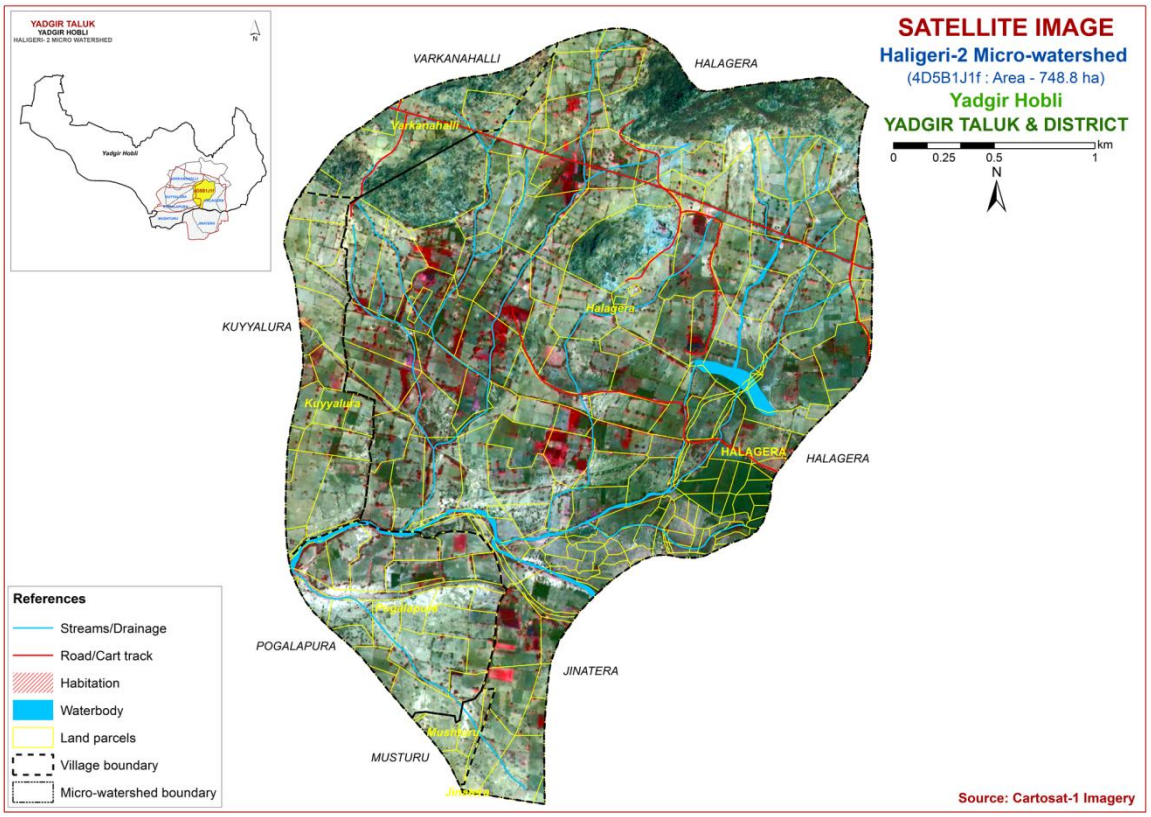


Fig.3.3Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Haligeri-2 microwatershed

3.3 Field Investigation

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

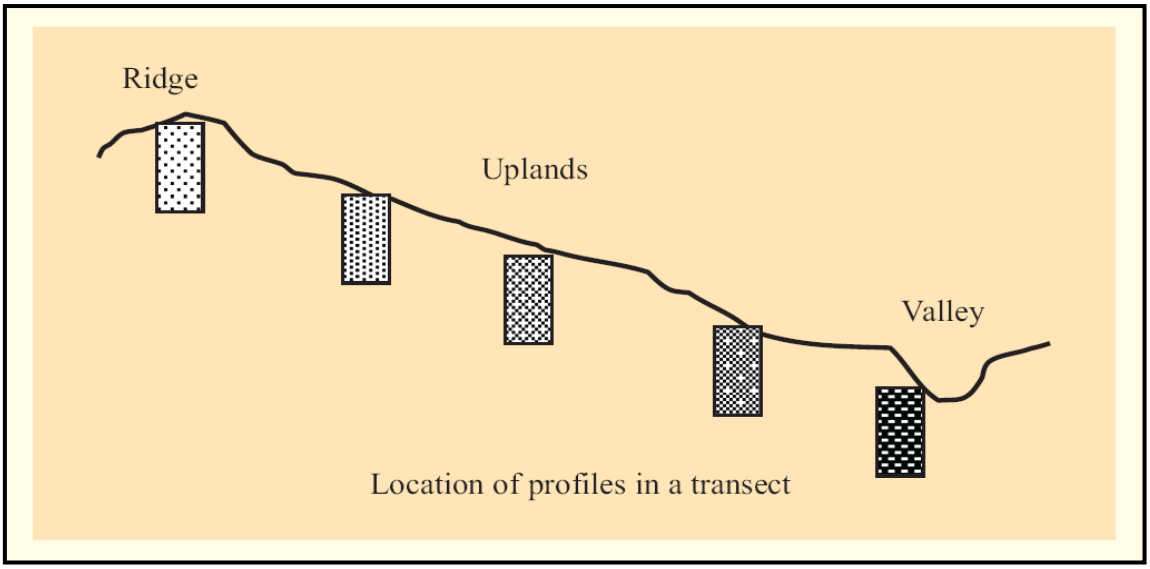


Fig: 3.4. Location of profiles in a transect

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

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

identifying soil series occurring in the area. The differentiating characteristics used for identifying the soil series are given in Table 3.1. Based on the above characteristics, 13 soil series were identified in the Haligeri-2 microwatershed.

Table 3.1 Differentiating Characteristics used for identifying Soil Series

(Characteristics are of Series Control Section)

Soils of Granite gneiss Landscape							
Sl. no	**Soil Series**	**Depth (cm)**	**Colour (moist)**	**Texture**	**Gravel (%)**	**Horizon sequence**	**Calcareous-ness**
1	BDP (Baddepalli)	<25	7.5YR3/2,3/4	scl	-	Ap-Ac	es
2	DSB (Dastharabad)	25-50	7.5YR3/3	gc	35-60	Ap-Bt-cr	-
3	DPL (Duppali)	50-75	7.5YR 3/3,5 YR 3/4	sc	-	Ap-Bt	-
4	YLR (Yalleri)	50-75	2.5YR 3/4,4/4 5YR3/4 7.5YR4/4	sc	15-35	Ap-Bt	-
5	SBR (Sambra)	50-75	10YR 7/1 7.5YR 7/4	ls-s	-	Ap-AC	-
6	HLG (Halagera)	50-75	10YR 3/2,4/4 7.5YR4/3,4/2	scl	-	Ap-Bw	es
7	JNK (Jinkera)	50-75	10YR5/3,3/2 7.5YR3/4	scl	-	Ap-Bw	e
8	KBD (Kalebelagundi)	75-100	2.5YR4/4,3/4 5Y4/2,4/3	gscl	35-60	Ap-Bt	-
9	HSL(Hosalli)	75-100	10YR5/,4/4,4/6	sc	-	Ap-Bw	e
10	ANR (Anur)	100-150	10YR 4/3,4/1	sc-c	-	Ap-Bw	es
11	MDR (Madhwarara)	>150	10YR3/,3/2, 2/1,2/2	scl	-	Ap-Bw	e
12	KDH (Kadechoor)	75-100	10YR3/2	sc	-	Ap-Bw	e
13	SGR (Sangwar)	>150	10YR3/1,4/1	c	-	Ap-Bss	es

3.4 Soil Mapping

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

addition to the profile study, spot observations in the form of minipits, road cuts, terrace cuts etc., were studied to validate the soil boundaries on the soil map.

The soil map shows the geographic distribution of 20 mapping units representing 13 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 20 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 Land Management Units

The 20 soil phases identified and mapped in the microwatershed were grouped into 7 Land Management Units (LMU's) for 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 Haligeri-2 microwatershed, five soil and site characteristics, namely soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The Land Management Units are expected to behave similarly for a given level of management.

3.6 Laboratory Characterization

Soil samples were collected from representative master profiles for laboratory characterization by following the methods outlined in the Laboratory Manual (Sarma *et al*, 1987). Surface soil samples collected from farmer's fields (76 samples) for fertility status (major and micronutrients) at 320 m grid interval in the year 2018 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 by using Kriging method for the microwatershed.

Table 3.2 Soil map unit description of Haligeri-2 microwatershed

Soil No*	Soil Series	Soil Phase	Mapping Unit Description	Area in ha (%)
Soil of Granite Gneiss Landscape				
	BDP	Baddeppalli soils are very shallow (<25 cm), well drained, have dark brown to dark reddish brown, calcareous sandy clay loam red soils occurring on very gently sloping uplands under cultivation		**27 (3.59)**
119		BDPiB3	Sandy clay surface, slope 1-3%,severe erosion	27 (3.59)
	DSB	Dastharabad soils are shallow (25-50 cm), well drained, have dark brown to very dark brown, gravelly clay soils occurring on very gently to gently sloping uplands under cultivation		**25(3.38)**

107		DSBhB2	Sandy clay loam surface, slope 1-3%, moderate erosion,	10 (1.34)
121		DSBcB2	Sandy loam surface, slope 1-3%, moderate erosion,	15 (2.04)
	DPL	Duppali soils are moderately shallow (50-75 cm), well drained, have dark brown to dark reddish brown, sandy clay red soils occurring on very gently sloping uplands under cultivation		**34 (4.59)**
26		DPLiB2	Sandy clay surface, slope 1-3%, moderate erosion,	34 (4.59)
	YLR	Yalleri soils are moderately shallow (50-75 cm), well drained, have brown to reddish brown and dark reddish brown, clay red soils occurring on very gently to gently sloping uplands under cultivation		**156(20.76)**
27		YLRbB2	Loamy sand surface, slope 1-3%, moderate erosion,	16 (2.08)
28		YLRbB3	Loamy sand surface, slope 1-3%,severe erosion	28 (3.74)
29		YLRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	112 (14.94)
	SBR	Sambra soils are moderately shallow (50-75 cm), somewhat excessively drained, have light gray to pink, loamy sand soils occurring on very gently to gently sloping uplands under cultivation		**36 (4.74)**
12		SBRcC3g1	Sandy loam surface, slope 3-5%, severe erosion, gravelly (15-35%)	36 (4.74)
	HLG	Halagera soils are moderately shallow (50-75 cm), well drained, have very dark grayish brown to dark yellowish brown, calcareous sandy clay loam soils occurring on very gently sloping uplands under cultivation		**62(8.25)**
15		HLGbB3	Loamy sand surface, slope 1-3%, severe erosion	34 (4.57)
16		HLGcB2	Sandy loam surface, slope 1-3%, moderate erosion	28 (3.68)
	JNK	Jinkera soils are moderately shallow (50-75 cm), well drained, have dark brown to very dark grayish brown, slightly calcareous sandy clay loam soils occurring on very gently sloping uplands under cultivation		**58(7.76)**
20		JNKcB2	Sandy loam surface, slope 1-3%, moderate erosion	44 (5.92)
22		JNKiB2	Sandy clay surface, slope 1-3%, moderate erosion	14 (1.84)
	KBD	Kalabelagundi soils are moderately deep (75-100 cm), well drained, have reddish brown to dark reddish brown and dark reddish gray, gravelly sandy clay loam soils occurring on very gently sloping uplands under cultivation		**17 (2.21)**
130		KBDhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	17 (2.21)

	HSL	Hosalli soils are moderately deep (75-100 cm), moderately well drained, have yellowish brown to dark yellowish brown, slightly calcareous sandy clay soils occurring on very gently sloping uplands under cultivation		**114 (15.27)**
32		HSLcB2	Sandy loam surface, slope 1-3%, moderate erosion	114 (15.27)
	ANR	Anur soils are deep (100-150 cm), moderately well drained, have dark gray to brown, calcareous sodic sandy clay to clay soils occurring on very gently sloping uplands under cultivation		**34 (4.51)**
55		ANRiB2	Sandy clay surface, slope 1-3%, moderate erosion	34 (4.51)
	MDR	Madhwara soils are very deep (>150 cm), moderately well drained, have very dark gray to very dark brown, slightly calcareous sandy clay loam soils occurring on nearly level to very gently sloping uplands under cultivation		**34 (4.56)**
132		MDRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	34 (4.56)
	KDH	Kadechoor soils are moderately deep (75-100 cm), moderately well drained, have very dark grayish brown to dark brown, slightly calcareous sandy clay soils occurring on very gently to gently sloping lowlands under cultivation		**14 (1.94)**
157		KDHiA1	Sandy clay surface, slope 0-1%, slight erosion,	14 (1.94)
	SGR	Sangwar soils are very deep (>150 cm), moderately well drained, have dark gray to very dark gray, sodic, calcareous cracking clay black soils occurring on very gently sloping lowlands under cultivation		**35(4.52)**
141		SGRcB2	Sandy loam surface, slope 1-3%, moderate erosion	6 (0.74)
143		SGRiB2	Sandy clay surface, slope 1-3%, moderate erosion	11 (1.41)
158		SGRiA1	Sandy clay surface, slope 0-1%,slight erosion	18 (2.37)
999		Rock out crops	Rock lands, both massive and bouldery with little or no soil	**95 (12.67)**
1000		Others	Habitation and water body	**9 (1.26)**

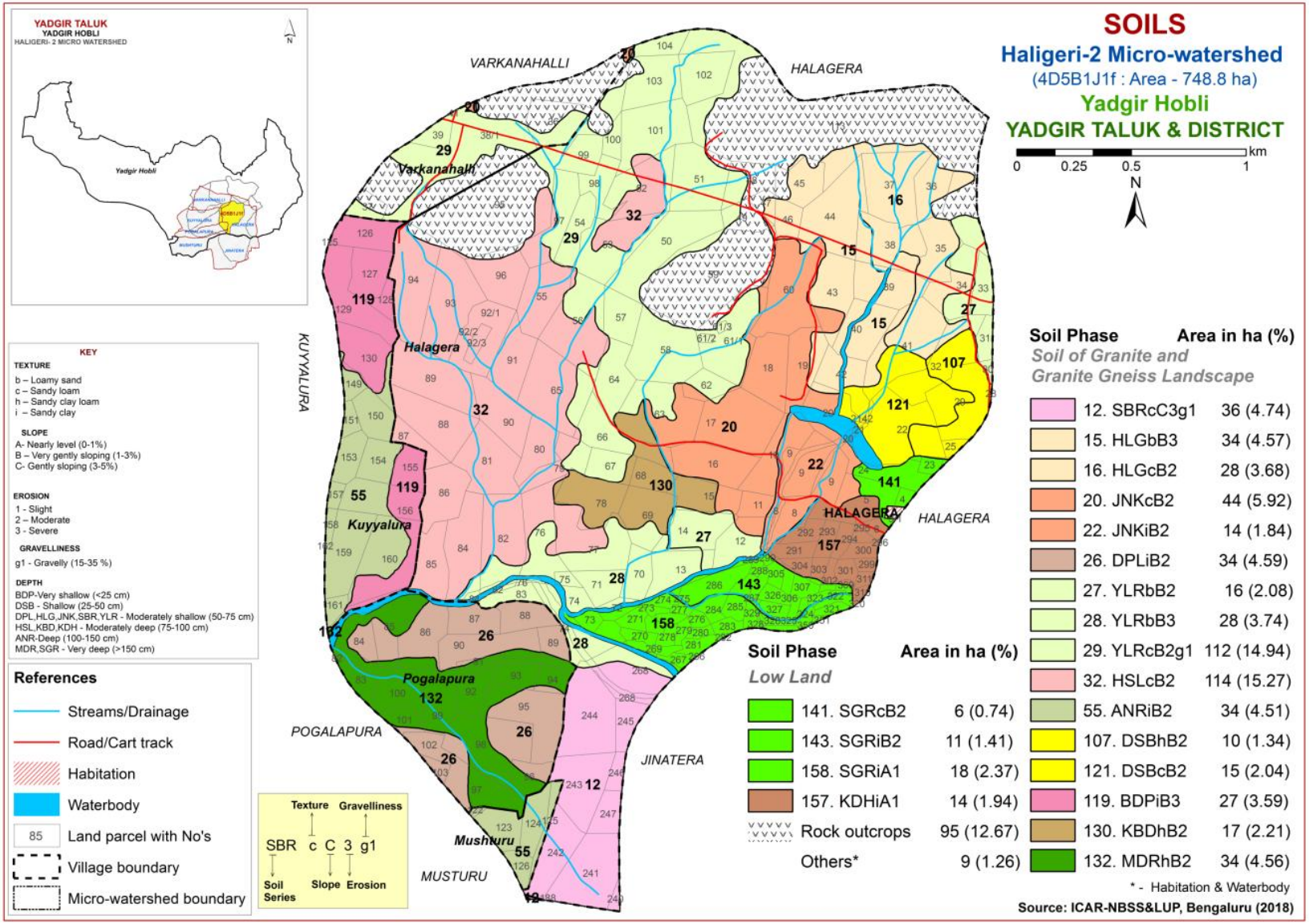


Fig 3.5 Soil Phase or Management Units- Haligeri-2 microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and their distribution of different kinds of soils occurring in Haligeri-2 microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss landscape based on geology. In all, 13 soil series are identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. In the granite gneiss landscape, it is by parent material, relief and climate.

A brief description of each of the 13 soil series identified followed by 20 soil phases (management units) mapped under each series are furnished below. The physical and chemical characteristics of soil series identified in Belagiri-2 microwatershed are given in Table 4.1.The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

4.1 Soils of granite gneiss landscape

In this landscape, 13 soil series are identified and mapped. Of these, YLR series occupies maximum area of 156 ha (21%) followed by HSL 114 ha (15%), SGR 35 ha (5%) and HLG 62 ha (8%).The other series occupy minor area in the microwatershed. Brief description of each series identified and number of soil phases mapped is given below.

4.1.1 Baddeppalli (BDP) Series: Baddeppalli soils are very shallow (<25cm), well drained, have dark brown to dark reddish brown, calcareous sandy clay loam soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Baddepalli series has been classified as a member of the loamy, mixed, calcareous, isohyperthermic family of Lithic Ustorthents.

The thickness of the soil is less than 25 cm. Its colour is in 7.5 YR and 5 YR hue with value 3 and chroma 2 to 4. The texture varies from sandy clay loam to sandy clay and is calcareous. The available water capacity is very low (<50 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Baddeppalli (BDP) Series

4.1.2 Dastharabad (DSB) Series: Dastharabad soils are shallow (25-50 cm), well drained, have dark brown, gravelly clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Dastharabad series has been classified as a member of the clayey-skeletal, mixed, isohyperthermic family of Paralithic Haplustalfs.

The thickness of the solum ranges from 28 to 50 cm. The thickness of A horizon ranges from 9 to 14 cm. Its colour is in 10 YR and 7.5 YR hue with value and chroma of 3 to 4. The texture varies from sandy loam to sandy clay. The thickness of B horizon ranges from 28 to 40 cm. Its colour is in 7.5 YR hue with value 3 and chroma 3 to 4. The texture is sandy clay to clay with 35-60 per cent gravel. The available water capacity is very low (<50 mm/m). Two phases were identified and mapped.

Landscape and Soil Profile characteristics of Dastharabad (DSB) Series

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

The thickness of the solum ranges from 51-75 cm. Thickness of A horizon ranges from 8 to 15 cm. Its colour is in hue 10 YR with value 4 and chroma 3 to 6. The texture varies from loamy sand to sandy clay. The thickness of B horizon ranges from 55 to 65 cm. Its colour is in 7.5 YR and 5 YR hue with value 3 to 4 and chroma 2 to 4. The texture is sandy clay. The available water capacity is low (51-100 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Duppali (DPL) Series

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

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

Landscape and Soil Profile characteristics of Yalleri (YLR) Series

4.1.5 Sambra (SBR) Series: Sambra soils are moderately shallow (50-75 cm), somewhat excessively drained, have light grey to reddish yellow, loamy sand soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Sambra series has been classified as a member of the mixed, isohyperthermic family of Typic Ustipsamments.

The thickness of the soil ranges from 52-75 cm. Thickness of A horizon ranges from 8 to 23 cm. Its colour is in hue 10 YR and 7.5 YR with value 3 and chroma 1 to 4. The texture varies from loamy sand to sandy loam. The thickness of subsurface horizons ranges from 41 to 66 cm. Its colour is in 10 YR and 7.5 YR hue with value 3 to 5 and chroma 1 to 4. The texture is loamy sand. The available water capacity is very low (<50 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Sambra (SBR) Series

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

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

Landscape and Soil Profile characteristics of Halagera (HLG) Series

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

The thickness of the solum ranges from 51-75 cm. Thickness of A horizon ranges from 6 to 11 cm. Its colour is in hue 10 YR and 7.5 YR with value and chroma of 3 to 4. The texture varies from sandy loam to sandy clay. The thickness of B horizon ranges from 53 to 66 cm. Its colour is in 10 YR and 7.5 YR hue with value and chroma of 2 to 4. The texture varies from sandy clay loam to sandy clay and is slightly calcareous. The available water capacity is low (51-100 mm/m). Two phases were identified and mapped.

Landscape and Soil Profile characteristics of Jinkera (JNK) Series

4.1.8 Kalabelagundi (KBD) Series: Kalabelagundi soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark reddish grey and reddish brown, gravelly sandy clay loam soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Kalabelagundi series has been classified as a member of the loamy-skeletal, mixed, isohyperthermic family of Typic Haplustalfs.

The thickness of the solum ranges from 75 to 98 cm. The thickness of A horizon ranges from 10 to 19 cm. Its colour is in hue 5 YR and 7.5 YR with value 3 to 4 and chroma 2 to 4. Its texture varies from loamy sand to sandy loam and sandy clay loam. The thickness of B horizon ranges from 70 to 84 cm. Its colour is in hue 5 YR and 2.5YR with value 3 to 4 and chroma 2 to 4. Its texture is sandy clay loam to sandy clay with gravel content of 35-60 per cent. The available water capacity is very low (<50 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Kalabelagundi (KBD) Series

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

The thickness of the solum ranges from 76 to 100 cm. The thickness of A horizon ranges from 6 to 15 cm. Its colour is in hue 10 YR and 7.5 YR with value 3 to 5 and chroma 2 to 4. Its texture varies from loamy sand to sandy loam and sandy clay loam. The thickness of B horizon ranges from 62 to 93 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 2 to 4. Its texture varies from sandy clay loam to sandy clay and clay and is slightly calcareous. The available water capacity is medium (101-150 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Hosalli (HSL) Series

4.1.10 Anur (ANR) Series: Anur soils are deep (100-150 cm), moderately well drained, have dark gray to dark brown, calcareous sandy clay to clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation.

The thickness of the solum ranges from 102 to 148 cm. The thickness of A-horizon ranges from 9 to 17 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 2 to 4. The texture ranges from loamy sand to sandy clay loam and sandy clay and are calcareous. The thickness of B horizon ranges from 102 to 135 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 6. Texture is sandy clay loam to sandy clay and clay. Soil is calcareous in nature. The available water capacity is medium (100-150 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Anur (ANR) Series

4.1.11 Madhwara (MDR) Series: Madhwara soils are very deep (>150 cm), well drained, have black to very dark brown and very dark gray to very dark grayish brown, slightly calcareous sandy clay loam soils. They are developed from weathered granite gneiss and occur on nearly level to very gently sloping uplands under cultivation. The Madhwara series has been classified as a member of the fine-loamy, mixed, isohyperthermic family of Fluventic Haplustepts.

The thickness of the solum is more than150 cm. The thickness of A horizon ranges from 10 to 16 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 2 to 3. Texture varies from sandy clay and clay. The thickness of B horizon is >150 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 3. Texture varies from sandy clay loam to sandy clay and is slightly calcareous. The available water capacity is very high (>200 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Madhwara (MDR) Series

4.1.12 Kadechoor (KDH) Series: Kadechoor soils are moderately deep (75-100 cm), moderately well drained, have very dark grayish brown to dark brown, slightly calcareous sandy clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping lowlands under cultivation. The Kadechoor series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Haplustepts.
The thickness of the solum ranges from 75 to 98 cm. The thickness of A horizon ranges from 6 to 11 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 2. Its texture varies from sandy loam to sandy clay. The thickness of B horizon ranges from 73 to 90 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 2 to 3. The texture is sandy clay loam to sandy clay and is slightly calcareous. The available water capacity is low (51-100 mm/m). Only one phase was identified and mapped.

Landscape and Soil Profile characteristics of Kadechoor (KDH) Series

4.1.13 Sangwar (SGR) Series: Sangwar soils are very deep (>150 cm), moderately well drained, have very dark gray to dark gray, sodic calcareous cracking clay black soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping lowlands under cultivation. The Sangwar series has been classified as a member of the fine, smectitic, calcareous, isohyperthermic family of Sodic Haplusterts.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 9 to 20 cm. Its colour is in 10 YR hue with value 3 to 5 and chroma 1 to 2 with sandy clay loam to sandy clay and clay texture. The thickness of B horizon ranges from 157 to 174 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. Its texture varies from sandy clay to clay and is calcareous. They are sodic with ESP ranging from 29 - 65%. The available water capacity is very high (>200 mm/m). Three phases were identified and mapped.

Landscape and Soil Profile characteristics of Sangwar (SGR) Series

Table: 4.1 Physical and Chemical characteristics of soil series identified in Heligeri-2 microwatershed

Soil Series: Baddeppalli **(**BDP) **Pedon:** R-11

Location: $16^0$43'84.4"N $77^0$14'06.4"E, Halagera village, Yadgir hobli, Yadgir taluk and district

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-16	Ap	58.67	17.02	24.31	19.03	13.74	9.62	10.57	5.71	<15	scl	16.19	8.18

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	8.58	-	-	0.262	1.60	7.67	-	-	0.24	0.06	-	18.10	0.74	100	0.35

Contd...

Soil Series: Dastharabad **(**DSB) **Pedon:** R-17

Location: $16^0$31’ 98.6”N $77^0$22’93.0”E, Duppalli village, Sydhapura hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Clayey-skeletal, mixed, isohyperthermic Paralithic 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
0-6	Ap	90.51	4.84	4.64	7.06	8.07	37.24	26.03	12.11	35	s	5.32	1.59
6-17	Bt1	49.11	8.08	42.81	10.67	15.44	10.00	8.44	4.56	20	sc	20.68	13.16
17-43	Bt2	39.54	2.84	57.63	12.89	9.14	7.71	6.83	2.97	50	c	26.69	18.50

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-6	5.93	-	-	0.04	0.67	0.00	2.00	0.54	0.07	0.01	2.61	3.60	0.78	73	0.14
6-17	7.31	-	-	0.110	0.91	0.91	11.19	3.37	0.12	0.49	15.00	15.20	0.36	100	3.22
17-43	6.64	-	-	0.048	0.76	0.00	18.81	5.57	0.23	0.09	24.70	24.90	0.43	99	0.38

Contd...

Soil Series: Duppali (DPL) **Pedon:** R-4

Location: $16^0$37'45.8"N $77^0$18'93.2"E, Neelahalli village, Balichakra hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **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
0-7	Ap	85.28	5.38	9.34	13.40	26.09	19.90	20.51	5.38	-	ls	9.30	4.92
7-39	Bt1	48.50	7.08	44.42	16.85	10.41	10.94	6.97	3.33	-	sc	21.31	16.82
39-65	Bt2	50.95	5.29	43.76	23.57	10.36	8.77	5.50	2.75	-	sc	21.99	17.50

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-7	6.92	-	-	0.122	0.92	0.00	4.73	1.61	0.19	0.01	6.54	7.10	0.76	92	0.09
7-39	7.00	-	-	0.060	0.62	0.00	13.57	4.78	0.12	0.40	18.87	19.30	0.43	98	2.06
39-65	6.87	-	-	0.072	0.41	0.00	13.69	4.57	0.19	0.65	19.10	19.90	0.45	96	3.25

Contd...

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

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

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed, isohyperthermic Typic 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
0-5	Ap	81.69	5.44	12.87	6.10	8.65	33.88	21.57	11.50	-	sl	8.60	3.37
5-34	Bt1	38.78	6.73	54.49	3.38	9.91	12.42	8.93	4.14	-	c	25.33	15.82
34-75	Bt2	40.35	2.90	56.75	12.91	6.83	10.30	7.48	2.82	35-60	c	24.49	16.20

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-5	6.91	-	-	0.069	0.70	0.00	5.29	1.37	0.28	0.03	6.96	6.90	0.54	100	0.45
5-34	7.05	-	-	0.053	0.62	0.00	16.43	3.89	0.26	0.09	20.67	21.60	0.40	96	0.42
34-75	7.25	-	-	0.058	0.59	0.00	15.22	3.46	0.25	0.14	19.06	19.90	0.35	96	0.69

Contd...

Soil Series: Sambara (SBR) **Pedon:** R-10

Location: $16^0$42'04.5"N $77^0$14'35.3"E, Jinatera village, Balichakra hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Mixed, isohyperthermic Typic Ustipsamments

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-9	Ap	81.90	8.22	9.88	23.76	14.05	23.76	10.62	9.71	-	ls	9.45	2.69
9-17	C1	84.08	6.59	9.33	21.30	20.69	17.65	17.65	6.80	-	ls	7.84	2.65
17-60	C2	86.86	6.17	6.98	11.53	21.54	25.08	23.46	5.26	-	ls	5.48	2.62
60-78	C3	87.27	6.92	5.81	15.05	20.91	26.36	19.29	5.66	-	ls	5.19	2.81

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-9	8.24	-	-	0.145	0.61	0.91	-	-	0.12	0.09	-	7.50	0.76	100	1.15
9-17	8.21	-	-	0.068	0.57	0.39	-	-	0.06	0.12	-	6.70	0.72	100	1.82
17-60	8.47	-	-	0.080	0.38	0.48	-	-	0.03	0.17	-	2.70	0.39	100	6.34
60-78	8.50	-	-	0.081	0.30	0.52	-	-	0.03	0.17	-	2.70	0.46	100	6.43

Contd...

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

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

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-8	Ap	81.02	8.42	10.56	10.41	24.08	18.98	19.08	8.47	<15	ls	9.10	4.79
8-22	Bw1	61.00	11.50	27.50	8.29	9.35	21.89	14.35	7.12	<15	scl	16.91	12.28
22-53	Bw2	61.41	13.80	24.79	15.98	15.67	12.62	11.78	5.36	15-35	scl	17.08	11.26

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-8	8.49	-	-	0.185	0.30	2.99	-	-	0.24	0.06	-	8.80	0.83	100	0.69
8-22	8.57	-	-	0.116	0.45	4.03	-	-	0.11	0.02	-	19.50	0.71	100	0.12
22-53	8.70	-	-	0.113	0.27	7.67	-	-	0.11	0.05	-	15.50	0.63	100	0.33

Contd...

Soil Series: Jinkera **(**JNK) **Pedon:** R-1

Location: $16^0$45'13.5"N $77^0$10'59.8"E, Varkanahalli village, Yadgir hobli, Yadgir taluk and district

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-15	Ap	66.84	13.62	19.54	12.15	21.22	11.23	12.56	9.68	10	sl	14.42	7.70
15-38	Bw1	59.08	12.11	28.81	12.53	12.42	17.85	8.77	7.52	20	scl	18.21	12.23
38-50	Bw2	68.21	11.68	20.11	17.90	21.81	10.60	10.80	7.10	10	scl	14.54	8.96

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	8.42	-	-	0.148	0.70	0.65	-	-	0.15	0.03	-	14.50	0.74	100	0.18
15-38	8.38	-	-	0.226	0.31	2.21	-	-	0.09	0.23	-	21.70	0.75	100	1.05
38-50	8.40	-	-	0.195	0.25	1.17	-	-	0.07	0.19	-	15.90	0.79	100	1.23

Contd...

Soil Series: Kalabelagundi (KBD) **Pedon:** R-13

Location: $16^0$43'78.3"n $77^0$13'71.4"E, Halagera village, Yadgir hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Loamy-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
0-11	Ap	72.35	5.19	22.46	7.19	14.29	19.01	25.28	6.58	15	scl	15.12	8.16
11-35	Bt1	73.20	5.81	20.99	13.66	18.67	16.79	17.62	6.47	20	scl	11.58	7.29
35-64	Bt2	51.68	7.30	41.03	29.41	8.00	4.86	5.62	3.78	40	sc	19.86	14.24
64-89	BC	64.35	3.51	32.15	21.84	12.03	14.87	10.23	5.38	40	scl	16.72	10.36

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}							%	%
0-11	7.84	-	-	0.604	0.88	0.52	8.69	2.17	0.44	0.49	11.78	11.50	0.51	100	4.27
11-35	5.57	-	-	0.181	0.68	0.00	6.40	1.63	0.18	0.14	8.36	9.10	0.43	92	1.57
35-64	7.42	-	-	0.098	0.44	1.05	15.82	2.34	0.12	0.76	19.04	19.60	0.48	97	3.90
64-89	6.66	-	-	0.165	0.56	0.65	10.45	4.00	0.09	0.43	14.97	15.10	0.47	99	2.86

Contd...

Soil Series: Hosalli (HSL) **Pedon:** R-3

Location: $16^0$46'60.3"N $77^0$05'47.6"E, Mudhanala village, Yadgir hobli, Yadgir taluk and district

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-10	Ap	88.43	5.15	6.42	5.69	6.40	36.04	27.31	12.99	-	s	7.40	2.74
10-30	Bw1	58.47	7.24	34.29	4.26	9.37	19.91	19.28	5.64	-	scl	19.07	11.57
30-50	Bw2	51.43	12.67	35.90	3.49	8.89	16.72	15.87	6.46	<15	sc	21.64	12.44
50-90	Bw3	49.89	13.64	36.47	2.43	2.96	20.61	16.17	7.72	<15	sc	21.12	12.95

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}							%	%
0-10	7.16	-	-	0.117	0.48	0.00	2.83	1.50	0.15	0.29	4.76	4.90	0.76	97	5.94
10-30	6.91	-	-	0.040	0.36	0.00	10.64	5.43	0.10	0.26	16.43	17.80	0.52	92	1.47
30-50	8.17	-	-	0.182	0.24	1.43	-	-	0.12	0.22	-	19.90	0.55	100	1.08
50-90	8.60	-	-	0.148	0.20	4.29	-	-	0.13	0.16	-	19.70	0.54	100	0.81

Contd...

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

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

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-18	Ap	64.60	13.44	21.96	7.33	10.42	18.68	20.12	8.05	<15	scl	16.59	7.96
18-49	Bw1	56.66	12.19	31.15	4.73	9.80	18.66	17.02	6.45	-	scl	33.38	13.51
49-95	Bw2	39.94	17.81	42.25	3.09	3.30	15.44	10.65	7.45	<15	c	44.68	25.23
95-123	Bw3	30.65	17.58	51.77	1.50	5.57	10.18	9.65	3.75	<15	c	54.94	32.07

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-18	10.17	-	-	0.365	0.48	6.11	-	-	0.25	3.52	-	19.90	0.91	100	7.08
18-49	10.32	-	-	1.38	0.30	6.76	-	-	0.21	16.03	-	24.60	0.79	100	26.07
49-95	10.08	-	-	2.55	0.17	6.11	-	-	0.33	21.49	-	32.60	0.77	100	26.36
95-123	9.92	-	-	2.56	0.12	7.93	-	-	0.51	26.03	-	36.00	0.70	100	28.92

Contd...

Soil Series: Madhawara (MDR) **Pedon:** T_2 P_2

Location: $16^0$43'48.9"N $77^0$18'38.3"E, Yaleri village, Balichakra hobli, Yadgir taluk and district

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-11	Ap	58.94	20.74	20.32	5.41	7.28	13.31	20.89	12.06	-	scl	16.47	8.85
11-30	Bw1	55.52	19.32	25.16	5.00	7.19	13.12	19.69	10.52	-	scl	18.25	10.18
30-53	Bw2	53.95	19.15	26.90	4.68	7.48	12.58	19.65	9.56	-	scl	26.99	14.02
53-117	Bw3	52.68	19.51	27.81	2.84	5.47	14.72	20.82	8.83	-	scl	37.86	17.40
117-160	Bw4	49.95	17.27	32.79	2.11	5.07	14.15	20.49	8.13	-	scl	44.15	20.38

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-11	8.31	-	-	0.33	0.46	2.76	-	-	0.45	0.47	-	20.57	1.01	100	0.90
11-30	9.25	-	-	0.20	0.31	4.20	-	-	0.19	1.40	-	23.98	0.95	100	2.34
30-53	9.78	-	-	0.40	0.19	5.76	-	-	0.16	1.53	-	24.53	0.91	100	2.49
53-117	9.94	-	-	0.88	0.23	4.80	-	-	0.18	9.09	-	24.31	0.87	100	14.96
117-160	9.98	-	-	0.93	0.15	3.00	-	-	0.24	11.09	-	28.27	0.86	100	15.69

Contd...

Soil Series: Kadechoor (KDH) **Pedon:** T1/P3

Location: $16^0$31'15.0"N $77^0$20'52.2"E, Kadechoora village, Sydhapura hobli, Yadgir taluk and district

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

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-18	Ap	75.81	4.05	20.14	7.09	16.85	24.77	19.10	8.01	-	scl	13.70	6.92
18-40	Bw1	57.82	7.95	34.23	2.38	13.52	21.68	14.97	5.27	-	scl	22.10	13.10
40-78	Bw2	50.54	10.54	38.92	1.99	4.51	24.19	12.91	6.95	<15	sc	24.00	14.54

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	8.22	-	-	0.198	0.84	0.91	-	-	0.41	0.33	-	12.26	0.61	100	2.71
18-40	8.71	-	-	0.163	0.64	1.56	-	-	0.18	0.26	-	20.31	0.59	100	1.27
40-78	8.92	-	-	0.17	0.40	2.90	-	-	0.16	0.37	-	21.41	0.55	100	1.71

Contd...

Soil Series: Sangwar **(**SGR) **Pedon:** R-4

Location: $16^0$32’25.9”N $77^0$12’52.6”E, Bheemanahalli village, Sydhapura hobli, Yadgir taluka and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed (calcareous), 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
0-8	Ap	37.30	18.18	44.52	4.91	6.76	12.10	4.80	8.72	-	c	32.36	23.18
8-30	BA	42.04	17.77	40.19	8.28	16.34	7.42	6.13	3.87	-	c	29.89	20.87
30-70	Bss1	33.77	18.63	47.60	5.45	11.66	6.21	6.75	3.70	-	c	37.04	26.13
70-100	Bss2	26.95	18.65	54.40	5.39	9.79	4.95	4.07	2.75	-	c	43.07	32.05
100-150	Bss3	14.35	17.32	68.33	2.69	4.15	2.35	2.69	2.47	-	c	55.74	38.19

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-8	8.3	-	-	6.49	1.48	6.69	-	-	1.32	10.09	-	34.77	0.78	100	11.61
8-30	9.09	-	-	2.54	0.64	6.76	-	-	0.75	10.00	-	33.76	0.84	100	11.85
30-70	9.23	-	-	2.6	0.28	6.63	-	-	0.42	11.55	-	38.98	0.82	100	11.86
70-100	9.39	-	-	3.01	0.36	6.89	-	-	0.73	27.73	-	42.46	0.78	100	26.132
100-150	9.28	-	-	4	0.24	7.15	-	-	0.80	27.78	-	47.67	0.70	100	23.308

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

5.1 Land Capability Classification

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

Soil Characteristics: Depth, texture, gravelliness, calcareousness.

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

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

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

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

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

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

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

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

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

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

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

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

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

The 20 soil map units identified in the Haligeri-2 microwatershed are grouped under 3 land capability classes and 6 subclasses. Entire area in the microwatershed is suitable for agriculture (Fig. 5.1).

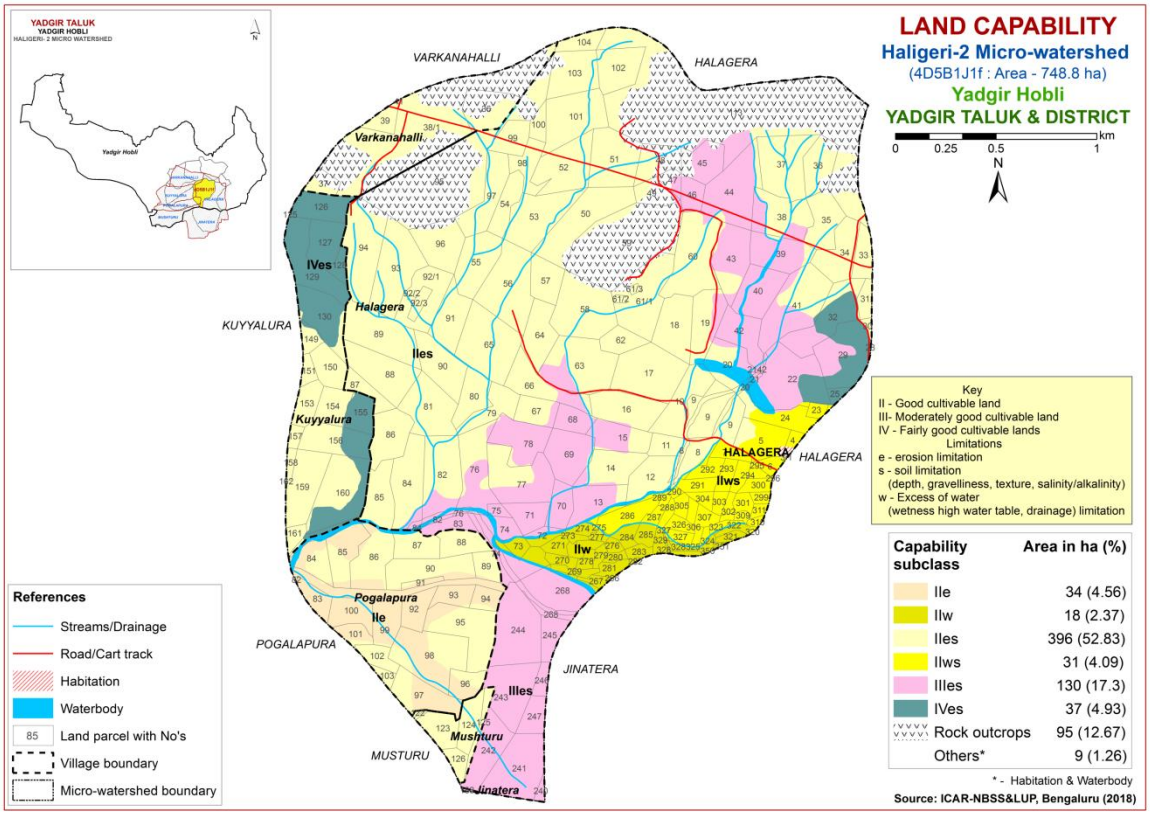


Fig. 5.1 Land Capability map of Haligeri-2 microwatershed

Good cultivable lands (Class II) cover an area of about 64 per cent and are distributed in the major part of the microwatershed with minor problems of soil, drainage and erosion. Moderately good cultivable lands (Class III) cover an area of about 17 per cent and are distributed in the eastern, northeastern and southern part of the microwatershed with moderate problems of soil and erosion. Fairly good cultivable lands (Class IV) cover an area of about 5 per cent and are distributed in the eastern and western part of the microwatershed with moderate problems of soil and erosion.

5.2 Soil Depth

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

Very shallow (<25 cm) soils occur in an area of 27 ha (4%) and are distributed in the eastern part of the microwatershed. Shallow (25-50 cm) soils occupy an area of about 25 ha (3%) and are distributed in the eastern part of the microwatershed. Moderately shallow (50-75 cm) soils occupy a maximum area of 345 ha (46%) and are distributed in the central, eastern, northeastern, northwestern and southern part of the microwatershed. Moderately deep (75-100 cm) soils occupy an area of 145 ha (19%) and are distributed in the central, western and eastern part of the microwatershed. Deep (100-150 cm) soils cover an area of 34 ha (5%) and are distributed in the western and southern part of the microwatershed. Very deep (>150 cm) soils cover an area of 68 ha (13%) and distributed in the eastern, southeastern and southwestern part of the microwatershed.

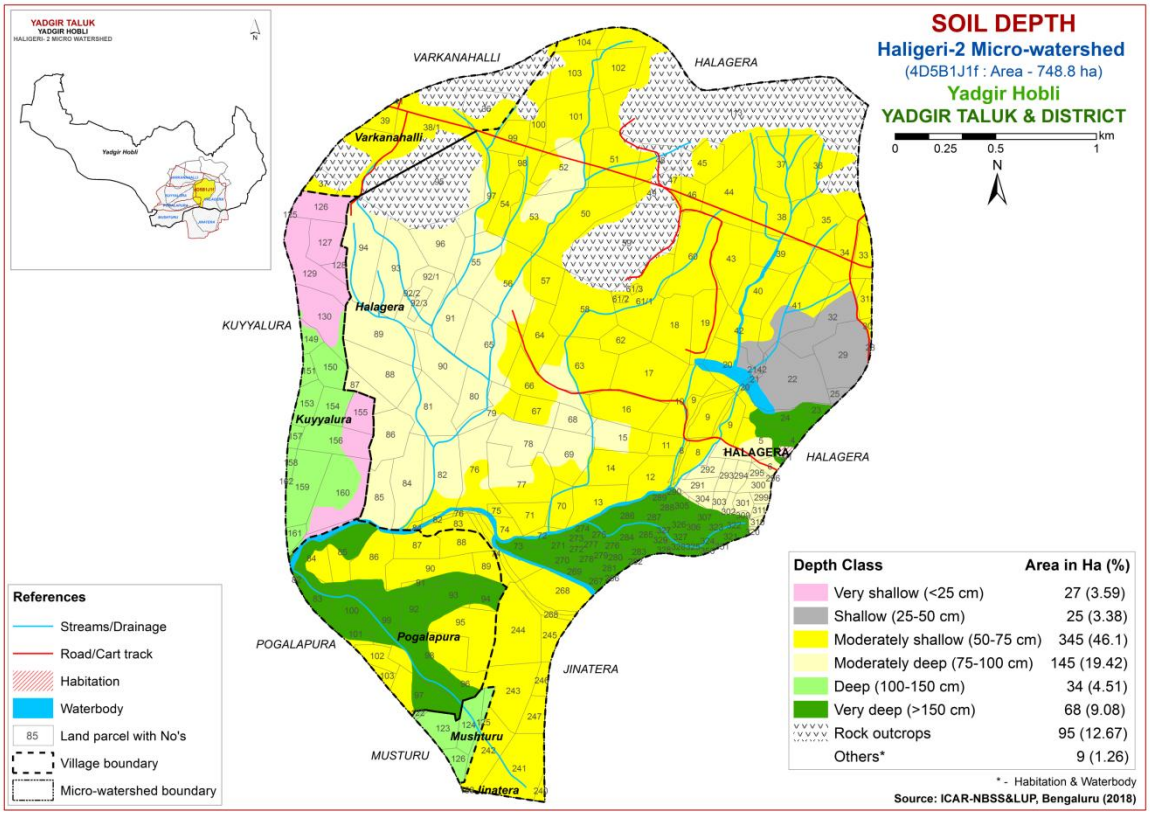


Fig. 5.2 Soil Depth map of Haligeri-2 microwatershed

5.3 Surface Soil Texture

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

An area of about 78 ha (10%) are sandy and are distributed in the northeastern and southern part of the microwatershed. An area of about 415 ha (55%) are loamy and are distributed in all parts of the microwatershed. An area of 152 ha (20%) has soils that are clayey at the surface and occur in the western, southeastern and southwestern parts of the microwatershed.

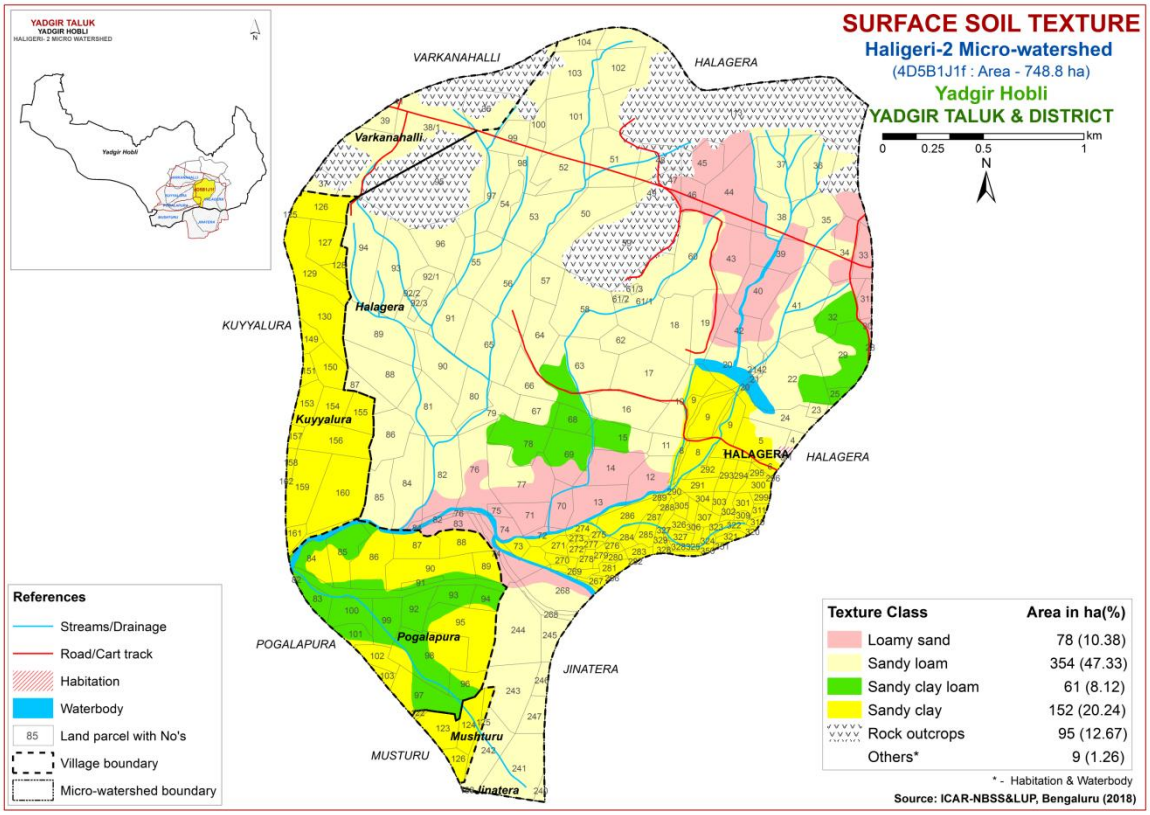


Fig. 5.3 Surface Soil Texture map of Haligeri-2 microwatershed

.The clay soils (20%) have high potential for soil-water retention and availability, and nutrient retention and availability, but have more problems of drainage, infiltration, workability and other physical problems. The other productive lands are loamy soils (55%) which also have high potential for soil-water retention and nutrient availability but have no drainage or other physical problems. The problem soils cover about 10 per cent where only some selected tuber crops can be grown and require more nutrients and more irrigation.

5.4 Soil Gravelliness

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

Non gravelly (<15%) soils cover maximum area of about 497 ha (66%) and are distributed in the major part of the microwatershed. An area of about147 ha (20%) is gravelly (15-35%) and are distributed in the central, northern, northwestern, and southern part of the microwatershed.

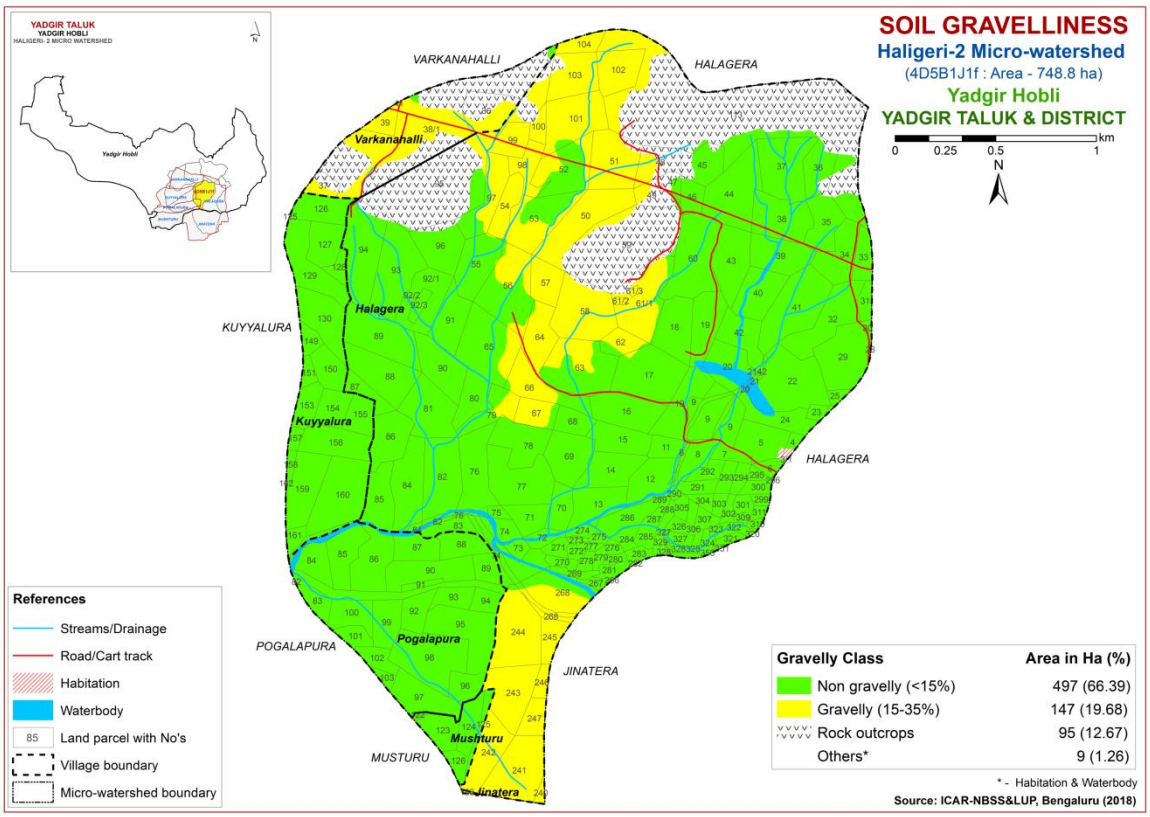


Fig. 5.4 Soil Gravelliness map of Haligeri-2 microwatershed

The problem soils (20%) that are gravelly (15-35%), where only short or medium duration crops can be grown. The most productive soils (66%) that are non gravelly (<15%), where all climatically adapted long duration crops can be grown.

5.5 Available Water Capacity

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

An area of about 104 ha (14%) and 438 ha (59%) in the microwatershed has soils that are very low (<50 mm/m) and low (51-100 mm/m) in available water capacity respectively and are distributed in all parts of the microwatershed. Very high (>200 mm/m) in 102 ha (14%) and are distributed in the western, eastern, southwestern, southeastern and southern part of the microwatershed.

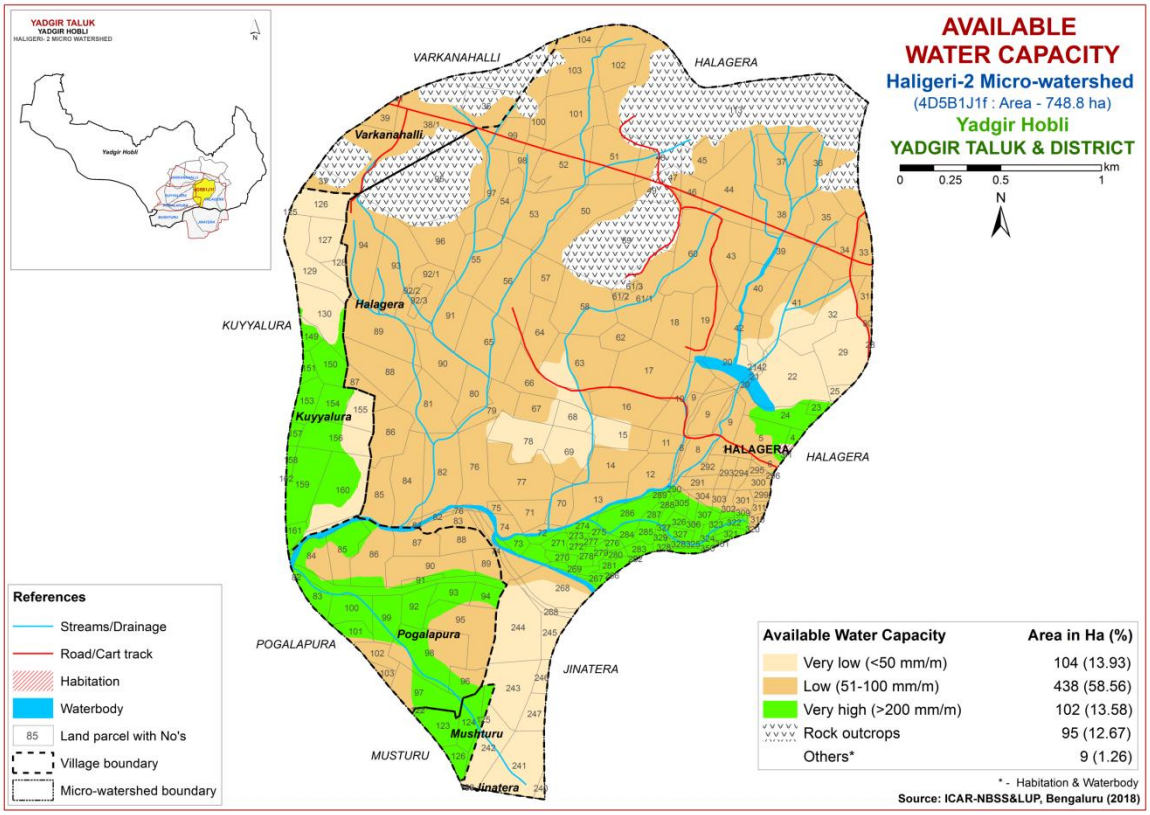


Fig. 5.5 Soil Available Water Capacity map of Haligeri-2 microwatershed

About 542 ha (73%) area in the microwatershed has soils that are problematic with regard to available water capacity. Here, only short duration crops can be grown and the probability of crop failure is very high. These areas are best put to other alternative uses. An area of 102 ha (14%) are potential areas with regard to AWC where all climatically adapted annual and perennial crops can be grown.

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

Maximum area of about 577 ha (77%) falls under very gently sloping (1-3% slope) lands and are distributed in the major part of the microwatershed. An area of about 36 ha (5%) are gently sloping (3-5%) and are distributed in the northern part of the microwatershed. An area of 32 ha (4%) are nearly level and it is distributed in the eastern and southeastern part of the microwatershed. An area of 36 ha is problematic with respect to slopes that require soil and water conservation and other land development measures. The other soils are potential that do not require conservation measures.

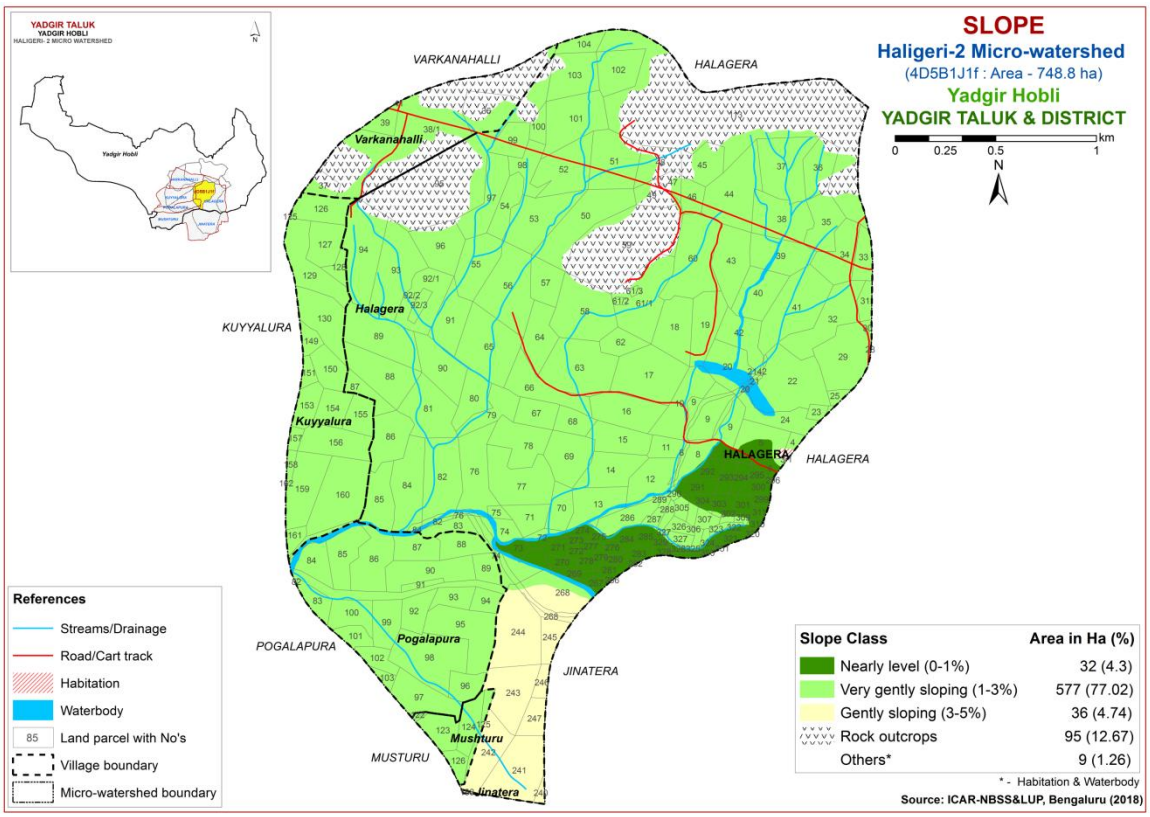


Fig. 5.6 Soil Slope map of Haligeri-2 microwatershed

5.7 Soil Erosion

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

Soils that are slightly eroded (e1 class) cover an area of 32 ha (4%) and are distributed in the southeastern part of the microwatershed. Soils that are moderately eroded (e2 class) cover an area of 488 ha (65%) and are distributed in all parts of the microwatershed. Severely eroded soils cover an area of 125 ha (17%) and are distributed in the western, southern, northeastern and northwestern part of the microwatershed.

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

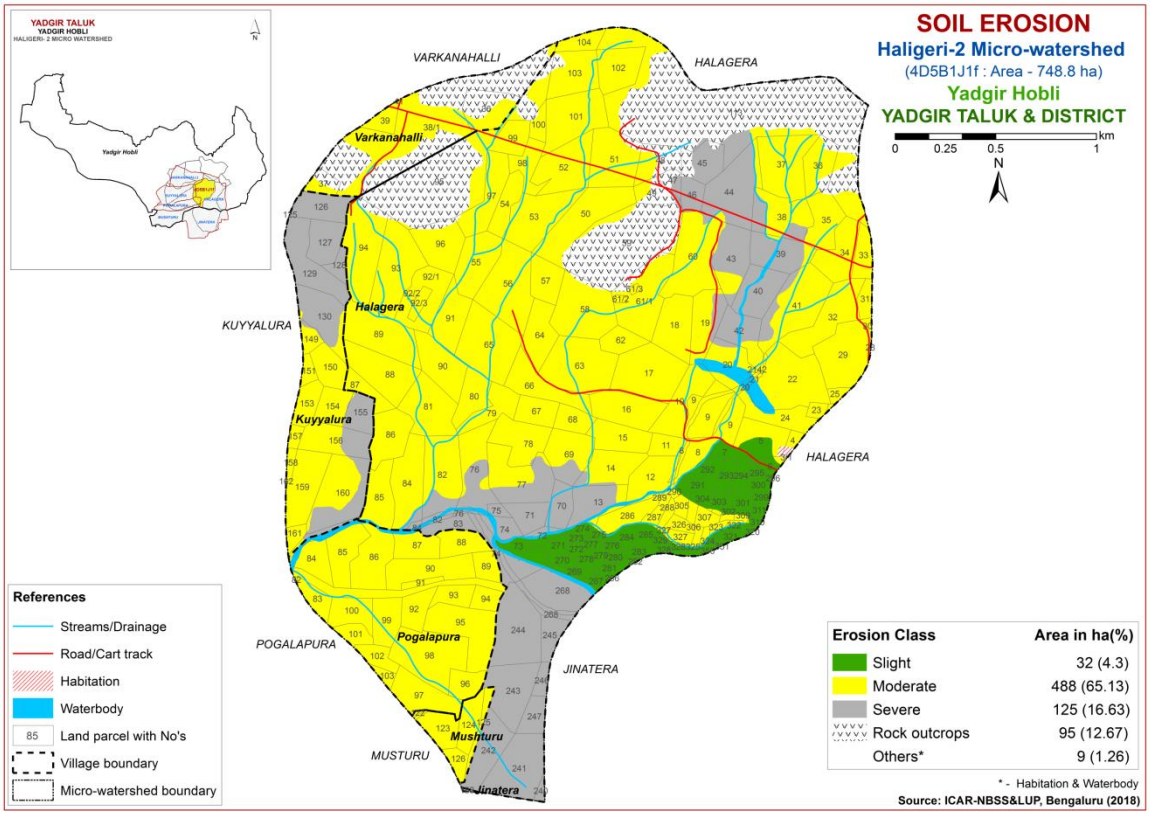


Fig. 5.7 Soil Erosion map of Haligeri-2 microwatershed

Chapter 6

FERTILITY STATUS

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

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

6.1 Soil Reaction (pH)

The soil analysis of the Haligeri-2 microwatershed for soil reaction (pH) showed that an area of about 3 ha (0.37%) is slightly acid (pH 6.0-6.5) and are distributed in the northern part of the microwatershed. An area of about 181 ha (24%) is neurtal (pH 6.5-7.3) and are distributed in all parts of the microwatershed. An area of about 130 ha (17%) is slightly alkaline (pH 7.3-7.8) and are distributed in all parts of the microwatershed. An area of about 143 ha (19%) are moderately alkaline (pH 7.8-8.4) and are distributed in all parts of the microwatershed. 128 ha (17%) area is strongly alkaline (pH 8.4-9.0) and are distributed in the central, northeastern and southeastern part of the microwatershed and an area of 59 ha (8%) is very strongly alkaline (pH >9.0) and are distributed in the eastern and southeastern part of the microwatershed (Fig.6.1).

6.2 Electrical Conductivity (EC)

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

6.3 Organic Carbon

The soil organic carbon content (an index of available Nitrogen) in the soils of the microwatershed is high (>0.75) in an area of about 92 ha (12%) and are distributed in the eastern part of the microwatershed and medium (0.5-0.75%) covering a maximum area of about 553 ha (74%) and are distributed in the major part of the microwatershed except eastern part of the microwatershed. (Fig.6.3).

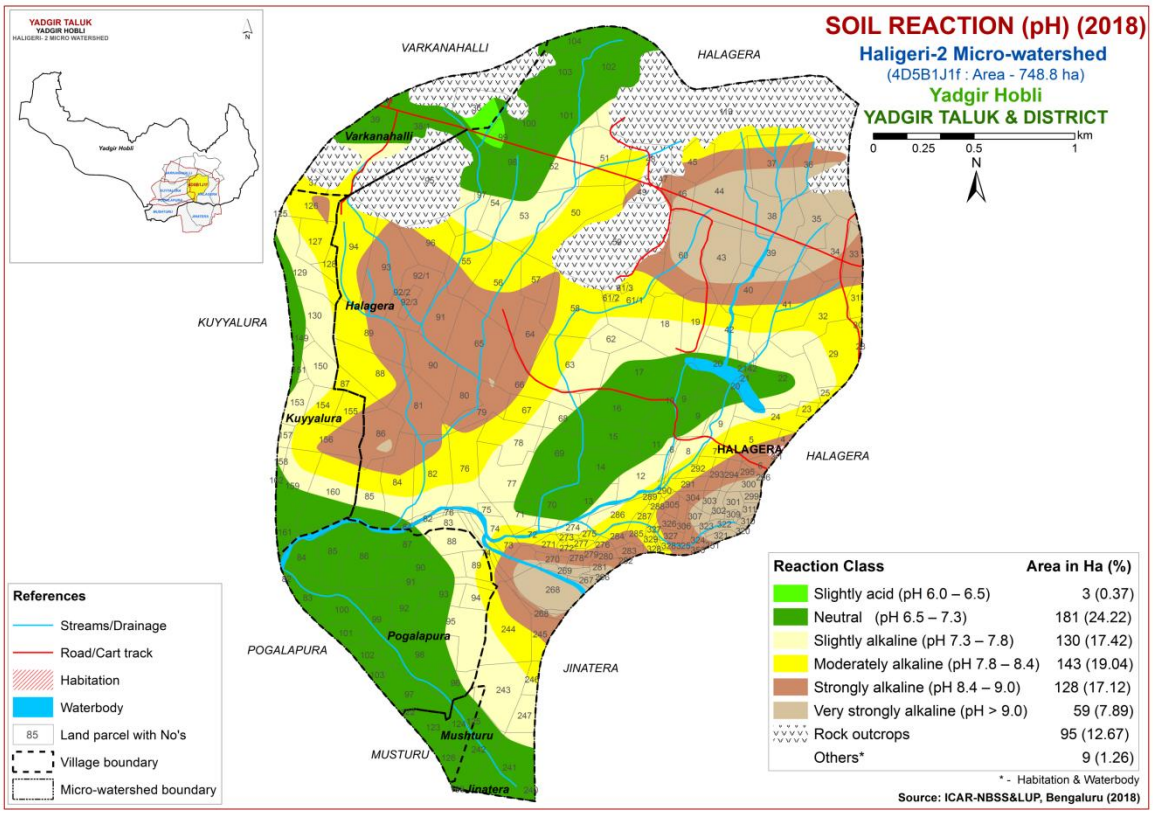


Fig.6.1 Soil Reaction (pH) map ofHaligeri-2 microwatershed

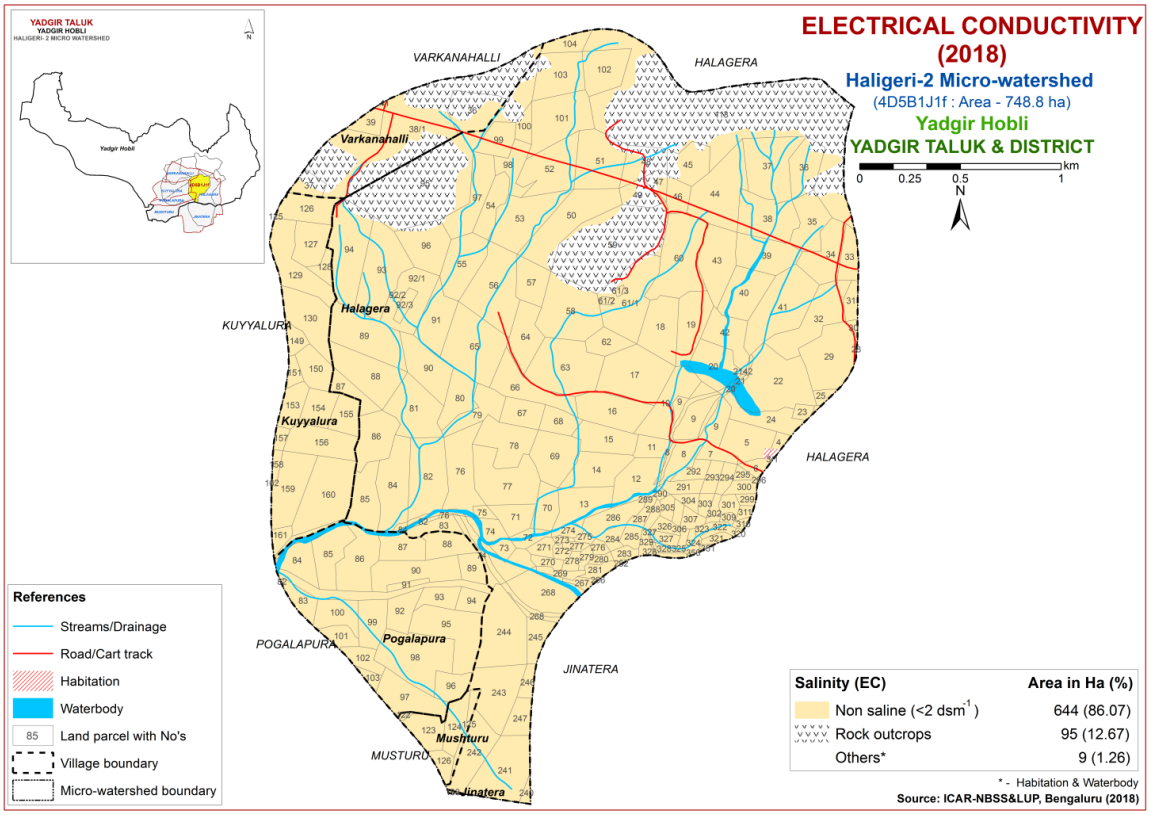


Fig.6.2 Electrical Conductivity (EC) map of Haligeri-2 microwatershed

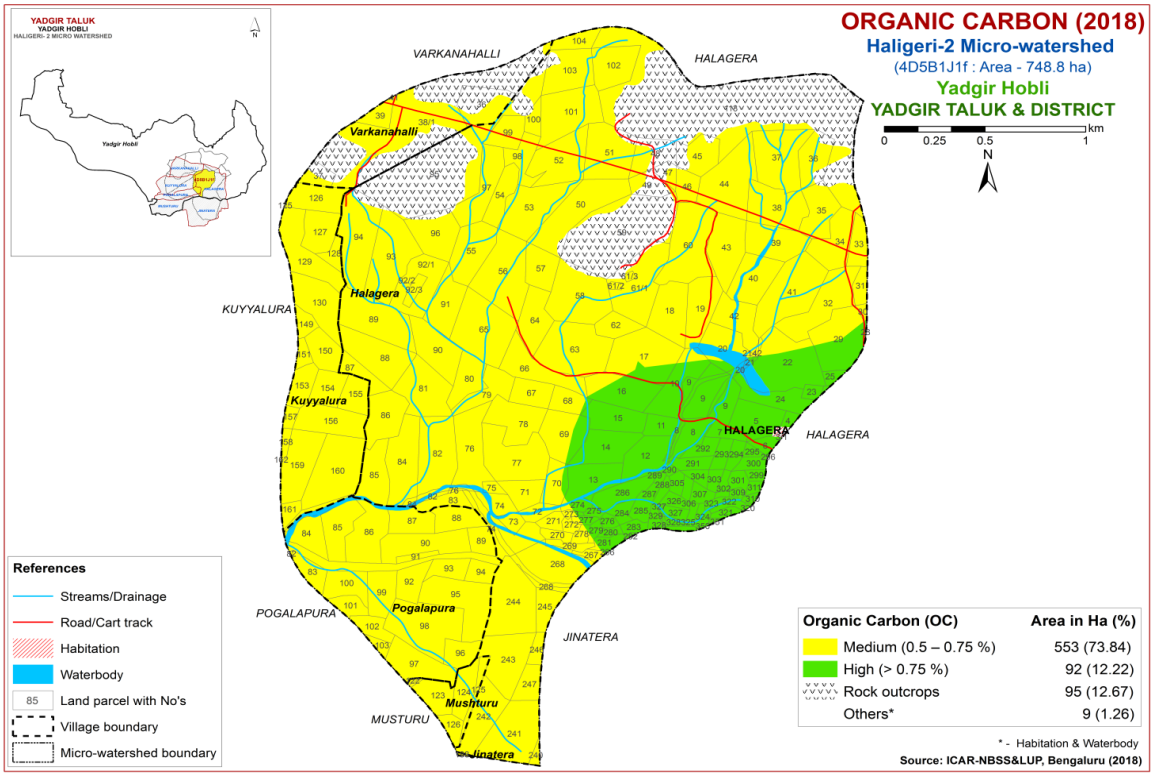


Fig.6.3 Soil Organic Carbon map of Haligeri-2 microwatershed

6.4 Available Phosphorus

Available phosphorus content is low (<23 kg/ha) in a maximum area of 573 ha (76%) and are distributed in the major part of the microwatershed. Medium (23-57 kg/ha) in an area of about 72 ha (10%) and occur in the eastern part of the microwatershed. (Fig. 6.4).

6.5 Available Potassium

Available potassium content is low (<145 kg/ha) in an area of about 194 ha (26%) and are distributed in the eastern, and some northern part of the microwatershed. Medium (145-337 kg/ha) in a maximum area of about 451 ha (60%) and are distributed in all parts of the microwatershed (Fig.6.5).

6.6 Available Sulphur

An area of about 223 ha (30%) is low (<10ppm) in available sulphur content and are distributed in the central and eastern part of the microwatershed and medium (10-20 ppm) in an area of about 369 ha (49%) and are distributed in the major area except central part of the microwatershed. High in a small area of about 53 ha (7%) and are distributed in the northern and southern part of the microwatershed (Fig.6.6).

6.7 Available Boron

Available boron content is low in a major area of an about 572 ha (76%) and are distributed in all parts of the microwatershed. Medium (0.5-1.0 ppm) in an area of 72 ha (10%) and are distributed in the eastern and western part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content is sufficient (>4.5 ppm) in an entire area of 644 ha (86%) and are distributed in the major part of the microwatershed (Fig 6.8).

6.9 Available Manganese

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

6.10 Available Copper

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

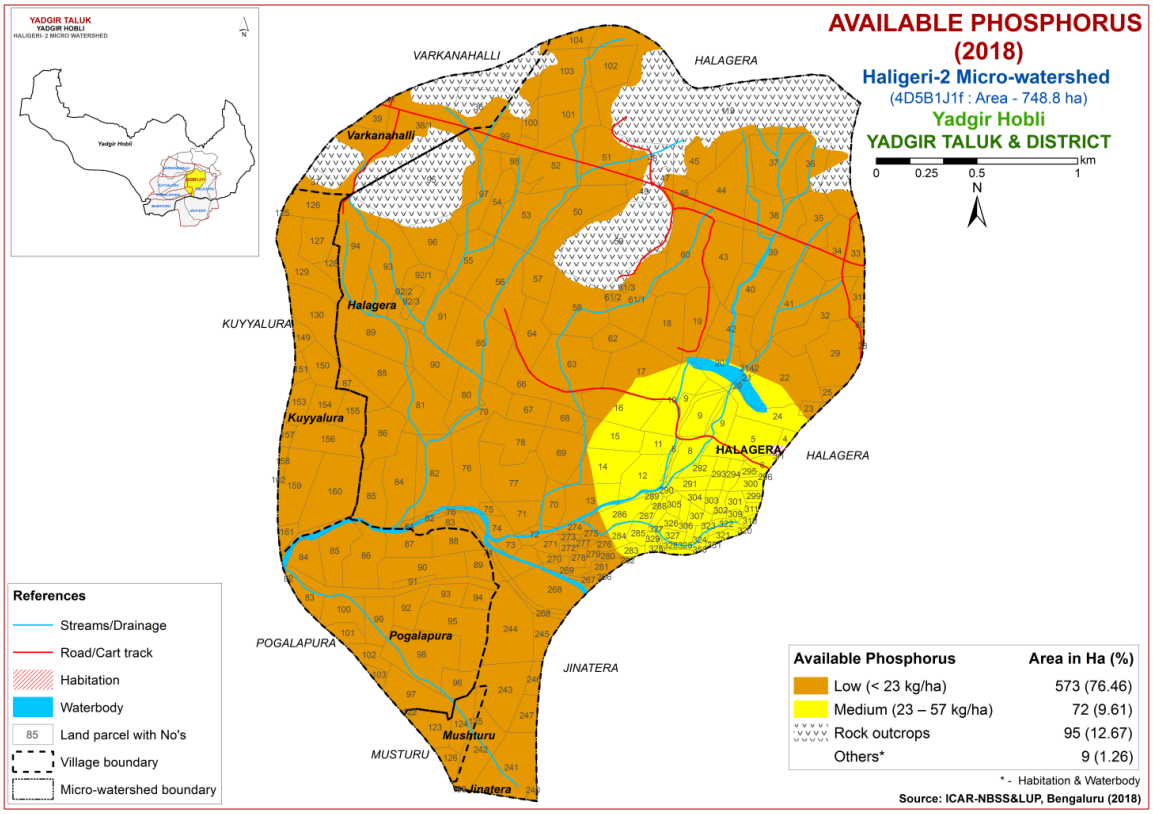


Fig.6.4 Soil Available Phosphorus map of Haligeri-2 microwatershed

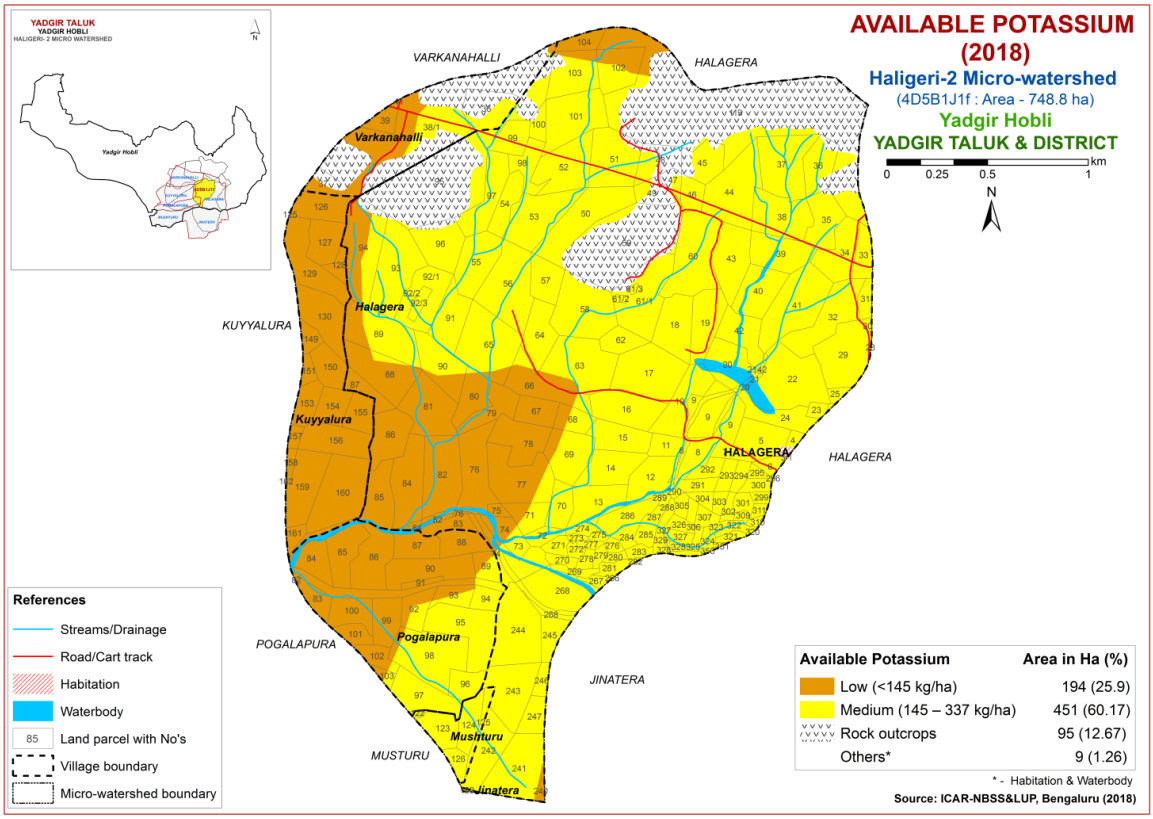


Fig.6.5 Soil Available Potassium map of Haligeri-2 microwatershed

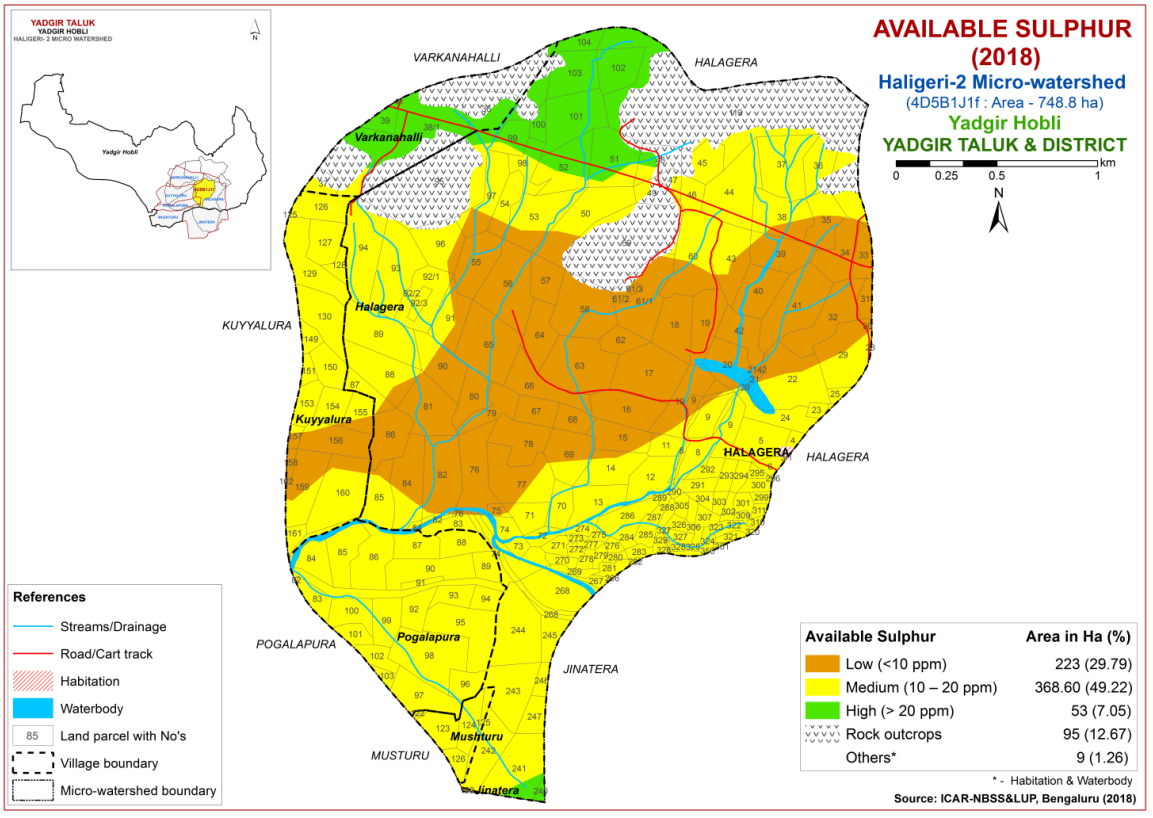


Fig.6.6 Soil Available Sulphur map of Haligeri-2 microwatershed

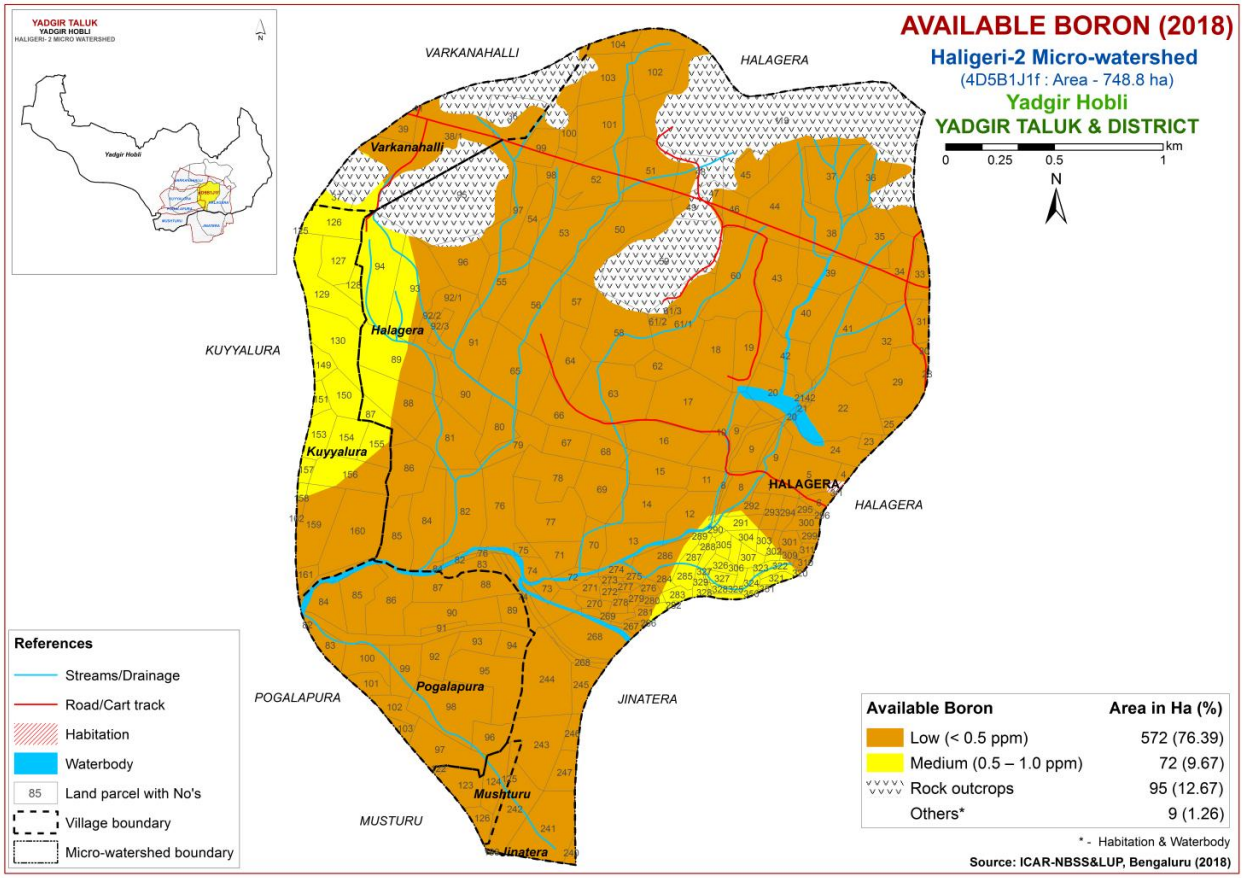


Fig.6.7 Soil Available Boron map of Haligeri-2 microwatershed

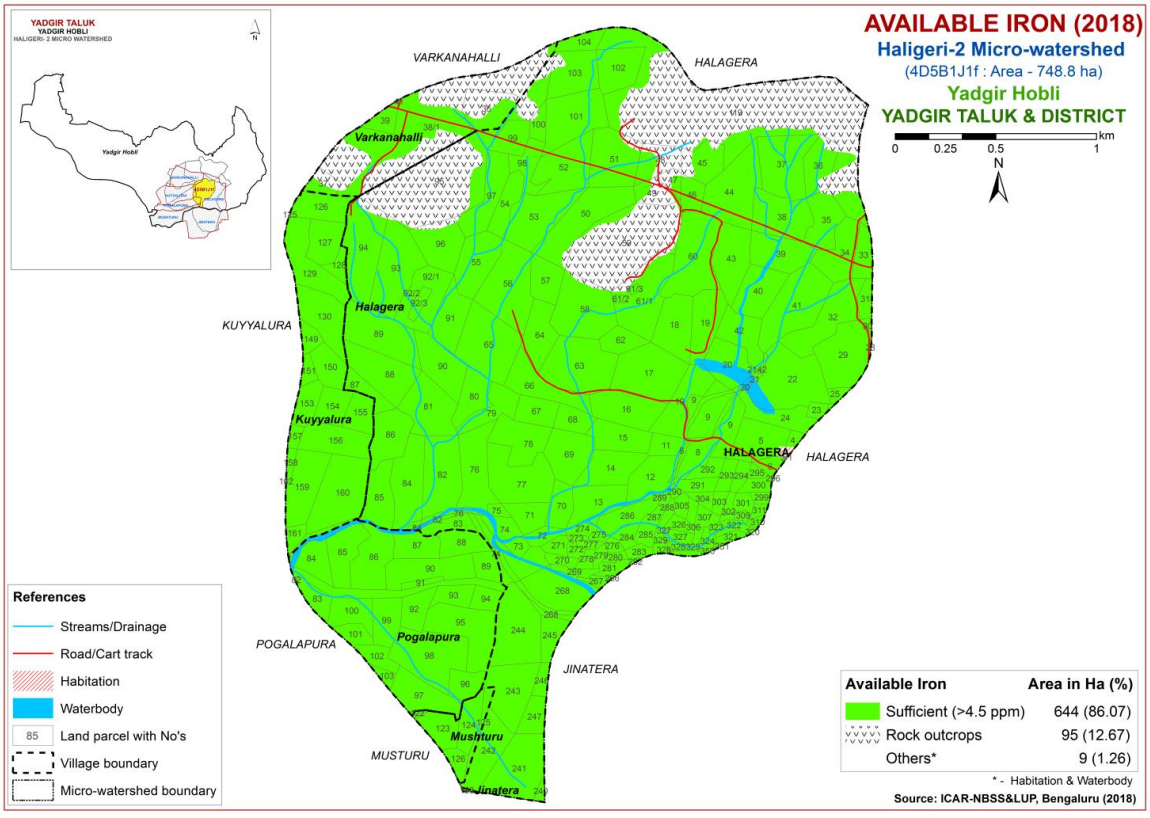


Fig.6.8 Soil Available Iron map of Haligeri-2 microwatershed

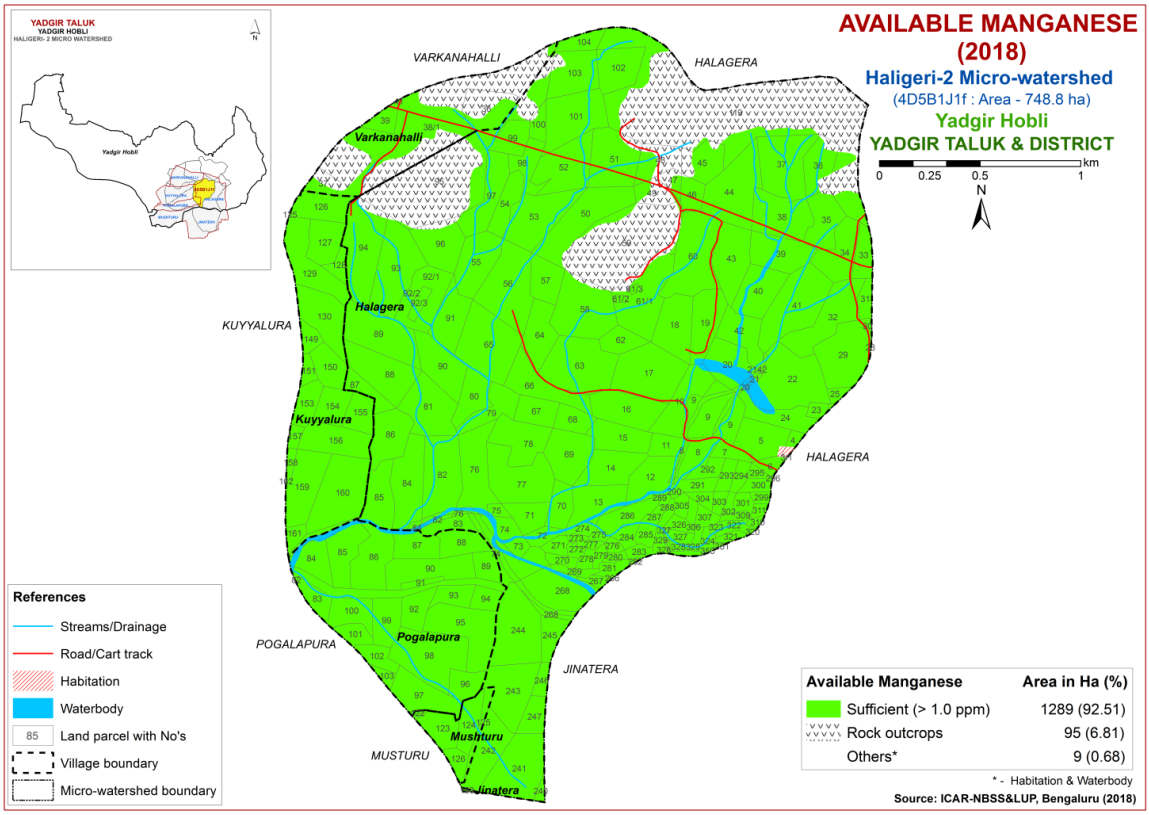


Fig.6.9 Soil Available Manganese map of Haligeri-2 microwatershed

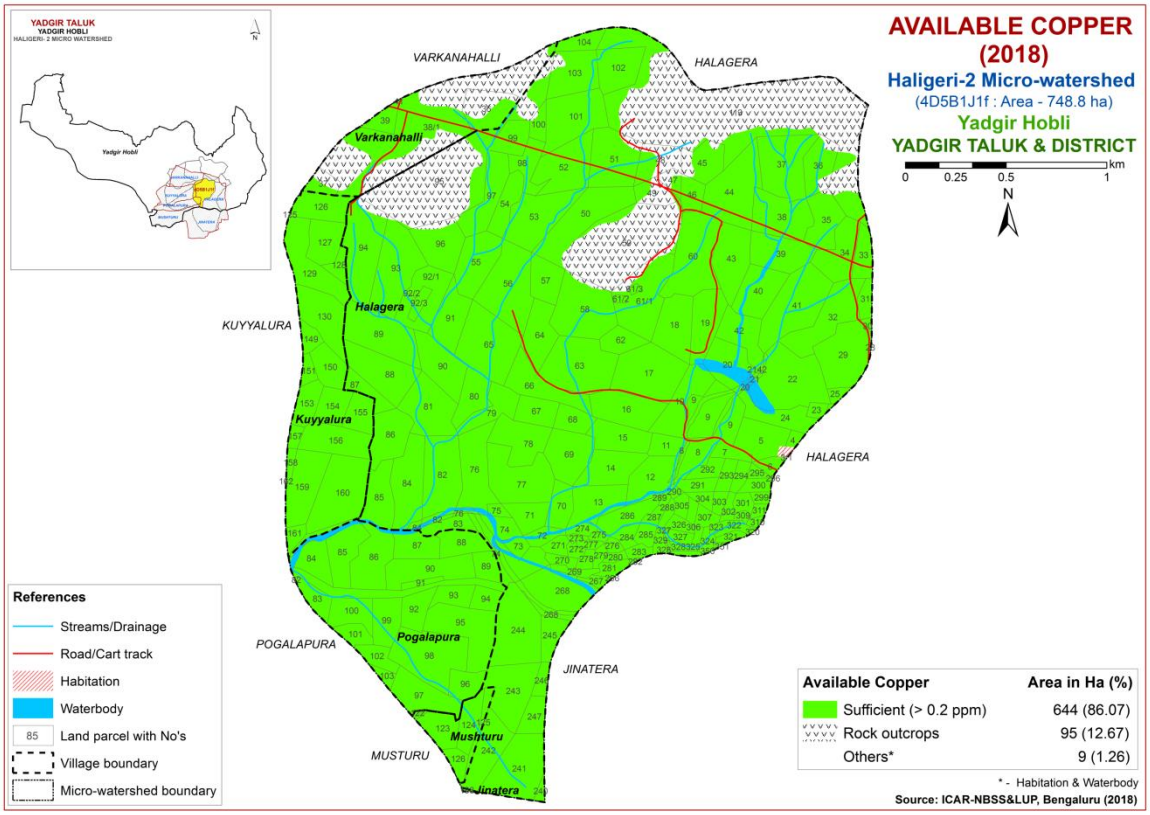


Fig.6.10 Soil Available Copper map of Haligeri-2 microwatershed

6.11 Available Zinc

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

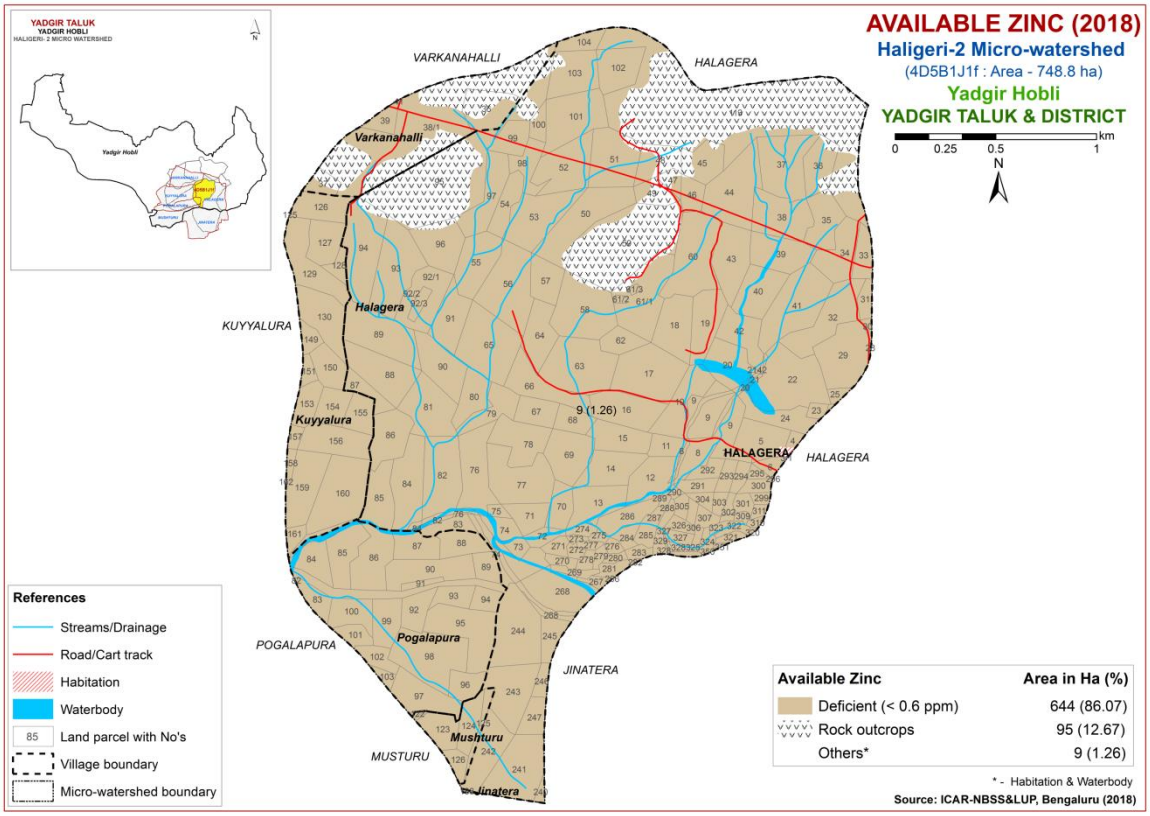


Fig.6.11 Soil Available Zinc map of Haligeri-2 microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Haligeri-2 microwatershed were assessed for their suitability for growing food, fodder, fibre and other horticulture crops by following the procedure as outlined in FAO, 1976 and 1983. Crop requirements were developed for each of the crop from the available research data and also by referring to Naidu *et. al.* (2006) and Natarajan *et. al* (2015). The crop requirements were matched with the soil and land characteristics (Table 7.1) to arrive at the crop suitability (Table 7.2 to 7.30) are given at the end. In FAO land suitability classification, two orders are recognized. Order S-Suitable and Order N-Not suitable. The orders have classes, subclasses and units. Order-S has three classes, Class S1-Highly Suitable, Class S2-Moderately Suitable and Class S3- Marginally Suitable. Order N has two classes, N1-Currently not Suitable and N2- Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2, S3 and N1are divided into subclasses based on the kinds of limitations encountered. The limitations that affect crop production are 'c' for erratic rainfall and its distribution and length of growing period (LGP), 'e' for erosion hazard, 'r' for rooting condition, 't' for lighter or heavy texture, 'g' for gravelliness or stoniness, 'n' for nutrient availability, 'l' for topography, 'm' for moisture availability, 'w' for drainage and 'z' for calcareousness. These limitations are indicated as lower case letters to the Class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

Using the above criteria, the soil map units of the microwatershed were evaluated and land suitability maps for 29 major annual and perennial 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 crop grown in Karnataka in an area of 10.47 lakh ha in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad, Bellary, Chitradurga, Mysore and Tumakuru districts. The crop requirements for growing sorghum (Table 7.2) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing sorghum was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.1.

An area of about 116 ha (16%) is highly suitable (Class S1) for growing sorghum and are distributed in the western, southwestern and southeastern part of the microwatershed. Maximum area of about 424 ha (57%) is moderately suitable (Class S2) for growing sorghum and are distributed in the major part of the microwatershed. They

have minor limitations of texture, gravelliness, calcareousness and rooting depth. An area of about 78 ha (10%) is marginally suitable (Class S3) for growing sorghum and are distributed in the central, eastern and southern part of the microwatershed with moderate limitations of rooting depth, texture and calcareousness. An area of about 27 ha (4%) is currently not suitable (Class N1) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

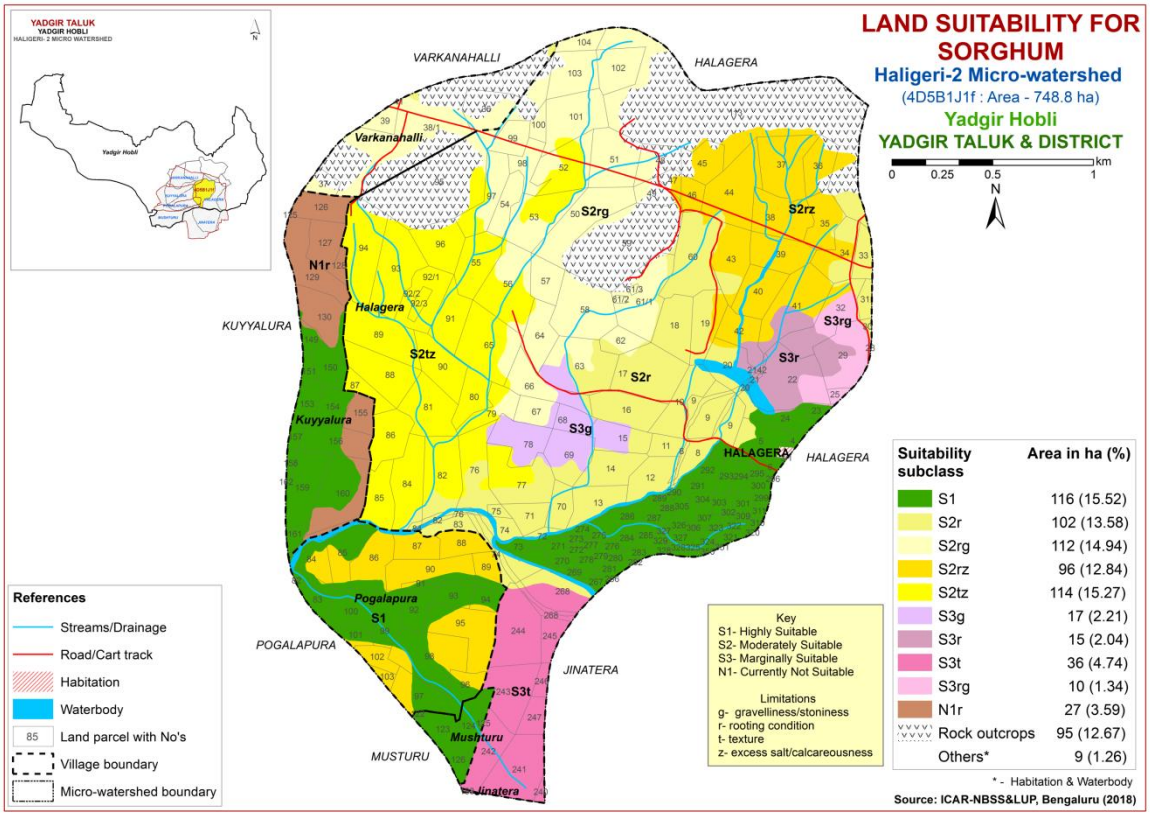


Fig. 7.1 Land Suitability map of Sorghum

7.2 Land Suitability for Maize (*Zea mays*)

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

An area of about 540 ha (72%) is moderately suitable (Class S2) for growing maize and are distributed in the major part of the microwatershed. They have minor limitations of texture, gravelliness, calcareousness, drainage and rooting depth. Marginally suitable (Class S3) lands cover an area of about 78 ha (10%) and occur in the central, eastern and southern part of the microwatershed. They have moderate limitations of gravelliness, rooting depth and texture. An area of about 27 ha (4%) is currently not suitable (Class N1) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

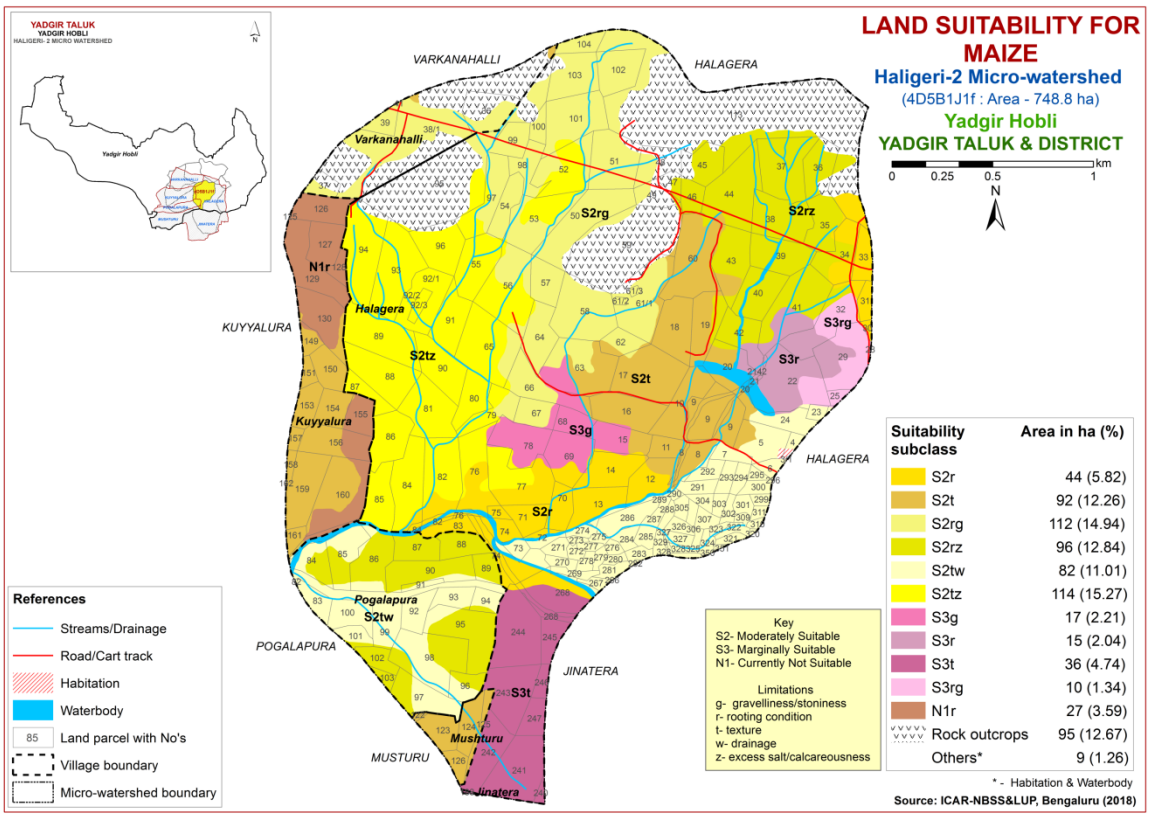


Fig. 7.2 Land Suitability map of Maize

7.3 Land Suitability for Bajra (*Pennisetumglaucum)*

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

Major area of about 556 ha (74%) is moderately suitable (Class S2) for growing bajra and are distributed in all parts of the microwatershed. They have minor limitations of texture, gravelliness, calcareousness and rooting depth. Marginally suitable lands (Class S3) occupy an area of about 88 ha (8%) and distributed in the eastern and southern part of the microwatershed. An area of about 27 ha (4%) is currently not suitable (Class N1) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

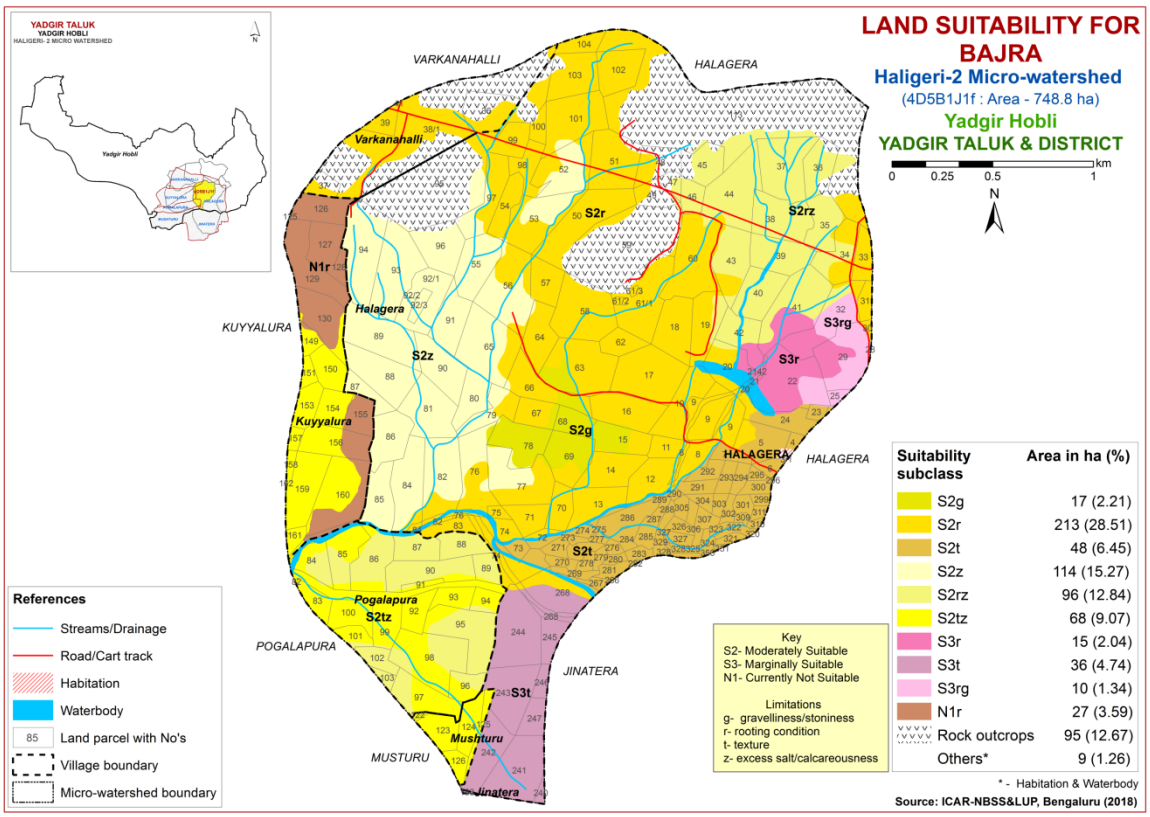


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachishypogaea*)

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.

The moderately suitable (Class S2) lands for growing Groundnut occur in an area of 382 ha (51%) and are distributed in the central, northern, northeastern, northwestern and southwestern part of the microwatershed. They have minor limitations of rooting depth, calcareousness and texture. Marginally suitable lands (Class S3) for growing groundnut occupy maximum area of about 235 ha (31%) and are distributed in the eastern, western, southern and southwestern part of the microwatershed. They have moderate limitations of texture, drainage, gravelliness and rooting depth. An area of about 27 ha (4%) is currently not suitable (Class N1) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

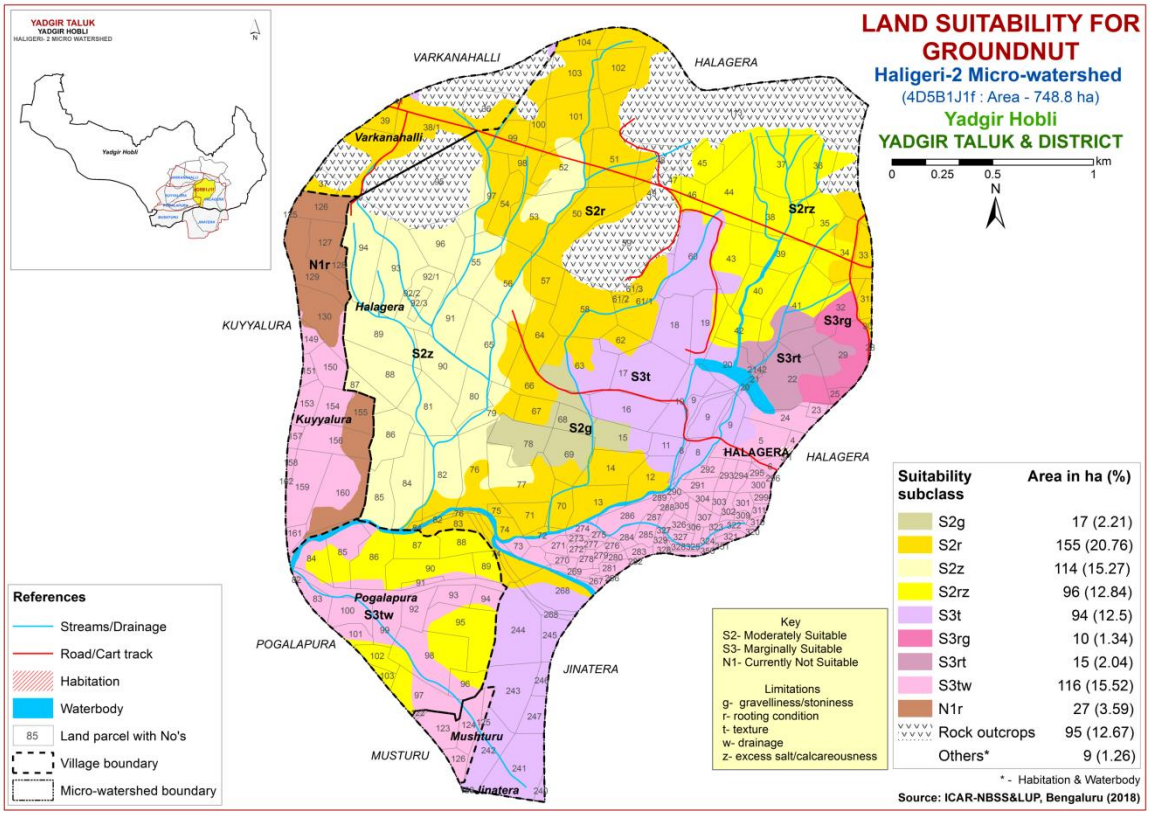


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annus*)

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

An area of about 64 ha (9%) is highly suitable (Class S1) for growing sunflower and is distributed in the eastern, western and southern part of the microwatershed. An area of about 166 ha (22%) is moderately suitable (Class S2) for sunflower and are distributed in the western, northwestern, southwestern and southeastern part of the microwatershed. They have minor limitations of rooting depth, calcareousness and drainage. Marginally suitable (Class S3) lands for sunflower are found to occur in a maximum area of about 363 ha (48%) with moderate limitations of rooting depth, texture and calcareousness and are distributed in the major part of the microwatershed. An area of about 52 ha (7%) is currently not suitable (Class N) and are distributed in the western and eastern part of the microwatershed with severe limitations of rooting depth gravelliness.

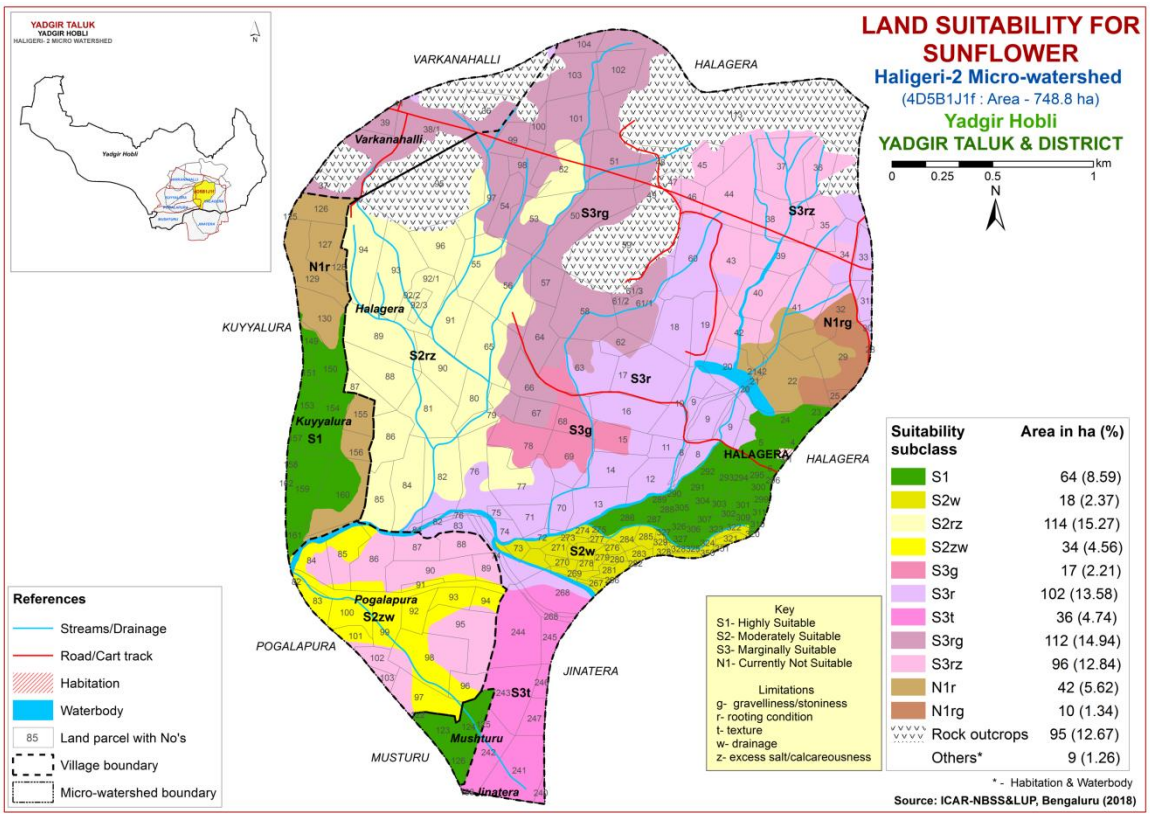


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land suitability criteria for Red gram (*CajanusCajan)*

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

No highly suitable (Class S1) lands available for growing red gram in the microwatershed. An area of about 192 ha (26%) is moderately suitable (Class S2) for growing redgram and are distributed in the eastern, western and southwestern part of the microwatershed. They have minor limitations of rooting depth, texture, drainage and calcareousness. Marginally suitable lands (Class S3) for growing redgram occupy an area of about 422 ha (56%) and occur in all parts of the microwatershed. They have moderate limitations of rooting depth, texture, drainage and calcareousness. An area of about 27 ha (4%) is not suitable (Class N) and are distributed in the western and eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

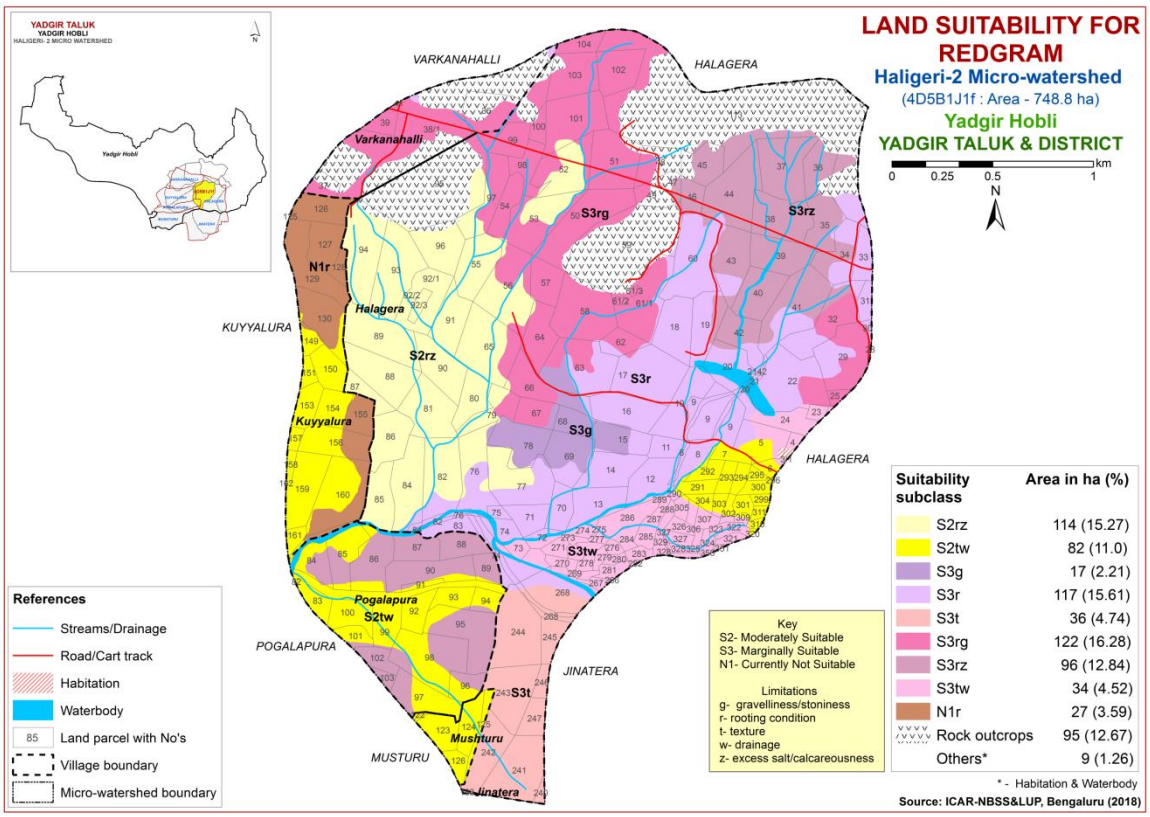


Fig. 7.6 Land Suitability map of Redgram

7.7 Land Suitability for Bengal gram (*Ciceraerativum*)

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

Highly (Class S1) suitable lands for growing Bengal gram occur in an area of 116 ha (16%) and are distributed in the southwestern, western and southeastern part of the microwatershed. An area of about 310 ha (42%) is moderately suitable (Class S2) for growing Bengal gram and are distributed in the eastern, northern, central and southwestern part of the microwatershed. They have minor limitations of gravelliness, calcareousness and rooting depth. Marginally suitable lands (Class S3) occupy an area of about 156 ha (20%) and are distributed in the central, western and eastern part of the microwatershed. They have moderate limitations of rooting depth, gravelliness, calcareousness and texture. Currently not suitable (Class N1) lands occur in an area of 63 ha (9%) and are distributed in the southern and western part of the microwatershed with severe limitations of texture and rooting depth.

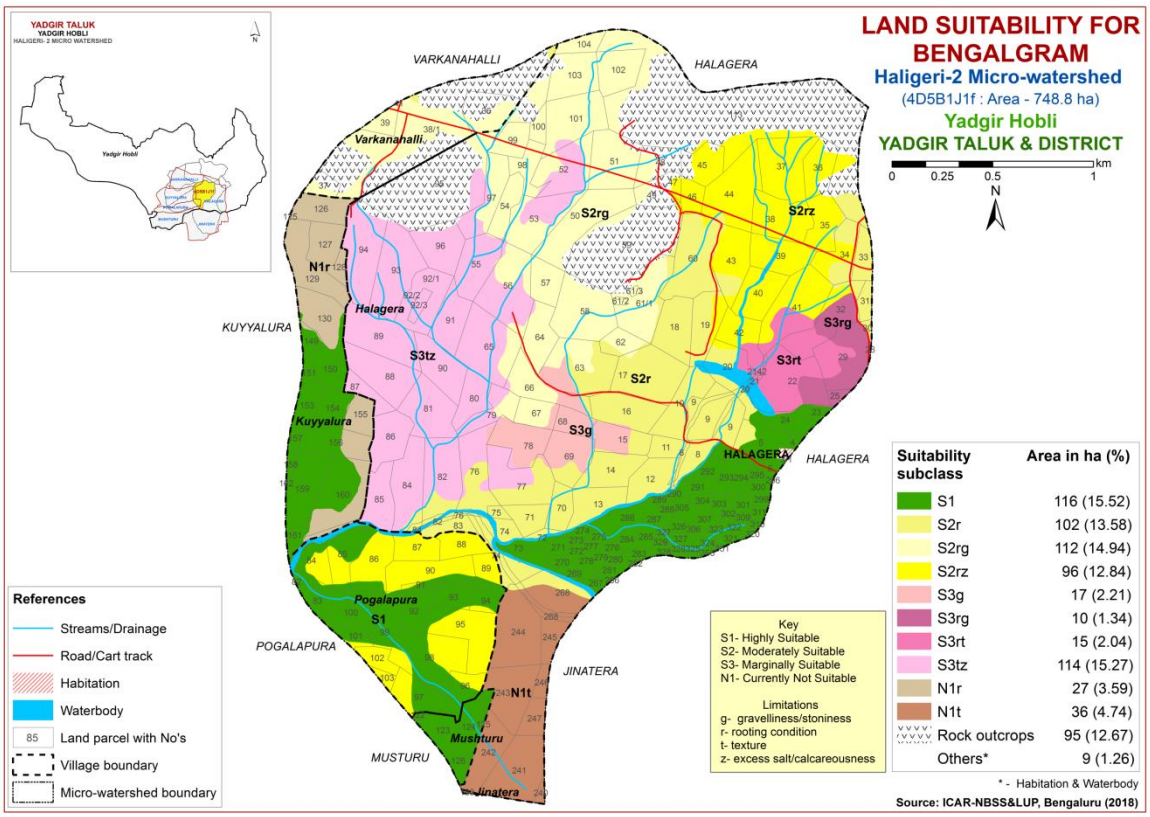


Fig. 7.7 Land Suitability map of Bengal gram.

7.8 Land Suitability for Cotton (*Gossypiumhirsutum*)

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

An area of about 68 ha (9%) in the microwatershed has soils that are highly suitable (Class S1) for growing cotton crop. They have minor or no limitations for growing cotton and are distributed in major area except western part of the microwatershed. Moderately suitable (Class S2) lands are found to occur in a maximum area of about 358 ha (49%). The soils have moderate limitations of rooting depth, gravelliness, texture, drainage and calcareousness. They are distributed in the major part of the microwatershed. Marginally suitable (Class S3) lands for cotton are found to occur in an area of about 156 ha (20%) with moderate limitations of rooting depth, texture, calcareousness and gravelliness and are distributed in the northeastern, eastern, central, southern and southeastern part of the microwatershed. Currently not suitable (Class N1) lands occur in an area of 63 ha (9%) and are distributed in the southern and western part of the microwatershed with severe limitations of texture and rooting depth.

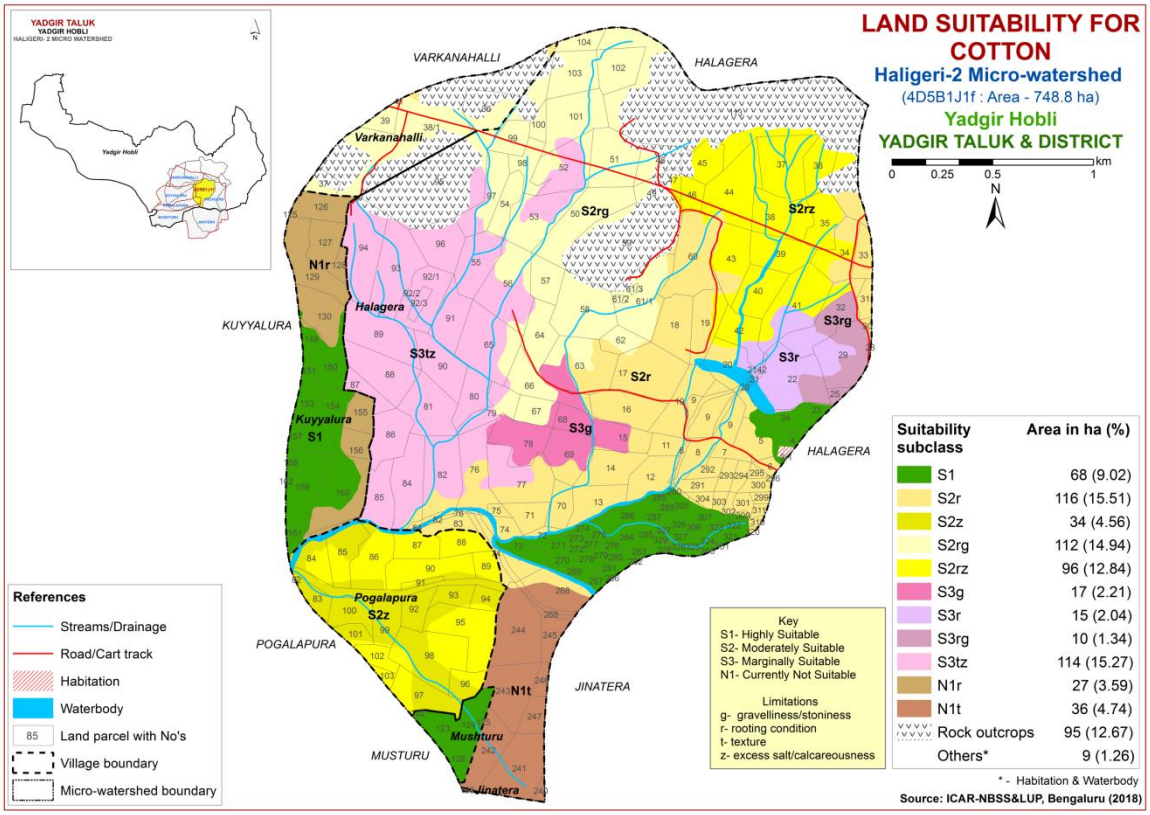


Fig. 7.8 Land Suitability map of Cotton

7.9 Land Suitability for Chilli (*Capsicum annuum)*

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

Highly (Class S1) suitable lands for growing chilli are not available in this microwatershed. Major area of about 540 ha (73%) is moderately suitable (Class S2) for growing chilli and are distributed in all parts of the microwatershed. They have minor limitations of gravelliness, texture, drainage, calcareousness and rooting depth. Marginally suitable lands (Class S3) occupy an area of about 78 ha (10%) and are distributed in the central, eastern and southern part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and texture. Currently not suitable (Class N1) lands occur in an area of 27 ha (4%) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

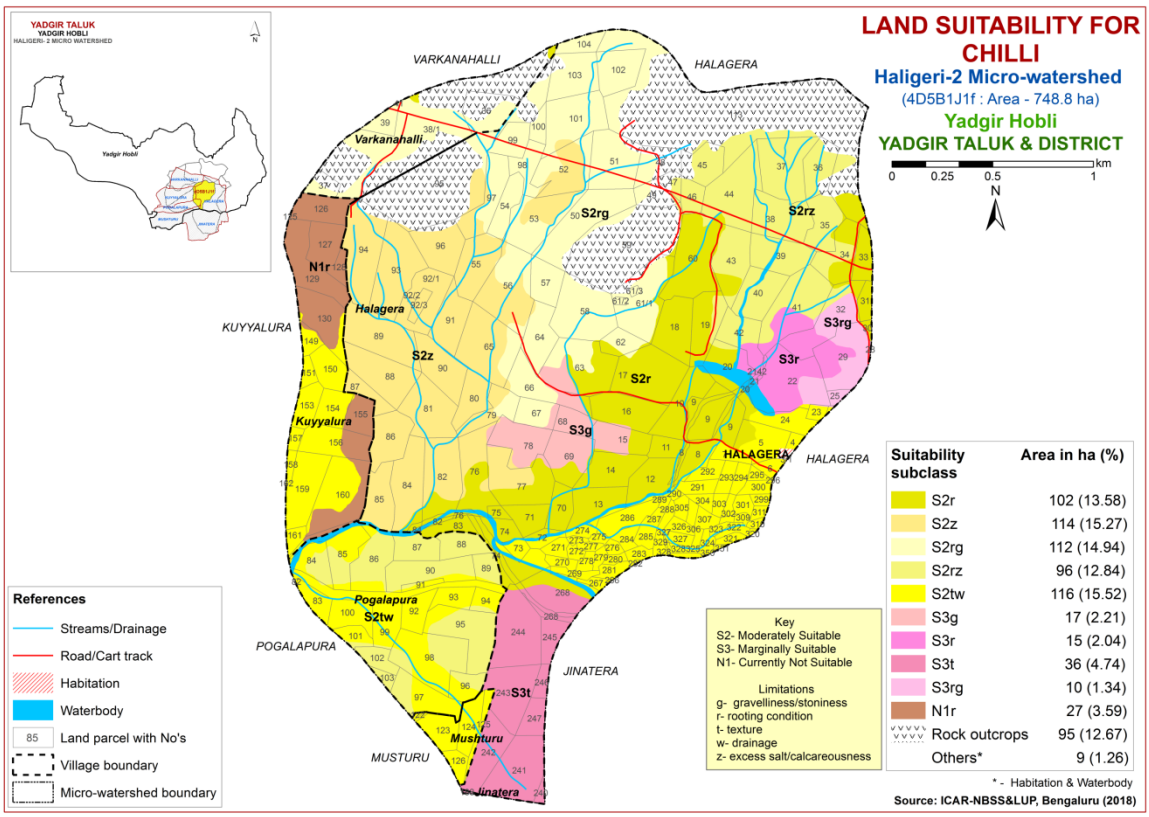


Fig 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Lycopersiconesculentum*)

Tomato is one of the most important fruit crop grown in about 0.61 lakh ha covering almost all the district of the state. The crop requirements for growing tomato (Table 7.11) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tomato was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.10.

Highly (Class S1) suitable lands for growing tomato is not available in this microwatershed. An area of about 458 ha (63%) is moderately suitable (Class S2) for growing tomato and are distributed in a major part of the microwatershed. They have minor limitations of gravelliness, calcareousness, drainage and rooting depth. Marginally suitable lands (Class S3) occupy anarea of about 160 ha (21%) and are distributed in the central, eastern, southern, southeastern and southwestern part of the microwatershed. They have moderate limitations of rooting depth, drainage, gravelliness and texture. Currently not suitable (Class N1) lands occur in an area of 27 ha (4%) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

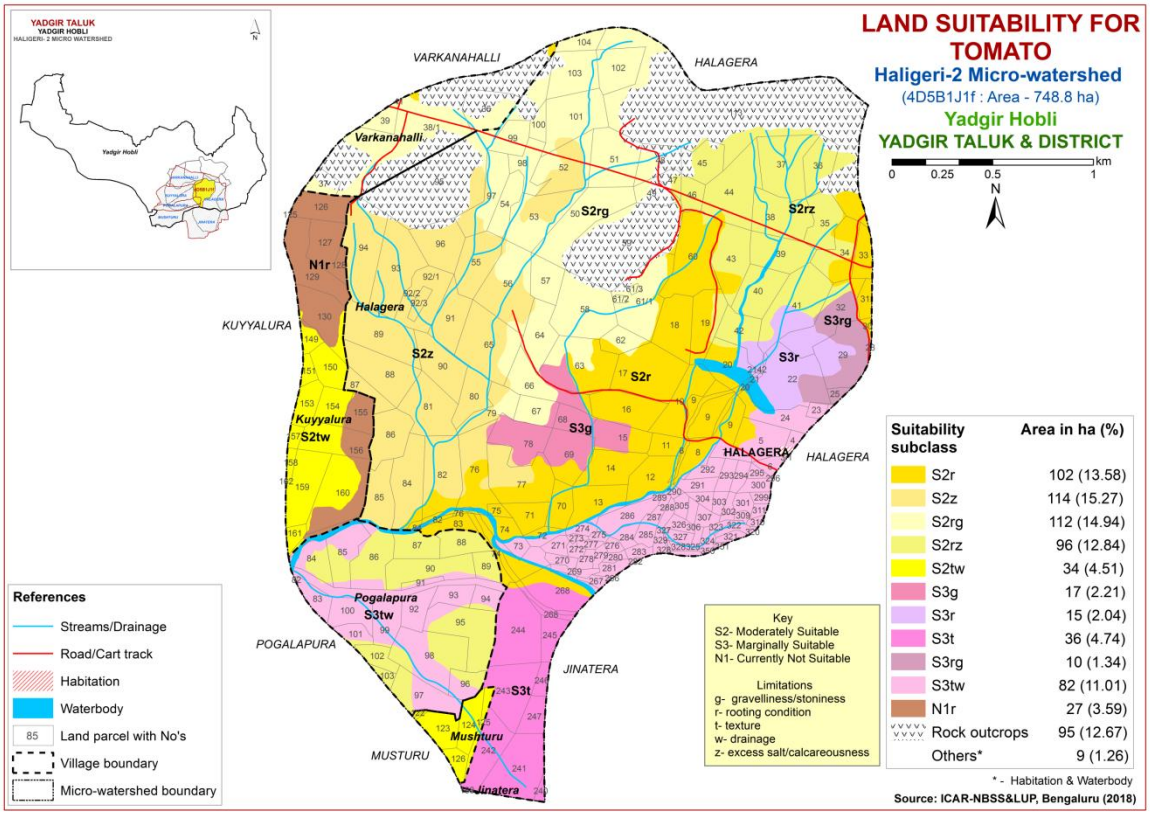


Fig 7.10 Land Suitability map of Tomato

7.11 Land Suitability for Brinjal (*Solanum melongena*)

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

Highly (Class S1) suitable lands for growing Brinjal occur in an area of 66 ha (9%) and are distributed in the western and southern part of the microwatershed. Maximum area of about 491 ha (65%) is moderately suitable (Class S2) for brinjal and is distributed in the major part of the microwatershed. They have minor limitations of texture, calcareousness and gravelliness. Very small area of 61 ha (8%) is marginally suitable and is distributed in the southern part of the microwatershed with moderate limitation of rooting depth. An area of about 27 ha (4%) is currently not suitable (Class N1) with severe limitation of rooting depth and distributed in the western part.

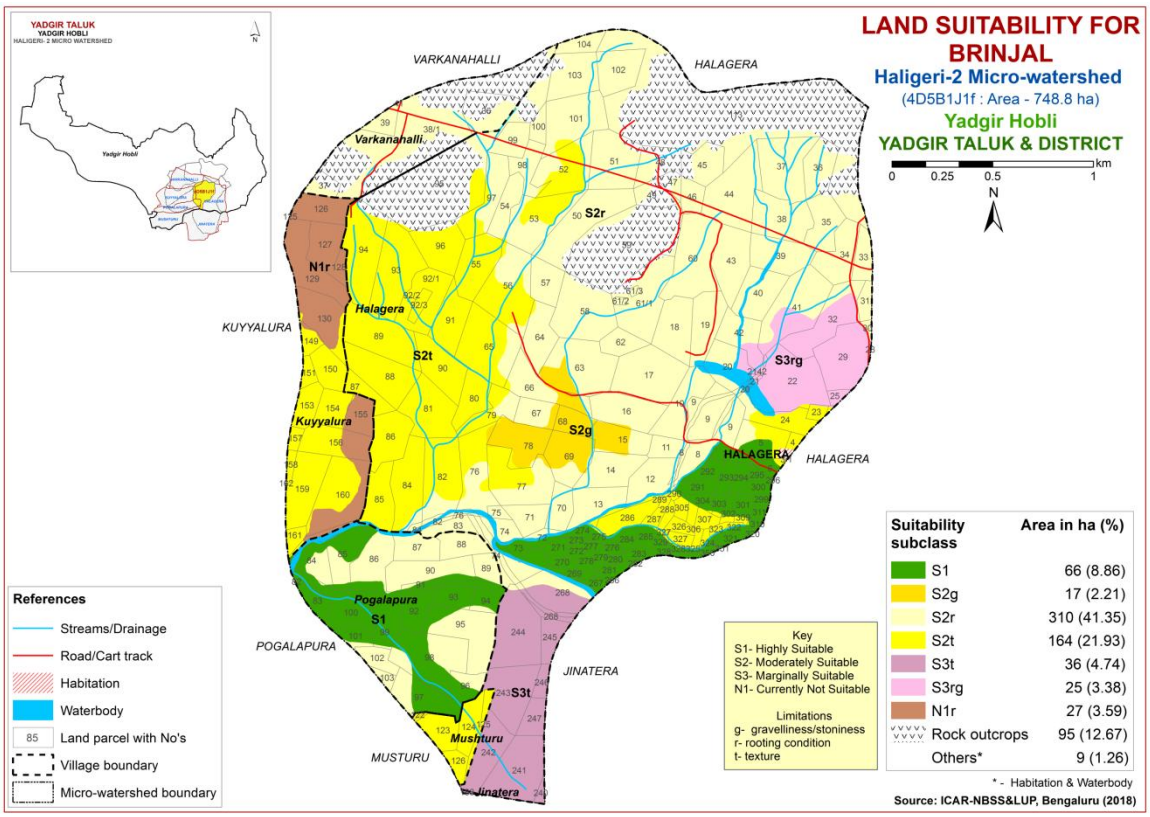


Fig. 7.11 Land Suitability map of Brinjal

7.12 Land Suitability for Bhendi (*Abelmoschus esculentus*)

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

Highly (Class S1) suitable lands for growing bhendi occur in a maximum area of 181 ha (24%) and are distributed in the major part of the microwatershed. Small area of about 10 ha (2%) is moderately suitable (Class S2) for bhendi and is distributed in the northern part of the microwatershed. They have minor limitations of texture, calcareousness and gravelliness. An area of 119 ha (20%) is marginally suitable and is distributed in all parts of the microwatershed with moderate limitations of rooting depth and texture. An area of about 27 ha (4%) is currently not suitable (Class N1) with severe limitation of rooting depth and distributed in the western part.

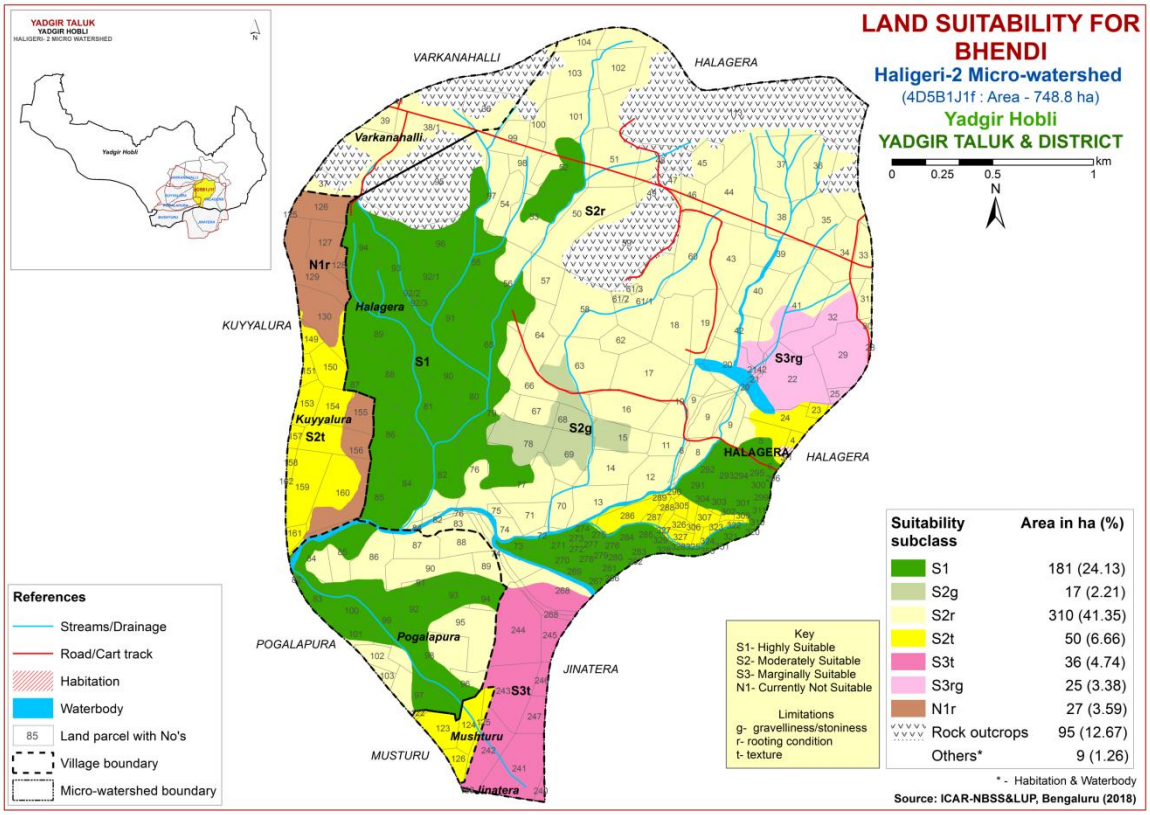


Fig. 7.12 Land Suitability map of Bhendi

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

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

Highly (Class S1) suitable lands for growing onion occur in an area of 197 ha (26%) and are distributed in the western, central, southwestern and southeastern part of the microwatershed. Maximum area of about 343 ha (46%) is moderately suitable (Class S2) for onion and is distributed in the major part of the microwatershed. They have minor limitations of gravelliness, texture and rooting depth. An area of 78 ha (10%) is marginally suitable and is distributed in the eastern and southern part of the microwatershed with moderate limitations gravelliness and texture. An area of about 27 ha (4%) is currently not suitable (Class N1) with severe limitation of rooting depth and distributed in the western part.

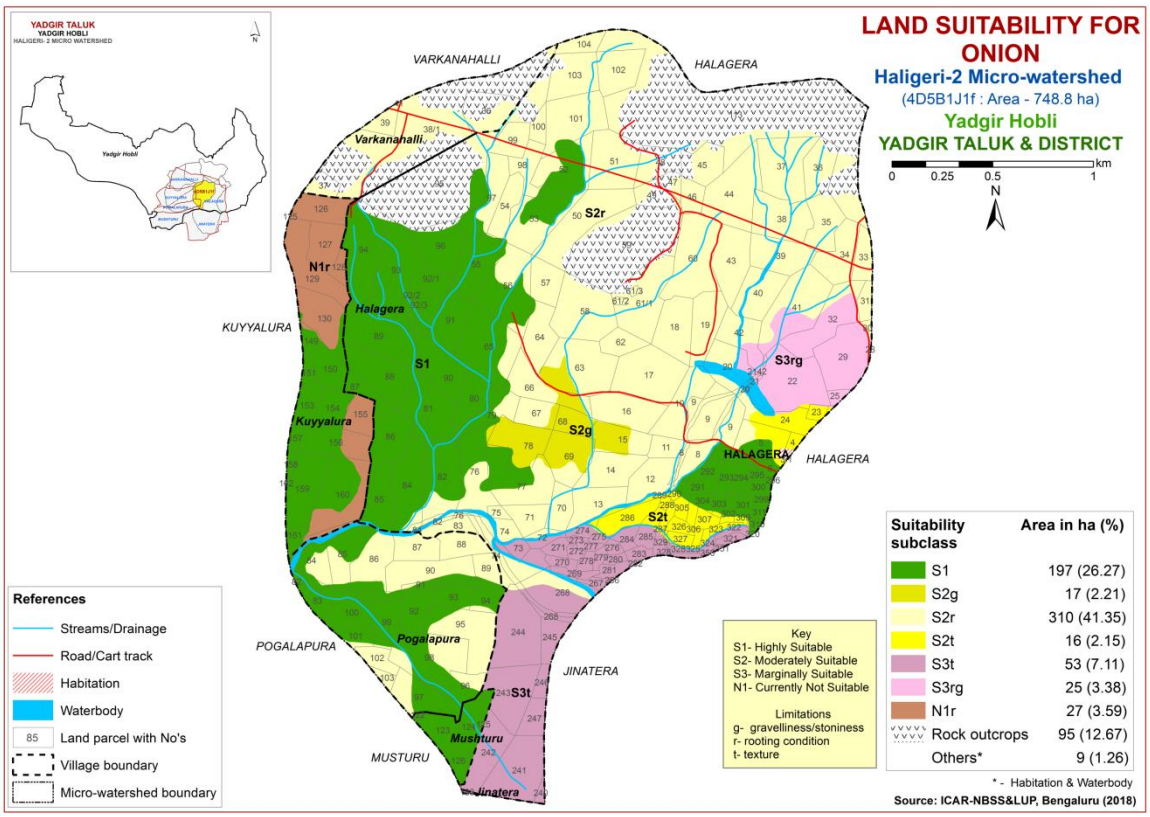


Fig. 7.14 Land Suitability map of Onion

7.14 Land Suitability for Drumstick (*Moringa oleifera*)

Drumstick is one of the most important vegetable crop grown in about 2403 ha in the state. The crop requirements for growing drumstick (Table 7.15) 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.

Highly (Class S1) suitable area is not available for growing drumstick in the microwatershed. An area of about 247 ha (33%) is moderately suitable (Class S2) for drumstick and is distributed in the major part of the microwatershed. They have minor limitations of rooting depth, texture, calcareousness, gravelliness and drainage. An area of about 345 ha (46%) is marginally suitable (Class S3) for growing drumstick and are distributed in all parts of the microwatershed. They have moderate limitations of rooting depth, texture and calcareousness. An area of about 52 ha (7%) is currently not suitable (Class N1) for growing drumstick and are distributed in the eastern and western part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

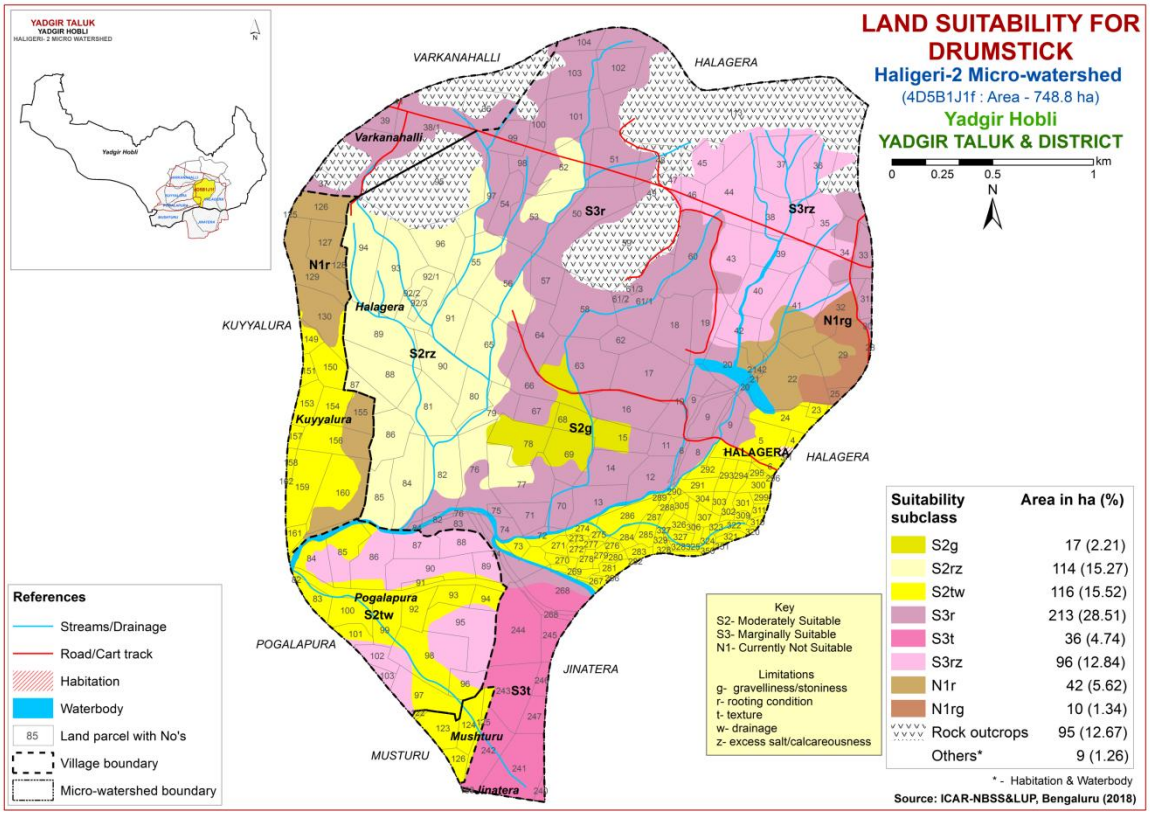


Fig 7.14 Land Suitability map of Drumstick

7.15 Land suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in an area of 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 is given in Figure 7.15.

Highly (Class S1) and moderately (Class S2) suitable lands are not available for growing mango in the microwatershed. An area of 247 ha (33%) is marginally suitable (Class S3) for growing mango with moderate limitations of drainage, texture, calcareousness, gravelliness and rooting depth and are distributed in all parts of the microwatershed. Maximum area of about 397 ha (53%) is currently not suitable (Class N1) for growing mango and occur in the major part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

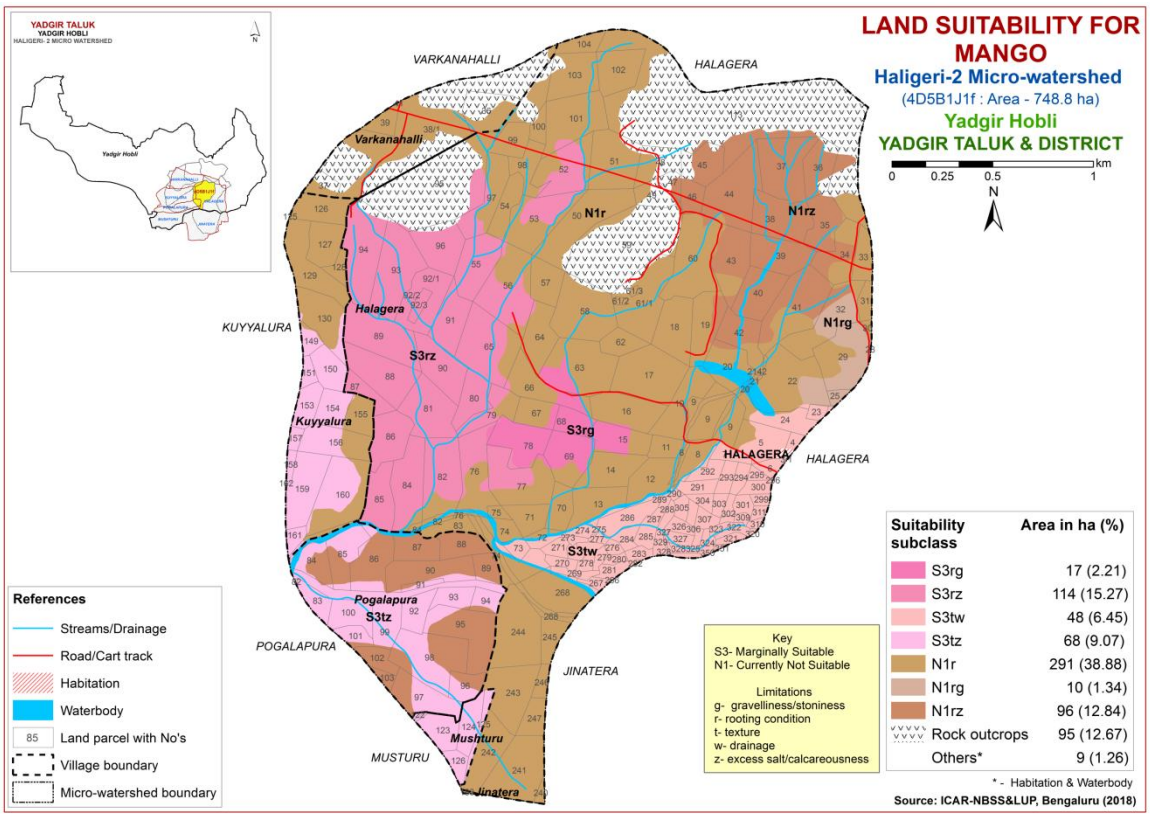


Fig. 7.15 Land Suitability map of Mango

7.16 Land suitability for Guava (*Psidiumguajava*)

Guava is one of the most important fruit crop grown in an area of 0.06 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 (7.1) and a land suitability map for growing guava was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.16.

No highly suitable (Class S1) lands available for growing guava in the microwatershed. An area of about 114 ha (15%) is moderately suitable (Class S2) for growing guava and are distributed in the central and western part of the microwatershed and have minor limitations of rooting depth and calcareousness. Marginally suitable (Class S3) lands cover a maximum area of about 478 ha (64%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness, drainage and gravelliness. An area of about 52 ha (7%) is currently not suitable (Class N1) for growing guava and occur in the western and eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

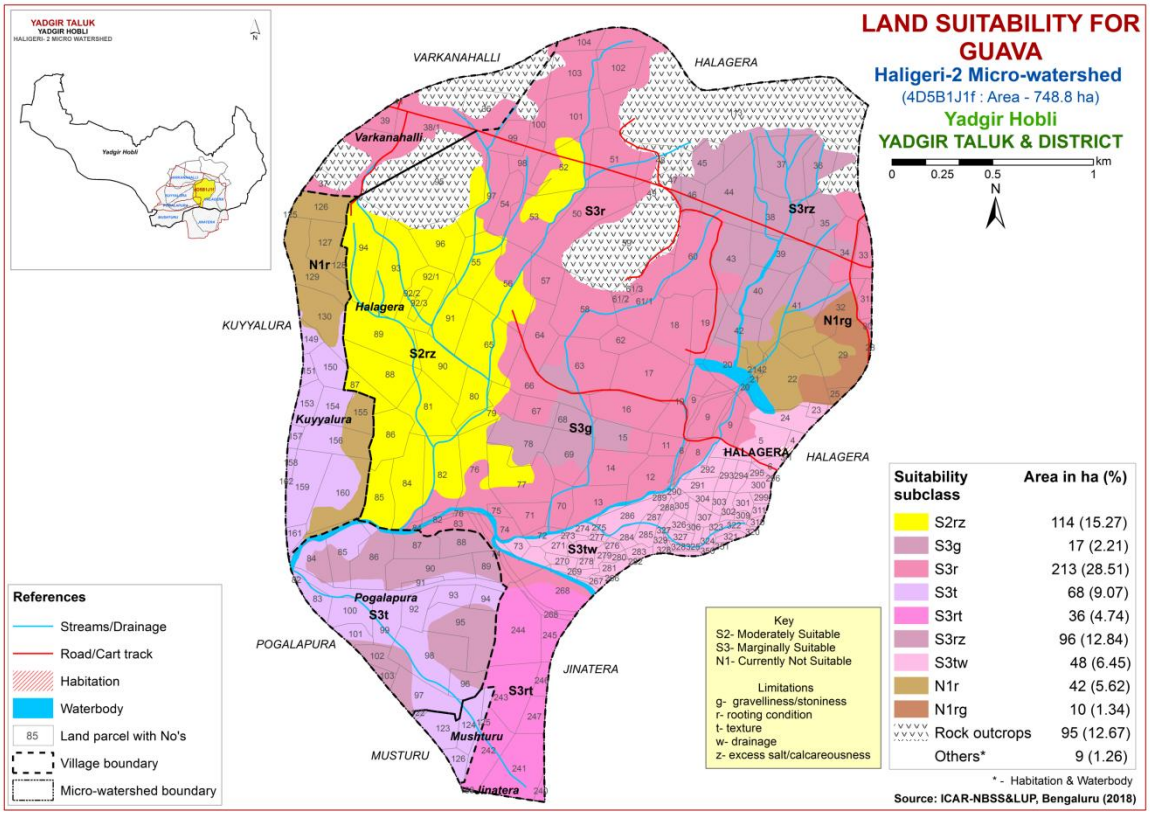


Fig. 7.16 Land Suitability map of Guava

7.17 Land suitability for Sapota (*Manilkarazapota*)

Sapota is one of the most important fruit crop grown in an area of 29373 ha in almost all the districts of the State. The crop requirements (Table 7.18) 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 geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.17.

No highly suitable (Class S1) lands available for growing sapota in the microwatershed. An area of about 114 ha (15%) is moderately suitable (Class S2) and are distributed in the western and central part of the microwatershed. They have minor limitations of calcareousness and rooting depth. Maximum area of about 478 ha (64%) is marginally suitable (Class S3) for growing sapota and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness, gravelliness and drainage. An area of about 52 ha (7%) is currently not suitable (Class N1) for growing sapota and occur in the eastern and western part of the microwatershed with severe limitations of rooting depth and gravelliness.

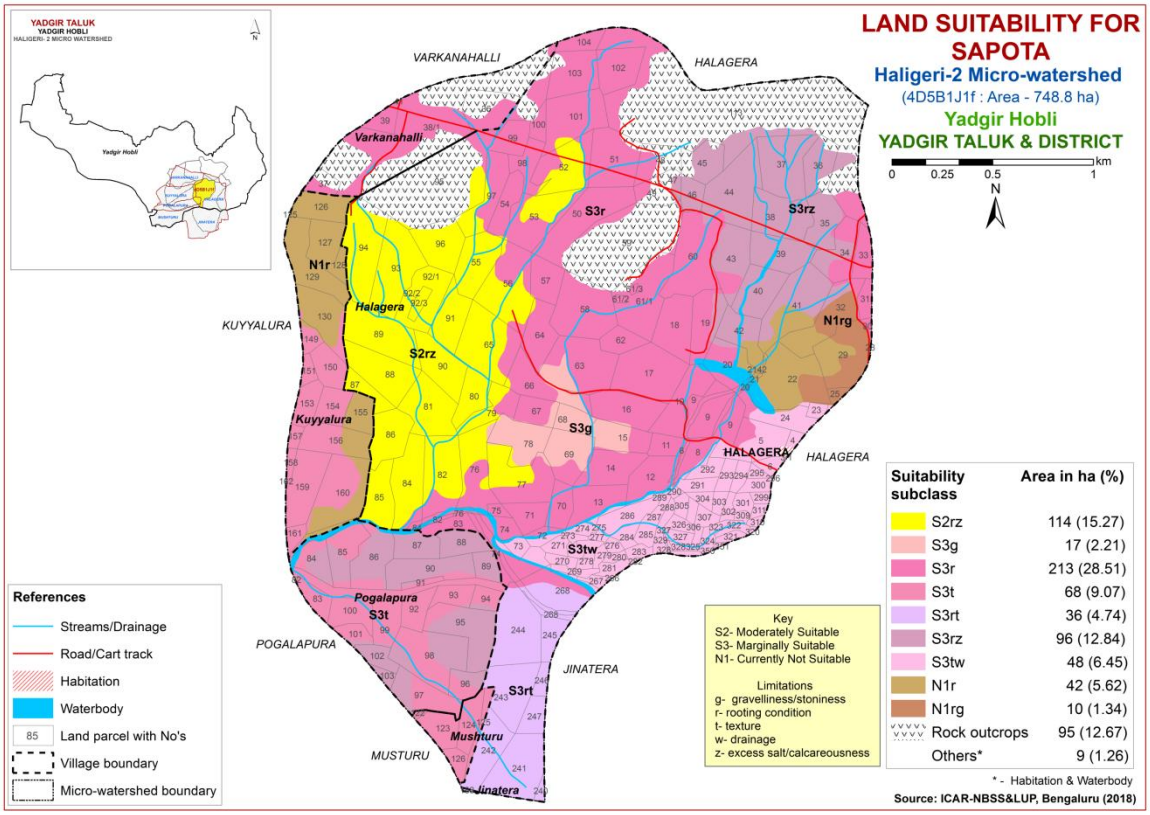


Fig. 7.17 Land Suitability map of Sapota

7.18 Land Suitability for Pomegranate (*Punicagranatum*)

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

No highly suitable (Class S1) lands available for growing pomegranate in the microwatershed. An area of about 230 ha (31%) is moderately suitable (Class S2) for pomegranate and is distributed in the western, central, southeastern and southwestern part of the microwatershed. They have minor limitations of rooting depth, texture, calcareousness and drainage. Maximum area of about 362 ha (48%) is marginally suitable (Class S3) for growing pomegranate and are distributed in all parts of the microwatershed. They have moderate limitations of rooting depth, gravelliness, calcareousness and texture. An area of about 52 ha (7%) is currently not suitable (Class N1) for growing pomegranate and are distributed in the northern, eastern, and western part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

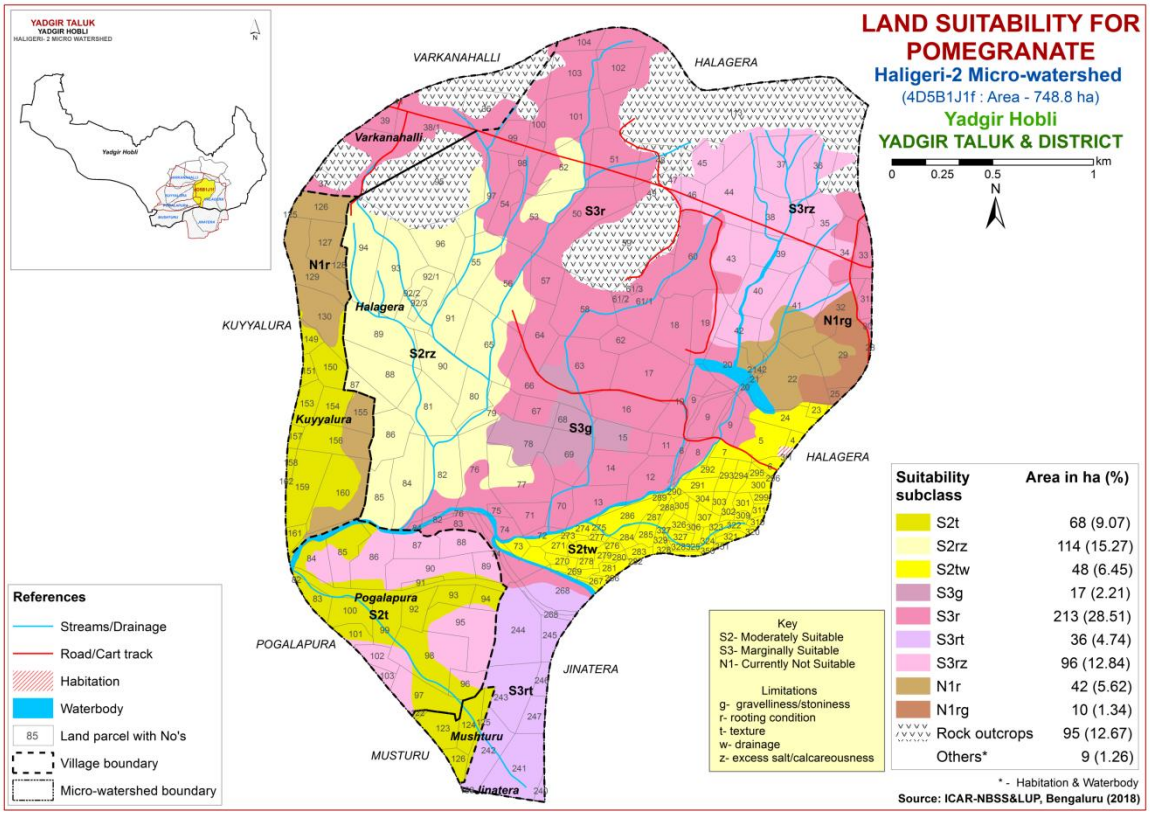


Fig 7.18 Land Suitability map of Pomegranate

7.19 Land Suitability for Musambi (*Citrus limetta*)

Musambi is one of the important fruit crop grown in an area of 3446 ha in almost all the districts of the State. The crop requirements for growing musambi (Table 7.20) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.19.

An area of about 34 ha (5%) is highly suitable (Class S1) for growing Musambi and are distributed in the southern and western part of the microwatershed. An area of about 196 ha (26%) is moderately suitable (Class S2) for growing Musambi and are distributed in the western and southern part of the microwatershed. They have minor limitations of drainage, calcareousness and rooting depth. Marginally suitable (Class S3) lands occupy an area of about 362 ha (48%) and are distributed in all parts except western part of the microwatershed. They have moderate limitations of rooting depth, texture, calcareousness and drainage. An area of about 52 ha (7%) is currently not suitable (Class N1) and are distributed in the western and eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

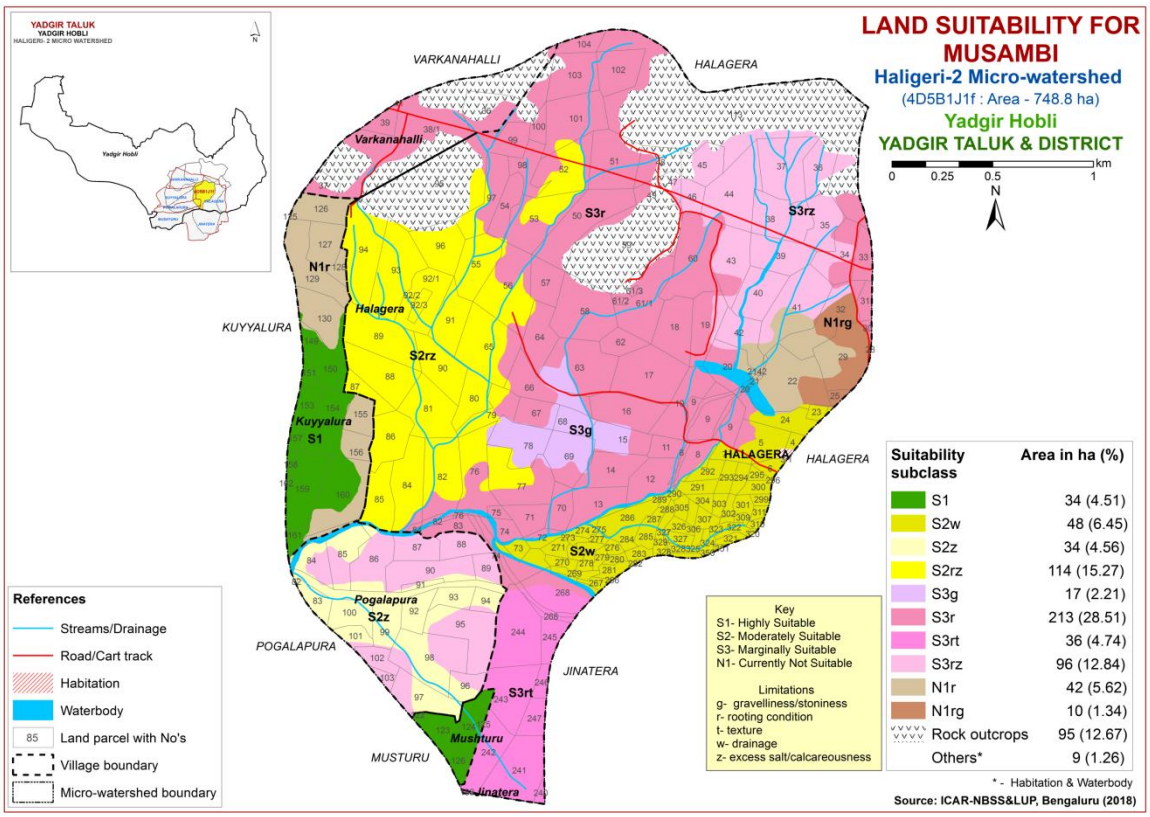


Fig. 7.19 Land Suitability map of Musambi

7.20 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7. 20.

An area of about 34 ha (5%) is highly suitable (Class S1) for growing Lime and are distributed in the southern and western part of the microwatershed. An area of about 196 ha (26%) is moderately suitable (Class S2) for growing lime and are distributed in the southeastern, central and western part of the microwatershed. They have minor limitations of drainage, calcareousness and rooting depth. Marginally suitable (Class S3) lands occupy an area of about 362 ha (48%) and are distributed in all parts of the microwatershed except western part of the microwatershed. They have moderate limitations of rooting depth, texture and calcareousness. An area of about 52 ha (7%) is currently not suitable (Class N1) and are distributed in the western and eastern part of the microwatershed with severe limitations of rooting depth and gravelliness.

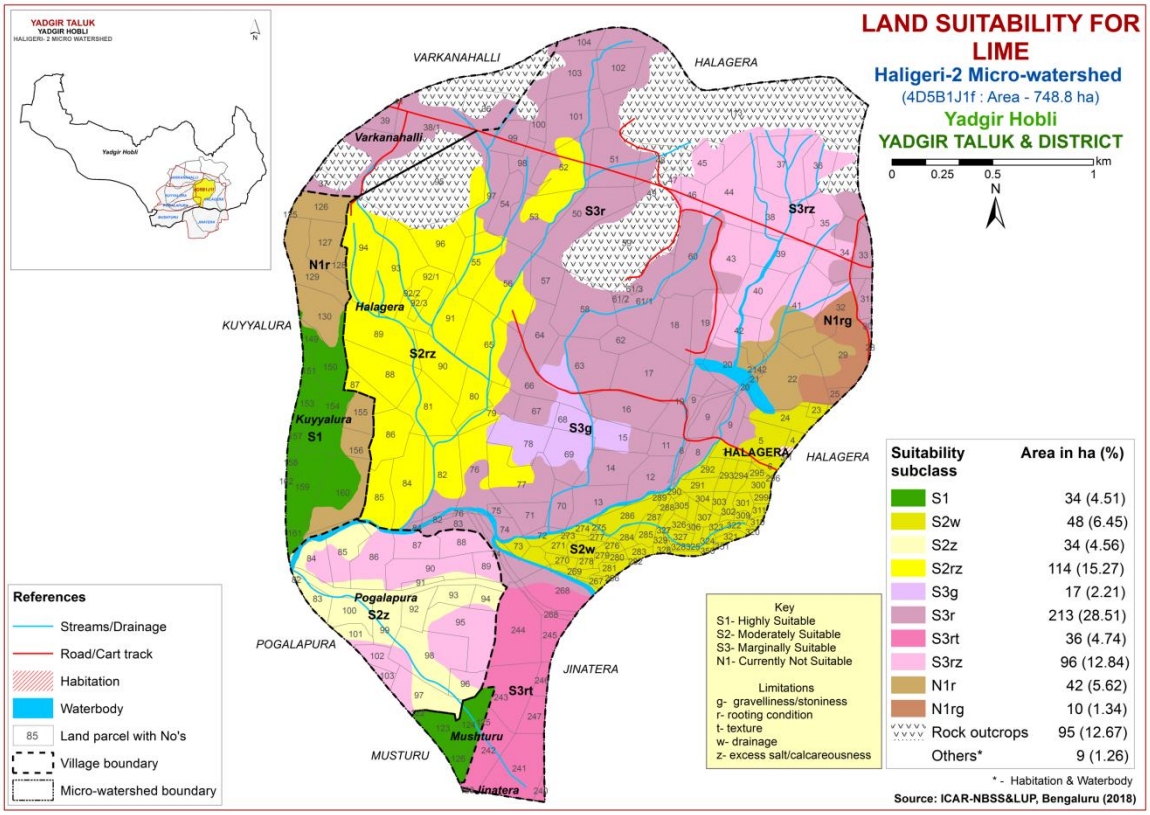


Fig. 7.20 Land Suitability map of Lime

7.21 Land Suitability for Amla (*Phyllanthusemblica*)

Amla is one of the medicinal fruit crop grown in almost all the districts of the State. The crop requirements for growing amla (Table 7.22) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.21.

An area of about 34 ha (5%) is highly suitable (Class S1) for growing Amla and are distributed in the southeastern and eastern part of the microwatershed. Maximum area of about 522 ha (70%) has soils that are moderately suitable (Class S2) for growing Amla with minor limitations of drainage, texture, calcareousness, gravelliness and rooting depth and are distributed in all parts except southeastern part of the microwatershed. An area of 61 ha (8%) is marginally suitable (Class S3) with moderate limitations of rooting depth, texture and gravelliness and are distributed in the major part of the microwatershed. An area of about 27 ha (4%) is currently not suitable (Class N1) and are distributed in the western part of the microwatershed. They have severe limitation of rooting depth.

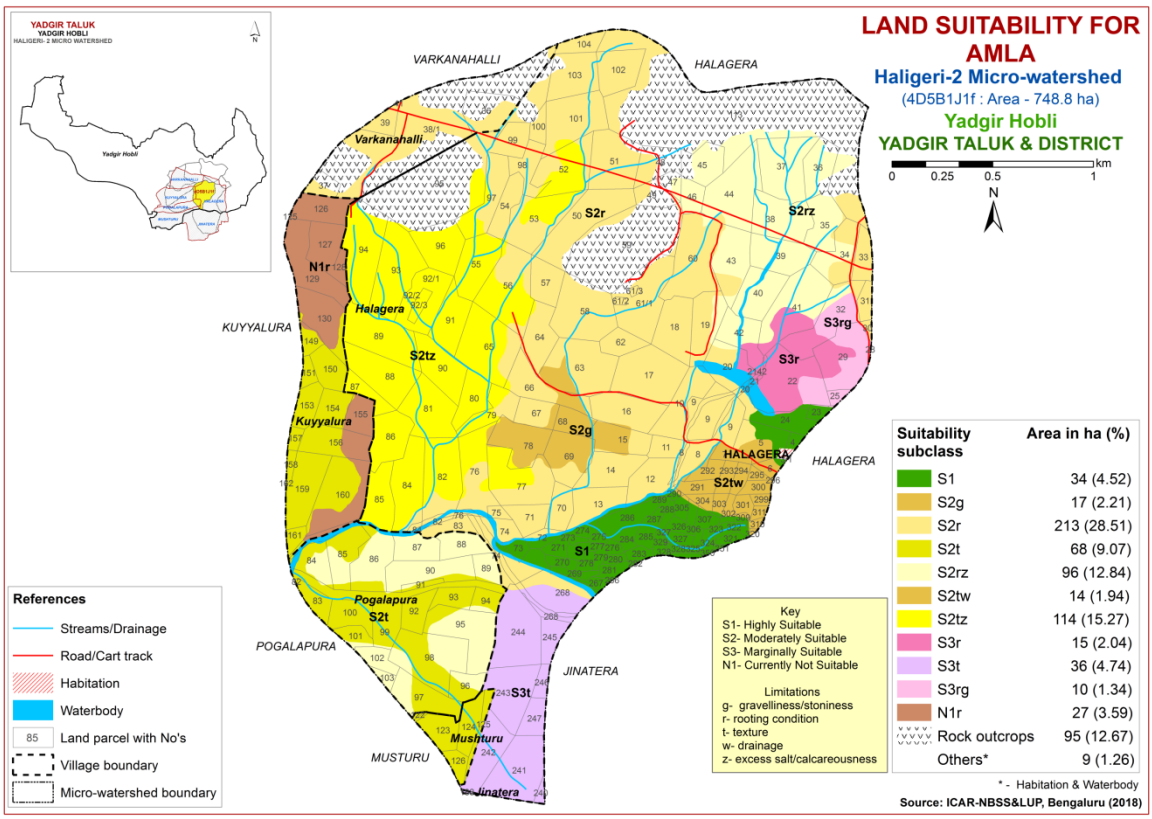


Fig. 7.21 Land Suitability map of Amla

7.22 Land Suitability for Cashew (*Anacardiumoccidentale)*

Cashew is one of the most important plantation nut crop grown in an area of 0.7 lakh ha in almost all the districts of the State. The crop requirements for growing cashew (Table 7.23) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.22.

Highly (Class S1) and moderately (Class S2) suitable lands are not available for growing the cashew in the microwatershed. The marginally suitable (Class S3) lands cover an area of about 242 ha (32%) and occur in the northern, northeastern, southwestern, southern and central part of the microwatershed. They have moderate limitations of gravelliness, rooting depth, texture and calcareousness. Maximum area of about 403 ha (54%) is currently not suitable (Class N1) and are distributed in the western, eastern, northeastern and southwestern part of the microwatershed with severe limitations of rooting depth, texture, calcareousness and drainage.

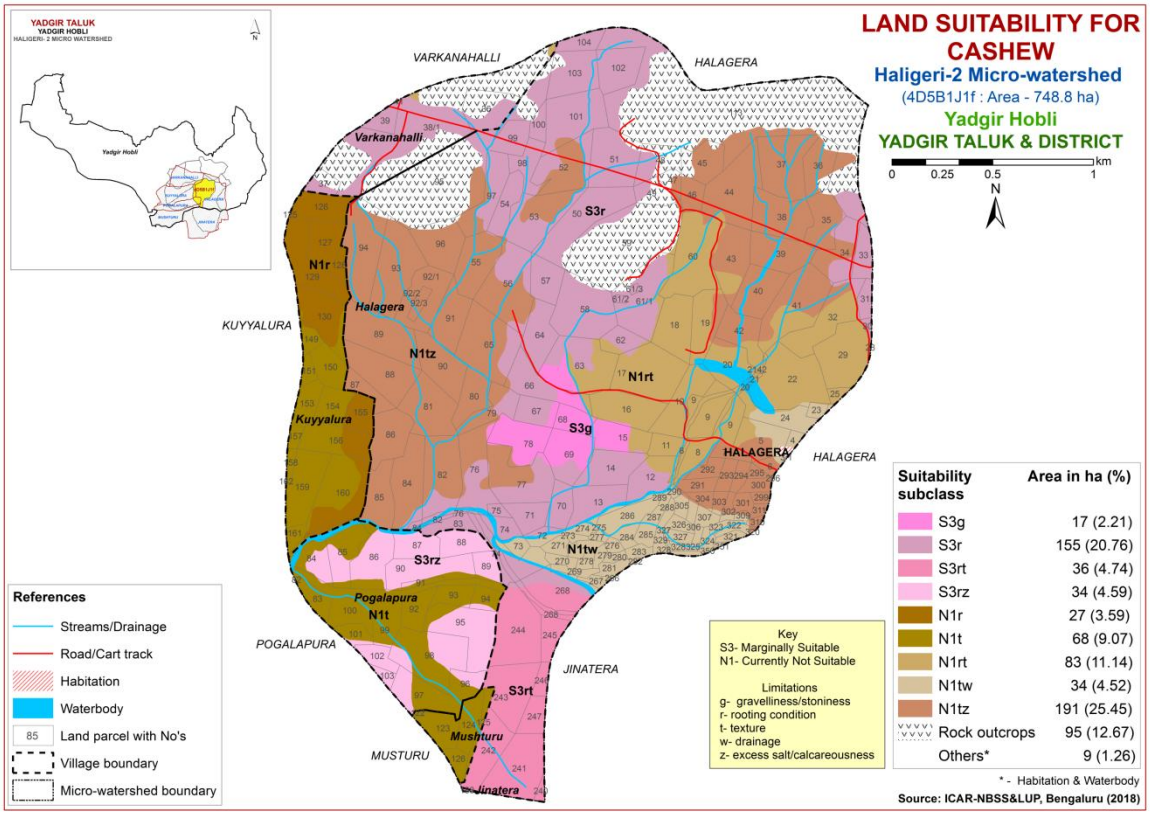


Fig. 7.22 Land Suitability map of Cashew

7. 23 Land Suitability for Jackfruit (*Artocarpusheterophyllus*)

Jackfruit is one of the most important fruit crop grown in an area of 5368 ha in almost all the districts of the State. The crop requirements for growing jackfruit (Table 7.24) 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 geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.23.

Highly (Class S1) suitable lands are not available for growing jackfruit in the microwatershed. Moderately suitable (Class S2) lands occupy an area of 114 ha (15%) and are distributed in the central and western part of the microwatershed with minor limitations of gravelliness, rooting depth and calcareousness. Marginally suitable (Class S3) lands for growing Jackfruit occupy a maximum area of about 478 ha (64%) and are distributed in the major part of the microwatershed. They have moderate limitations of rooting depth, drainage, texture, gravelliness and calcareousness. An area of about 52 ha (7%) is currently not suitable (Class N1) and are distributed in the eastern and western part of the microwatershed with severe limitations of rooting depth and gravelliness.

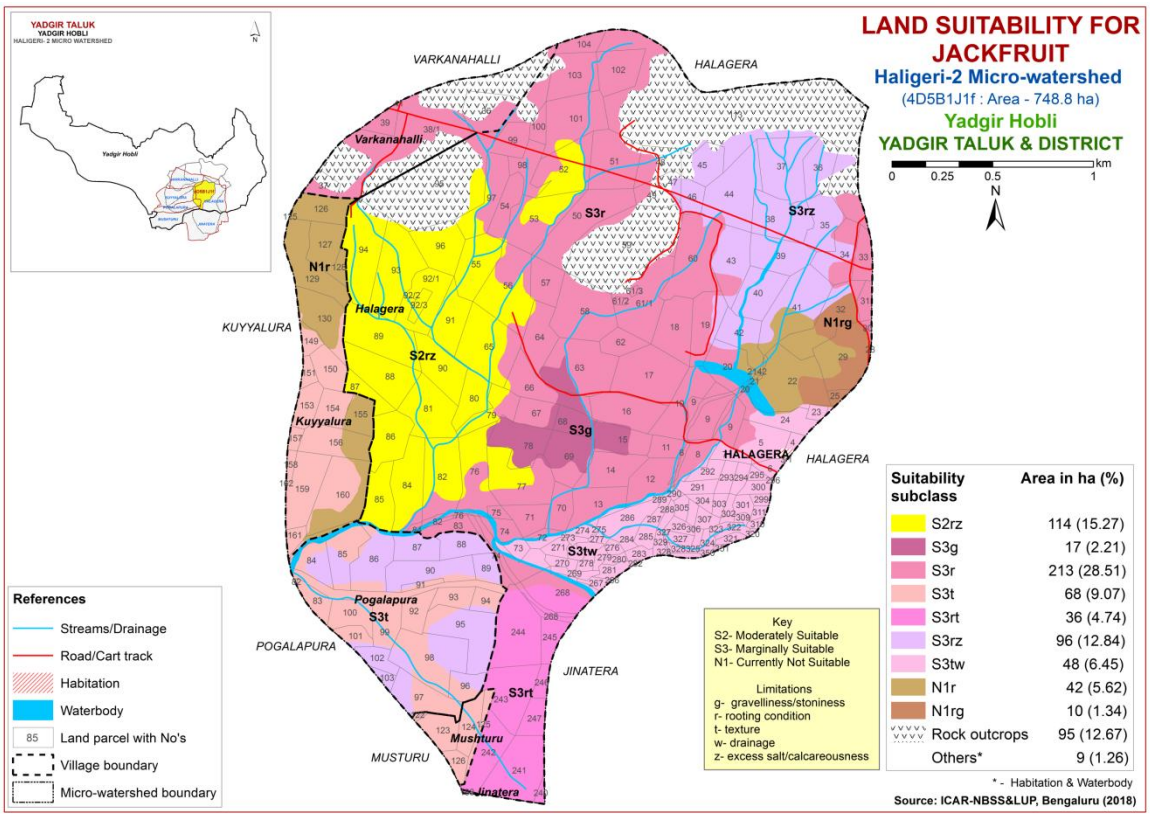


Fig. 7.23 Land Suitability map of Jackfruit

7.24 Land Suitability for Jamun (*Syzygiumcumini*)

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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.24.

No highly suitable (Class S1) land available for growing Jamun in the microwatershed. An area of about 116 ha (16%) is moderately suitable (Class S2) for growing Jamun and are distributed in the western, southeastern and southwestern part of the microwatershed. They have minor limitations of texture and drainage. Maximum area of about 476 ha (64%) is marginally suitable (Class S3) for growing Jamun and are distributed in all parts of the microwatershed. They have moderate limitations of texture, calcareousness, gravelliness and rooting depth. An area of about 52 ha (7%) is currently not suitable (Class N1) and are distributed in the eastern and western part of the microwatershed with severe limitations of rooting depth and gravelliness.

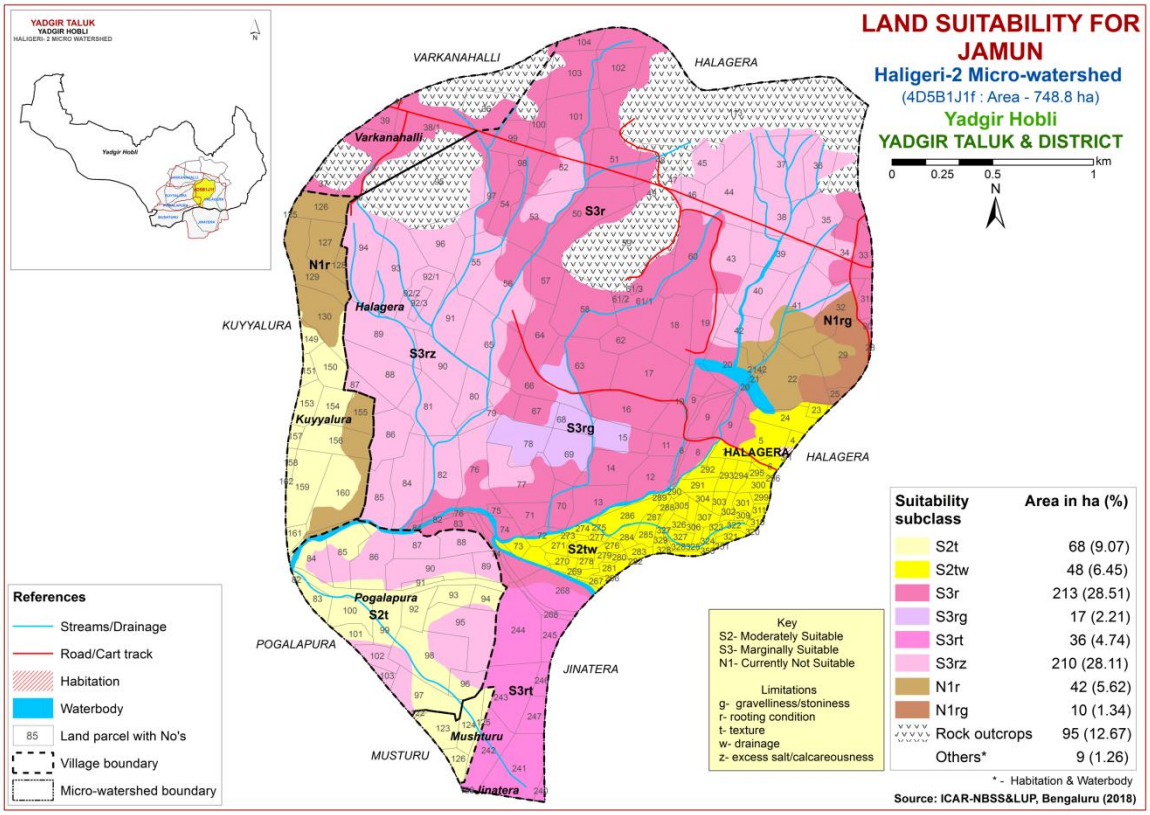


Fig. 7.24 Land Suitability map of Jamun

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

Custard apple is one of the most important fruit crop grown in almost all the districts of the State. The crop requirements for growing custard apple (Table7.26) 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 geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.25.

An area of 231 ha (31%) is highly suitable (Class S1) for growing custard apple and are distributed in the southwestern, southeastern and western part of the microwatershed. An area of about 326 ha (44%) has soils that are moderately suitable (Class S2) for growing custard apple with minor limitations of gravelliness, calcareousness and rooting depth and are distributed in the northeastern, northern, central and southwestern part of the microwatershed. Maximum area of about 61 ha (8%) is marginally suitable (Class S3) for growing custard apple and are distributed in the eastern and southern part of the microwatershed with moderate limitations of rooting depth, texture, calcareousness and gravelliness. An area of about 27 ha (4%) is currently not suitable (Class N1) and are distributed in the western part of the microwatershed with severe limitation of rooting depth.

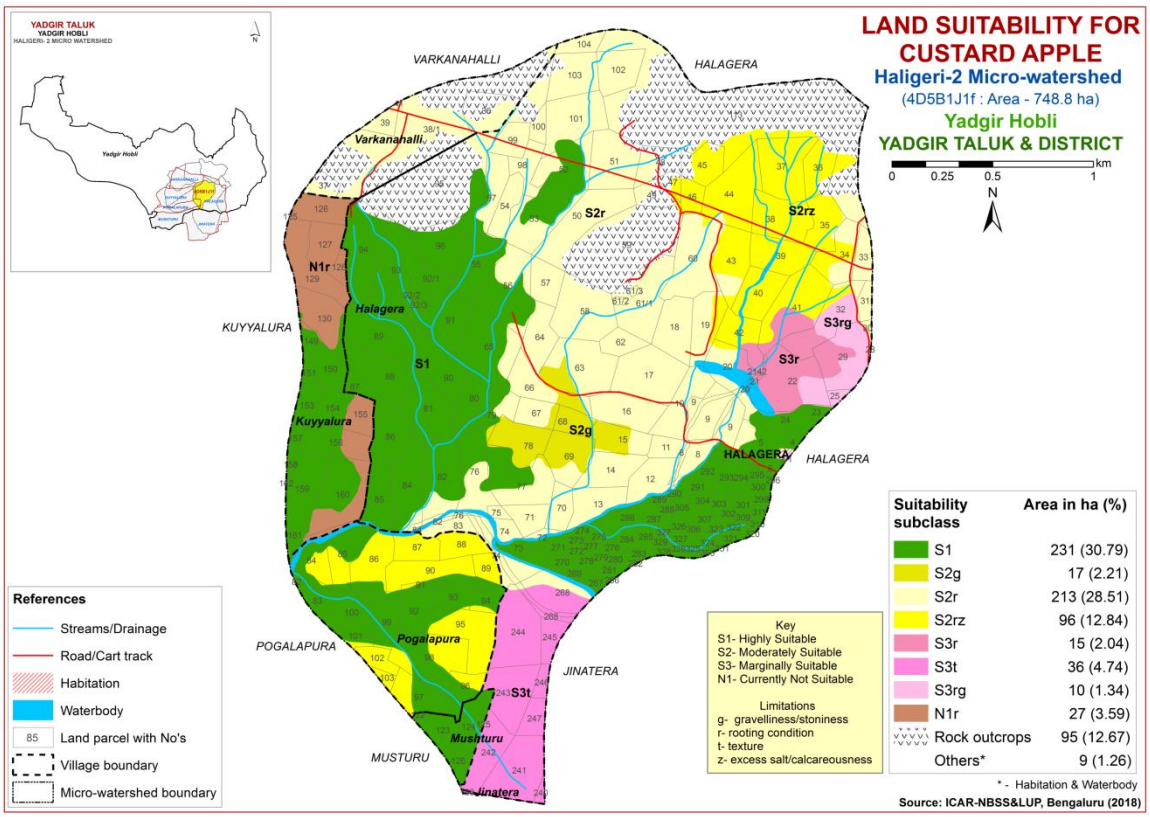


Fig. 7.25 Land Suitability map of Custard Apple

7.26 Land Suitability for Tamarind (*Tamarindusindica*)

Tamarind is one of the most important spice crop grown in almost all the districts of the state. The crop requirements for growing tamarind (Table 7.27) 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 Fig. 7.26.

No highly suitable (Class S1) lands are available for growing Tamarind in the microwatershed. An area of about 116 ha (15%) is moderately suitable (Class S2) for growing Tamarind and are distributed in the southwestern, southeastern and western part of the microwatershed. They have minor limitations of texture and drainage. Marginally suitable (Class S3) lands for growing Tamarind occupy an area of about 131 ha (17%) and are distributed in the central and western part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and calcareousness. Maximum area of about 397 ha (53%) is currently not suitable (Class N1) for growing Tamarind and occur in the major part of the microwatershed with severe limitations of rooting depth, gravelliness and calcareousness.

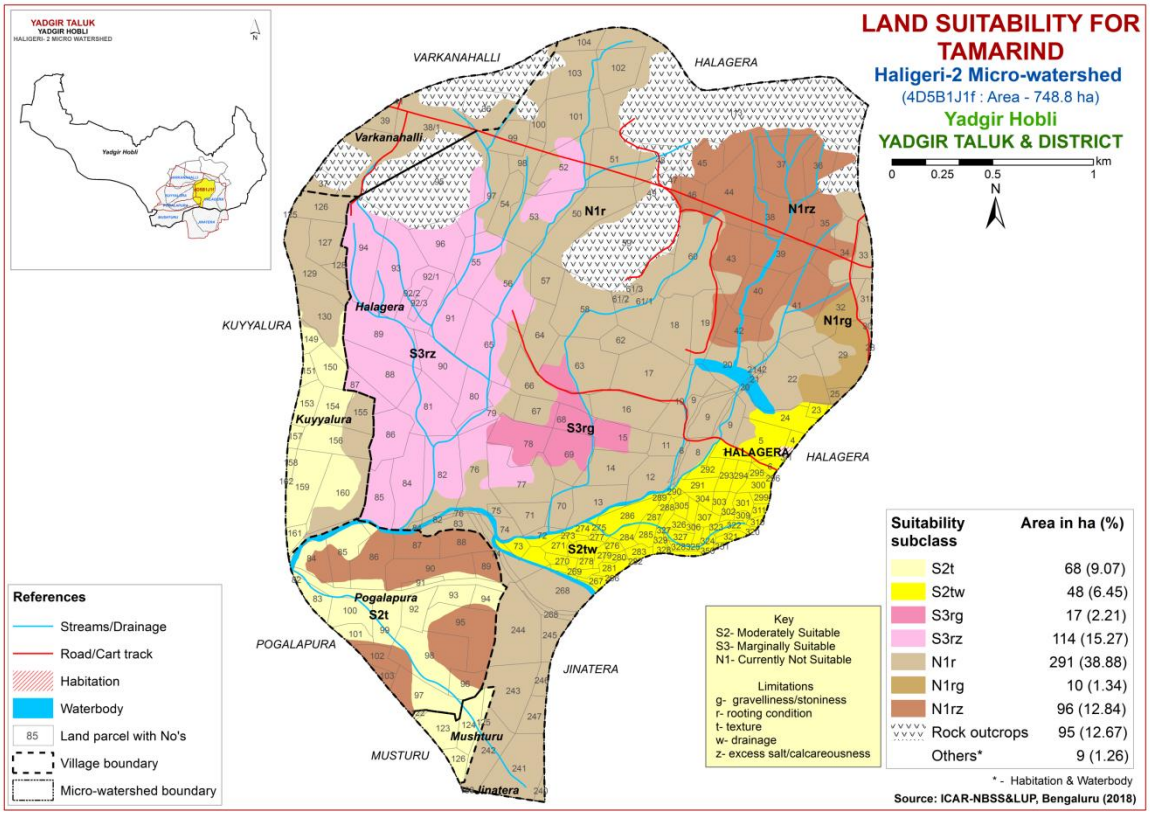


Fig. 7.26 Land Suitability map of Tamarind

7.27 Land Suitability for Mulberry (*Morusnigra*)

Mulberry is the important leaf crop grown for rearing silkworms in about 1.6 lakh ha area in all the districts of the state. The crop requirements for growing mulberry (Table 7.28) were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing mulberry was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.27.

No highly suitable (Class S1) lands available for growing mulberry in the microwatershed. Moderately (Class S2) suitable lands occur in 131 ha (17%) and are distributed in the central and western part of the microwatershed with minor limitations of rooting depth, gravelliness and calcareousness. Major area of about 461 ha (62%) is marginally suitable (Class S3) for growing mulberry and are distributed in all parts of the microwatershed. They have moderate limitations of texture, drainage, calcareousness and rooting depth. Currently not suitable lands (Class N1) occupy an area of about 52 ha (7%) and distributed in the eastern and western part of the microwatershed. They have severe limitations of rooting depth and gravelliness.

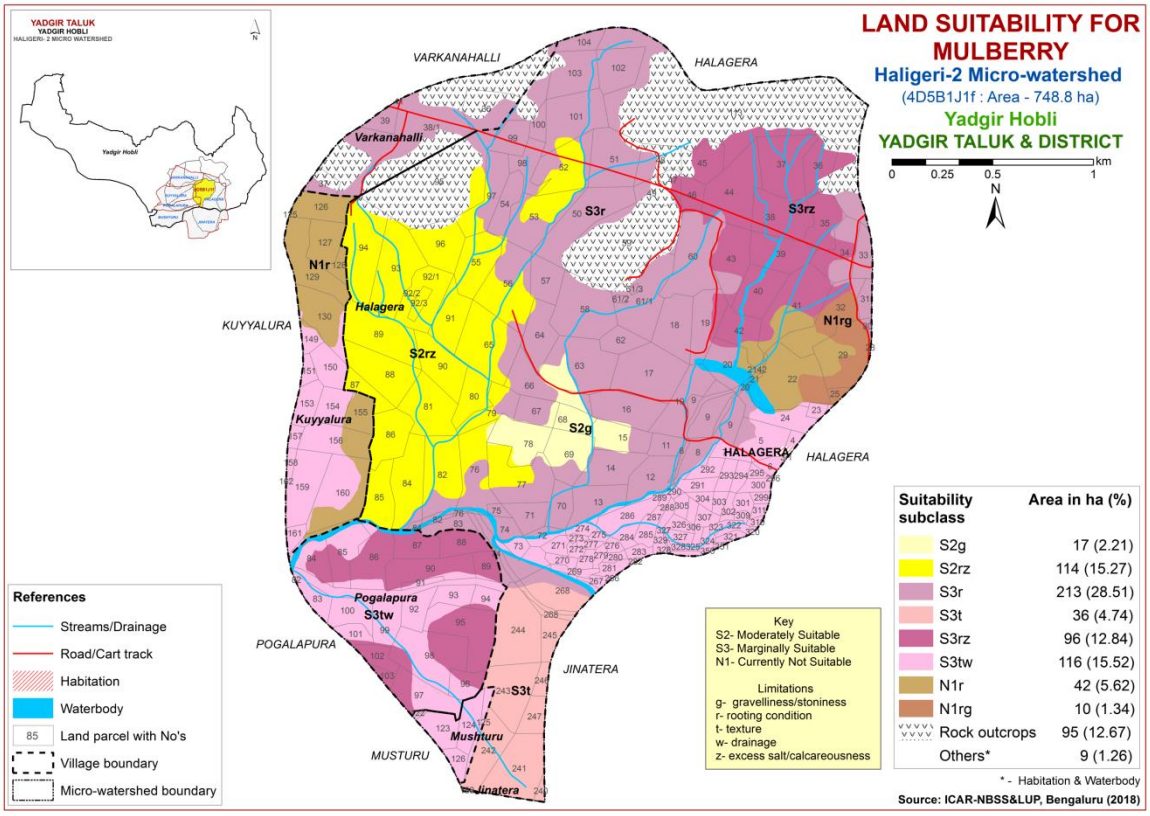


Fig 7.27 Land Suitability map of Mulberry

7.28 Land suitability for Marigold (*Tagetessps*.)

Marigold is one of the most important flower crop grown in an area of 9108 ha in almost all the districts of the State. The crop requirements (Table 7.29) for growing marigold were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing marigold was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.28.

No highly suitable (Class S1) land is available for growing Marigold in the microwatershed. Maximum area of about 540 ha (72%) is moderately suitable (Class S2) for growing Marigold and are distributed in the major part of the microwatershed. They have minor limitations of texture, gravelliness, drainage, rooting depth and calcareousness. Marginally suitable (Class S3) lands for growing Marigold occupy an area of about 78 ha (10%) and are distributed in the central, eastern and southern part of the microwatershed. They have moderate limitations of texture, gravelliness, and rooting depth. Currently not suitable lands (Class N1) occupy an area of about 27 ha (4%) and distributed in the western part of the microwatershed. They have severe limitation of rooting depth.

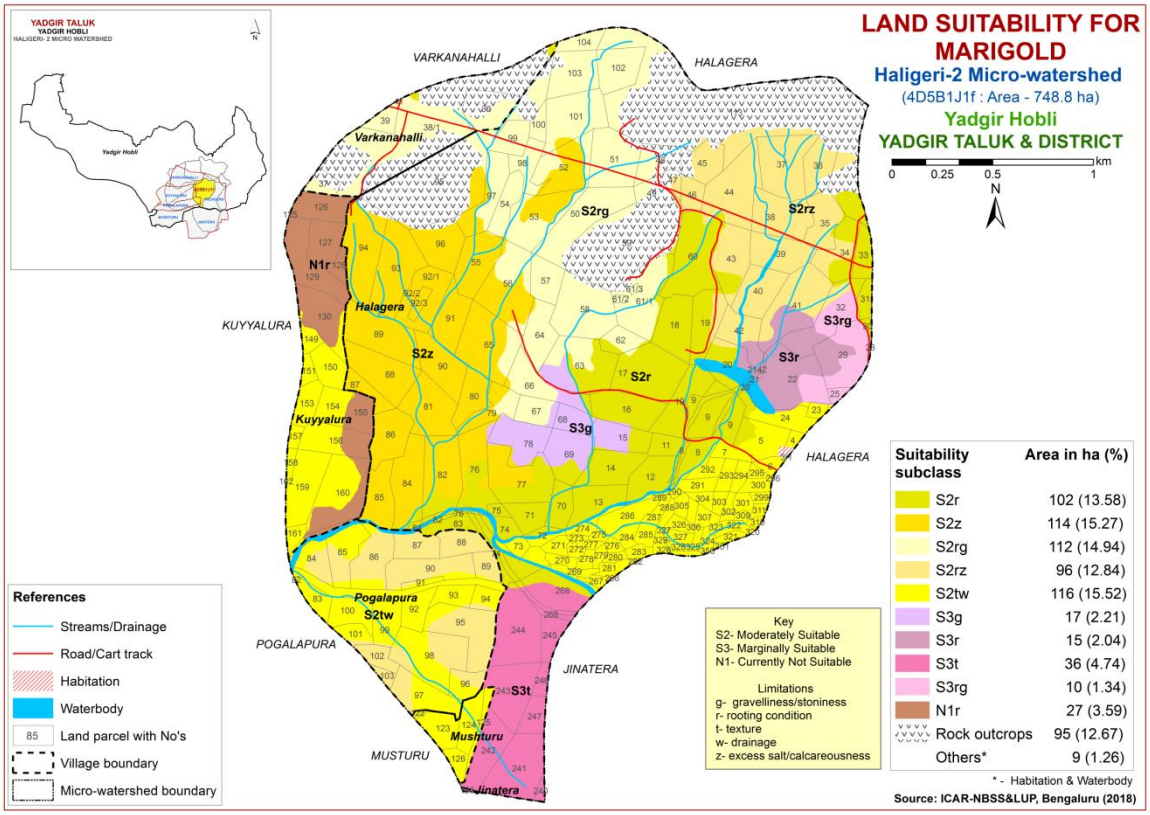


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Dendranthema grandiflora*)

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

No highly suitable (Class S1) land is available for growing Chrysanthemum in the microwatershed. Maximum area of about 540 ha (72%) is moderately suitable (Class S2) for growing Chrysanthemum and are distributed in the major part of the microwatershed. They have minor limitations of texture, gravelliness, rooting depth, calcareousness and drainage. Marginally suitable (Class S3) lands for growing Chrysanthemum occupy an area of about 78 ha (10%) and are distributed in the eastern, central and southern part of the microwatershed. They have moderate limitations of rooting depth, gravelliness and texture. Currently not suitable lands (Class N1) occupy an area of about 27 ha (4%) and distributed in the western part of the microwatershed. They have severe limitation of rooting depth.

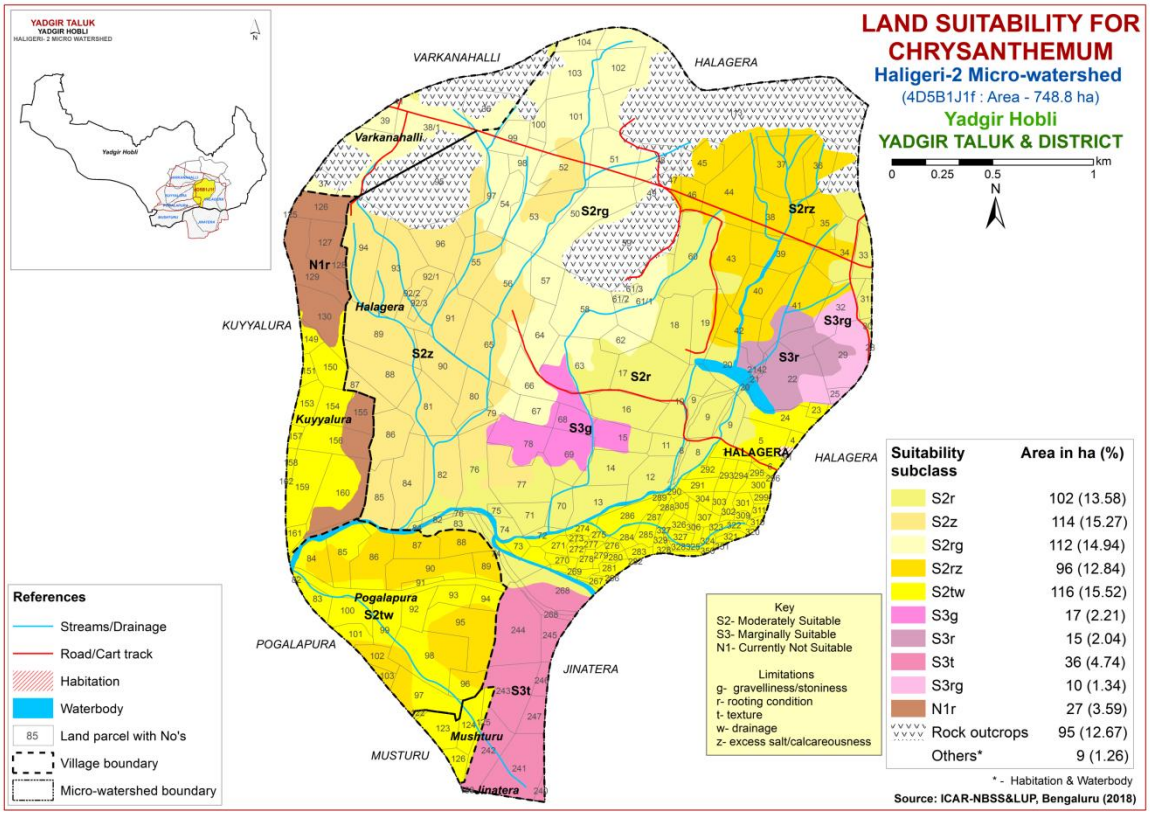


Fig. 7.29 Land Suitability map of Chrysanthemum

Table 7.1 Soil-Site Characteristics of Haligeri-2 microwatershed

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drain-age Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m)	Slope (%)	Erosion	pH	EC (dSm^{-1})	ESP (%)	CEC [$Cmol(p^{+})kg^{-1}$]	BS (%)
					Sur-face	Sub-surface	Surface (%)	Sub-surface (%)								
BDPiB3	866	150	WD	<25	sc	scl	-	-	<50	1-3	severe	8.58	0.26	0.35	18.10	100
DSBhB2	866	150	WD	25-50	scl	gc	-	35-60	<50	1-3	moderate	5.93	0.04	0.14	3.60	73
DSBcB2	866	150	WD	25-50	sl	gc	-	35-60	<50	1-3	moderate	5.93	0.04	0.14	3.60	73
DPLiB2	866	150	WD	50-75	sc	sc	-	-	51-100	1-3	moderate	6.92	0.12	0.09	7.10	92
YLRbB2	866	150	WD	50-75	ls	c	-	15-35	51-100	1-3	moderate	6.91	0.06	0.45	6.90	100
YLRbB3	866	150	WD	50-75	ls	c	-	15-35	51-100	1-3	moderate	6.91	0.06	0.45	6.90	100
YLRcB2g1	866	150	WD	50-75	sl	c	15-35	15-35	51-100	1-3	moderate	6.91	0.06	0.45	6.90	100
SBRcC3g1	866	150	SED	50-75	sl	ls	15-35	-	<50	3-5	severe	8.24	0.14	1.15	7.50	100
HLGbB3	866	150	WD	50-75	ls	scl	-	-	51-100	1-3	moderate	8.49	0.18	0.69	8.80	100
HLGcB2	866	150	WD	50-75	sl	sc	-	-	51-150	1-3	moderate	8.49	0.18	0.69	8.80	100
JNKcB2	866	150	MWD	50-75	sl	gscl	-	-	51-150	1-3	moderate	8.42	0.15	0.18	0.74	100
JNKiB2	866	150	WD	50-75	sc	scl	-	-	>200	1-3	moderate	8.42	0.15	0.18	0.74	100
KBDhB2	866	150	WD	75-100	scl	gscl	-	35-60	<50	1-3	moderate	7.84	0.60	4.27	11.50	100
HSLcB2	866	150	MWD	75-100	sl	sc	-	-	101-150	1-3	moderate	7.16	0.11	5.94	4.90	97
ANRiB2	866	150	MWD	100-150	sc	c	-	-	>200	1-3	moderate	10.17	0.36	7.08	19.90	100
MDRhB2	866	150	WD	>150	scl	scl	-	-	>200	1-3	moderate	8.31	0.33	0.90	20.57	100
KDHiA1	866	150	MWD	75-100	sc	sc	-	-	101-150	0-1	slight	8.22	0.19	2.71	12.26	100
SGRcB2	866	150	MWD	100-150	sl	c	-	-	>200	1-3	moderate	8.3	6.49	11.61	34.77	100
SGRiB2	866	150	MWD	50-75	sc	c	-	-	>200	1-3	moderate	8.3	6.49	11.61	34.77	100
SGRiA1	866	150	MWD	>150	sc	c	-	-	>200	0-1	slight	8.3	6.49	11.61	34.77	100

Table 7.2 Land suitability criteria for Sorghum

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

Table 7.3 Land suitability criteria for Maize

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

Table 7.4 Land suitability criteria for Bajra

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

Table 7.5 Land suitability criteria for Groundnut

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

Table 7.6 Land suitability criteria for Sunflower

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

Table 7.7 Land suitability criteria for Redgram

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

Table 7.8 Land suitability criteria for Bengal gram

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

Table 7.9 Land suitability criteria for Cotton

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

Table 7.10 Land suitability criteria for Chilli

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

Table 7.11 Land suitability criteria for Tomato

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

Table 7.12 Land suitability criteria for Brinjal

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

Table 7.13 Land suitability criteria for 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 7.14 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 7.15 Land suitability criteria for Drumstick

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

Table 7.16 Land suitability criteria for Mango

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

Table 7.17 Land suitability criteria for Guava

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

Table 7.18 Land suitability criteria for Sapota

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

Table 7.19 Land suitability criteria for Pomegranate

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

Table 7.20 Land suitability criteria for Musambi

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

Table 7.21 Land suitability criteria for Lime

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

Table 7.22 Land suitability criteria for Amla

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

Table 7.23 Land suitability criteria for Cashew

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

Table 7.24 Land suitability criteria for Jackfruit

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

Table 7.25 Land suitability criteria for Jamun

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

Table 7.26 Land suitability criteria for Custard apple

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

Table 7.27 Land suitability criteria for Tamarind

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

Table 7.28 Land suitability criteria for Mulberry

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

Table 7.29 Land suitability criteria for Marigold

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

Table 7.30 Land suitability criteria for Chrysanthemum

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

7.30 Land Management Units (LMUs)

The 20 soil map units identified in Haligeri-2 microwatershed have been grouped into 7 Land Management Units (LMU's) for the purpose of preparing a Proposed Crop Plan. Land Management Units are grouped based on the similarities in respect of the type of soil, the depth of the soil, the surface soil texture, gravel content, AWC, slope, erosion etc. and a Land Management Units map (Fig. 7.30) has been generated. These Land Management Units are expected to behave similarly for a given level of management.

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

LMU	Soil map units	Soil and site characteristics
1	141.SGRcB2 143.SGRiB2 157.KDHiA1 158.SGRiA1	Moderately deep to very deep soils (75 to >150 cm), 0-3% slopes, non-gravelly (<15 %), slight to moderate erosion.
2	32.HSLcB2 55.ANRiB2 132.MDRhB2	Moderately deep to very deep soils (75 to >150 cm), 1-3 % slopes, non-gravelly (<15%), moderate erosion.
3	130.KBDhB2	Moderately deep soils (75 to 100 cm), 1-3% slopes, non-gravelly (<15%), moderate erosion.
4	27.YLRbB2 28.YLRbB3 29.YLRcB2g1	Moderately shallow soils (50 to 75 cm), 1-3 % slopes, non-gravelly to gravelly (<15 to 35%), moderate to severe erosion.
5	12.SBRcC3g1 15.HLGbB3 16.HLGcB2 20.JNKcB2 22.JNKiB2 26.DPLiB2	Moderately shallow soils (50 to75 cm), 1-3 % slopes, non-gravelly (<15%), moderate erosion.
6	107.DSBhB2 121.DSBcB2	Shallow soils (25 to50 cm), 1-3 % slopes, non-gravelly (<15%), moderate erosion.
7	119.BDPiB3	Very shallow soils (<25 cm), 1-3 % slopes, non-gravelly (15%), severe erosion.

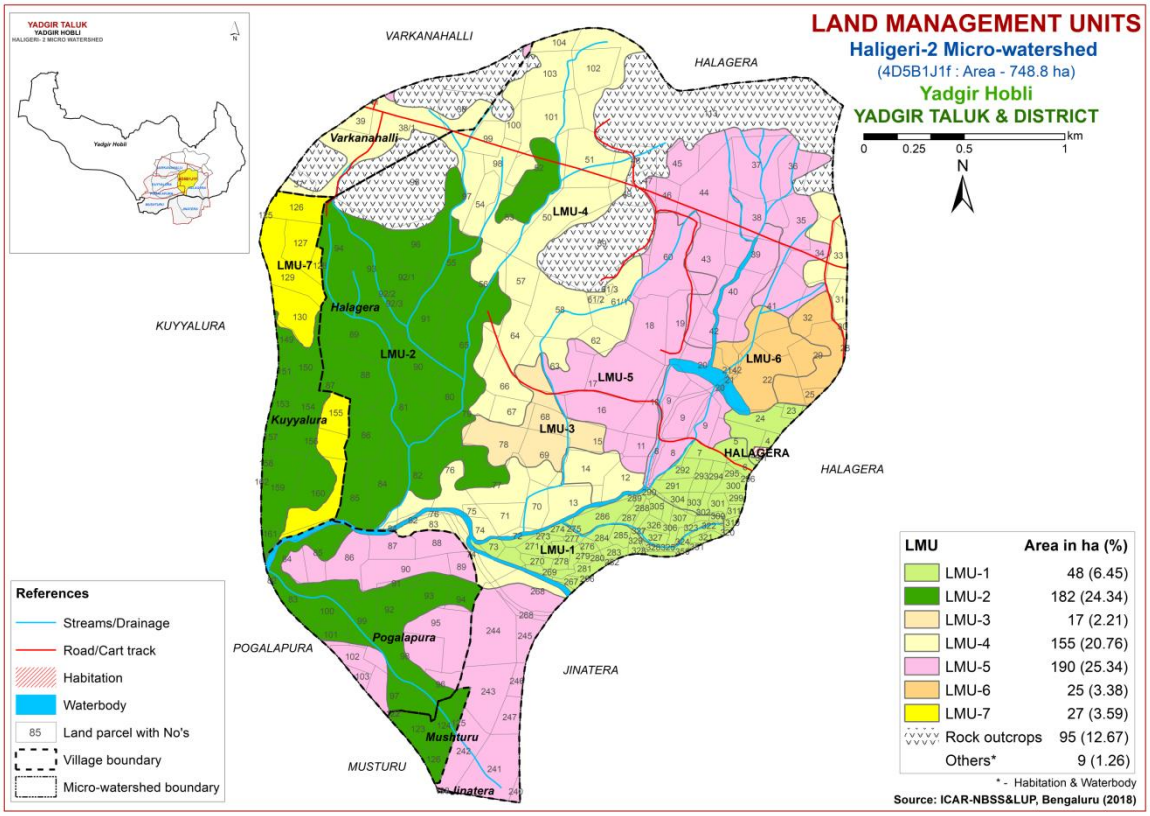


Fig. 7.30 Land Management Units Map- Haligeri-2 microwatershed

7.31 Proposed Crop Plan for Haligeri-2 microwatershed

After assessing the land suitability for the 29 crops, the Proposed Crop Plan has been prepared for the 7 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 29 crops. The resultant proposed crop plan is presented below in Table 7.31.

Table 7.31 Proposed Crop Plan for Haligeri-2 microwatershed

LMU	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
1	141.SGRcB2 143.SGRiB2 157.KDHiA1 158.SGRiA1 (Moderately deep to very deep, lowland sandy clay to clay soils)	**Halagera:**4,5,6,7,23,24,72,73,266,267,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,299,300,301,302,303,304,305,306,307,308,309,310,311,312,320,321,322,323,324,325,326, 327, 328,329,350,351	Sorghum, maize, cotton, Bajra	**Fruit crops:** Custard Apple, Amla **Vegetable crops:** Brinjal, Tomato, Chillies, Drumstick, Coriander **Flower crops:** Marigold, Chrysanthemum, Jasmine	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practices
2	32.HSLcB2 55.ANRiB2 132.MDRhB2 (Moderately deep to very deep, black sandy clay to clay soils)	**Halagera:**52,55,56,65,79,80,81,82,84,85,86,87,88,89,90,91,92/1,92/2, 92/3,93,94,96 **Kuyyalura:**122,123,124,125,149,150,151,153,154,156,157,158,159,160, 161,162 **Pogalapura:**82,83,85,91,92,93, 94,96,97,98, 99, 100,101	Sunflower, Sorghum, Maize, Soybean, Cotton, Bengal gram, Safflower, Linseed, Bajra	**Fruit crops:** Pomegranate, Lime, Musambi, Tamarind, Jamun, Amla, Custard apple **Vegetables:** Drumstick, Chilli, Bhendi, Cluster bean, Coriander **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
3	130.KBDhB2 (Moderately deep, red gravelly clay soils)	**Halagera :** 15,68,69,78	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)
4	27.YLRbB2 28.YLRbB3 29.YLRcB2g1 (Moderately shallow, red clay soils	**Halagera:**12,13,14,244,268,30,31,33,34,50,51,53,54,57,58,61/1,61/2,61/3,62,64,66,67,70,71,74,75,76,77,83,97,98,99,100,101,102, 103,104	Sorghum, Maize, Bajra, Red gram , Finger millet	Fruit crops: Amla, Custard apple **Vegetables:** Tomato, Chilli **Flowers:** Marigold, Chrysanthemum	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)

5	12.SBRcC3g1 15.HLGbB3 16.HLGcB2 20.JNKcB2 22.JNKiB2 26.DPLiB2 (Moderately shallow, black sandy clay to loamy sand soils)	**Halagera:**8,9,10,11,16,17,18,19,35,37,38,39,40,41,42,43,44,45,46,60,63 **Jinatera:**188,240,241,242,243,244,245,246,247,268 **Pogalapura:**84,86,87,88,89,90,95,102,103	Sorghum, Bajra, Coriander	**Fruit crops:** Amla, Custard apple **Vegetables:** Coriander, Bhendi **Flowers:** Marigold, Jasmine, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices
6	107.DSBhB2 121.DSBcB2 (Shallow, black gravelly clay soils)	**Halagera :** 22,25,28,29,32	Bengal gram	**Agri-Silvi-Pasture:** Hybrid Napier, *Styloxanthes hamata, Styloxanthes scabra*	Use of short duration varieties, sowing across the slope
7	119.BDPiB3 (Very shallow, black loamy soils)	**Kuyyalura:**126,127,128,129,130,155	-	Glyricidia, *Styloxanthes hamata, Styloxanthes scabra*	Sowing across the slope, drip irrigation and mulching is recommended

Chapter 8

SOIL HEALTH MANAGEMENT

8.1 Soil Health

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

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

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

The most important characteristics of a healthy soil are

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

Characteristics of Haligeri-2 microwatershed

- The soil phases identified in the microwatershed belonged to the soil series of SBR 36 ha (4.74%), BDP 27 ha (4%), ANR 34 ha (5%), DPL 34 ha (5%), YLR 156 ha (21%), DSB 25 ha (3%), JNK 58 ha (8%), HLG 62 ha (8%), KBD 17 ha (2%), HSL 114 ha (15%), MDR 34 ha (5%), KDH 14 ha (2%), SGR 35 ha (5%)
- As per land capability classification entire area of the microwatershed falls under arable land category (Class II, III &IV). The major limitations identified in the arable lands were soil, wetness/drainage and erosion, soil limitation and wetness.

- On the basis of soil reaction, about 3 ha (0.37%) is slightly acid (pH 6.0 -6.5), 181 ha (24%), area is neutral (pH 6.5 - 7.3), 130 ha (17%) slightly alkaline (pH 7.3-7.8), 143 ha (19%) is moderately alkaline (pH 7.8-8.4), 128 ha (17%) is strongly alkaline (pH 8.4-9.0) and 59 ha (8%) is very strongly alkaline (pH 8.4 - >9.0).
- **Soil Health Management**

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

Acid soils

Slightly acid soils cover small area of about 3 ha

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

Liming materials:

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

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

Alkaline soils

Slightly alkaline to very strongly alkaline soils cover about 460 ha area

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

Neutral soils

Neutral soil cover about 181 ha area in the microwatershed

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

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

Soil Degradation

Soil erosion is one of the major factor affecting the soil health in the microwatershed. Out of total 749 ha area in the microwatershed, an area of about 613 ha is suffering from moderate to severe erosion. These areas need immediate soil and water conservation and, other land development and land husbandry practices for restoring soil health.

Dissemination of Information and Communication of Benefits

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

Inputs for Net Planning (Saturation Plan) and Interventions needed

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

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

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

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

erosion; such soils can be improved by sand mulching. The technology that is developed by the AICRP-Dryland Agriculture, Vijayapura, Karnataka can be adopted.

- **Gravelliness:** More gravel content is favorable for run-off harvesting but poor in soil moisture storage and nutrient availability. It is a significant parameter that decides the kind of crop to be raised.
- **Land Capability Classification:** The land capability map shows the areas suitable and not suitable for agriculture and the major constraints in each of the plot/survey number. Hence, one can decide what kind of enterprise is possible in each of these units. In general, erosion, wetness and soil are the major constraints in Haligeri-2 microwatershed.
- **Organic Carbon:** The OC content (an index of available Nitrogen) is high in (>0.75%) in about 92 ha (12%), medium (0.5-0.75%) in 553 ha (74%). 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 tonnes/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 372 ha area where OC to medium (<0.5-0.75%). For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg/ha needs to be applied for all the crops grown in these plots.
- **Available Phosphorus**: Available Phosphorus is low (<23 kg/ha) in an area of 573 ha (76%) and medium (23-57 kg/ha) in 72 ha (10%) of the microwatershed. For all the crops 25% additional P needs to be applied where available P is low and medium.
- **Available Potassium:** Available potassium is low (<145 kg/ha) in an area of 194 ha (26%) and medium (145-337 kg/ha) in maximum area of 451 ha (60%) of the microwatershed. All the plots, where available potassium is low and medium, for all the crops, additional 25 % potassium may be applied.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops. It is high in 223ha (30%), medium in 369 ha (49%) and low in 223 ha (30%). Low and medium areas need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Boron:** An area of 572 ha (76%) is low and 72 ha (10%) medium. For these areas, application of sodium borate @ 10 kg/ha as soil application or 0.2 % borax as foliar spray is recommended.
- **Available Iron:** Entire area of 644 ha (86%) is sufficient in available iron in the microwatershed. For the deficient areas, iron sulphate @ 25 kg/ha need to be applied for 2-3 years.

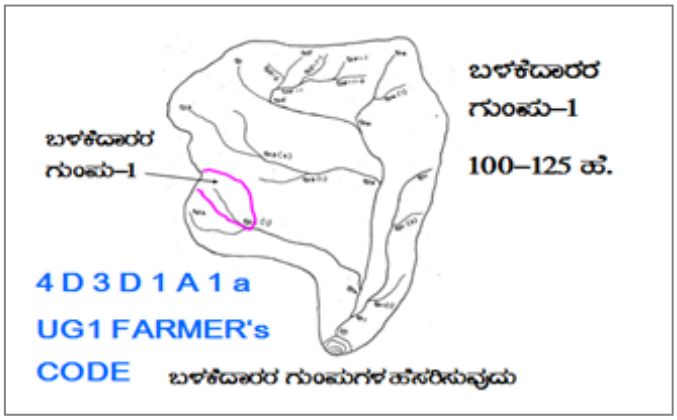
- **Available Zinc:** Entire area of the microwatershed is deficient in available zinc content. Application of zinc sulphate @25 kg/ha is to be recommended for the deficient areas.
- **Soil Alkalinity:** The microwatershed has 460 ha (61%) area with soils that are slightly to very strongly alkaline. These areas need application of gypsum and wherever calcium is in excess, iron pyrites and element sulphur can be recommended. Management practices like treating repeatedly with good quality water to drain out the excess salts and provision of subsurface drainage and growing of salt tolerant crops like Casuarina, Acasia, Neem, Beretc, are recommended.
- **Land Suitability for various crops:** Areas that are highly, moderately and marginally suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, rooting depth and salinity/alkalinity are the major constraints in various plots. With suitable management interventions, the productivity can be enhanced. In order to increase the water holding capacity of light textured soils, growing of green manure crops and application of organic manure is recommended.

Chapter 9

SOIL AND WATER CONSERVATION TREATMENT PLAN

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

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



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

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

Steps for Survey and Preparation of Treatment Plan

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

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

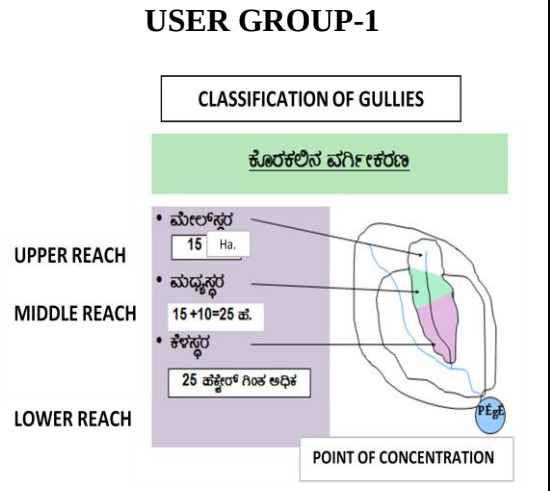
9.1 Treatment Plan

The treatment plan recommended for arable lands is briefly described below

9.1.1 Arable Land Treatment

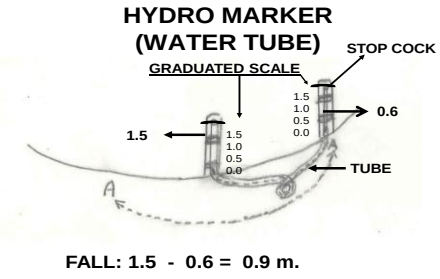
A. BUNDING

Steps for Survey and Preparation of Treatment Plan	
• 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.

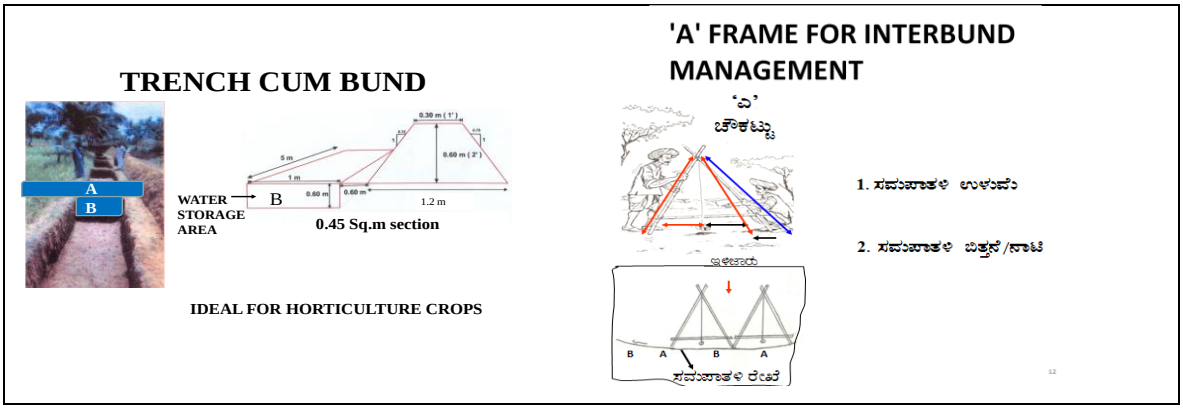
Recommended Bund Section

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

Formation of Trench cum Bund

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

Details of Borrow Pit dimensions are given below:



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

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

B. Water Ways

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

C. Farm Ponds

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

D. Diversion Channel

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

9.1.2 Non-Arable Land Treatment

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

9.1.3 Treatment of Natural Water Course/ Drainage Lines

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

9.2 Recommended Soil and Water Conservation Measures

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

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

A map (Fig. 9.1) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. An area of about 243 ha (32%) needs Trench cum bunding, 369 ha (49%) needs Graded bunding and 32 ha requires strengthening of existing bunds.

The conservation plan prepared may be presented to all the stakeholders including farmers and after considering their suggestions, the conservation plan for the microwatershed may be finalised in a participatory approach.

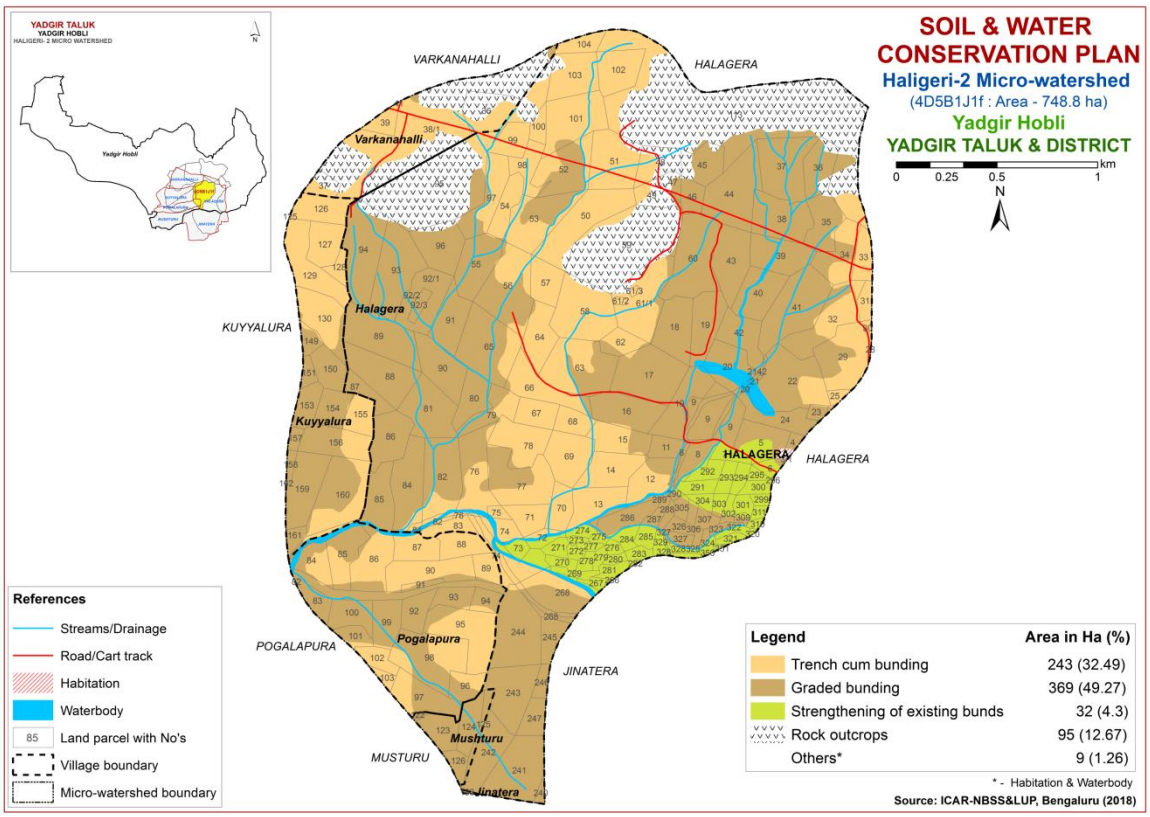


Fig. 9.1 Soil and Water Conservation Plan map of Haligeri-2 microwatershed.

9.3 Greening of Microwatershed

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

It is recommended to open pits during the 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 Nerale (*Sizyziumcumini*) and Bamboo. Dry areas are to be planted with species like Honge, Bevu, Seetaphal *etc*.

Dry Deciduous Species			Temp (°C)	Rainfall (mm)
1.	Bevu	*Azadiractaindica*	21–32	400 –1,200
2.	Tapasi	*Holopteliaintegrifolia*	20-30	500 - 1000
3.	Seetaphal	*AnonaSquamosa*	20-40	400 - 1000
4.	Honge	*Pongamiapinnata*	20 -50	500– 2,500
5.	Kamara	*Hardwikiabinata*	25 -35	400 - 1000
6.	Bage	*Albezzialebbek*	20 - 45	500 - 1000
7.	Ficus	*Ficusbengalensis*	20 - 50	500–2,500
8.	Sisso	*DalbargiaSissoo*	20 - 50	500 -2000
9.	Ailanthus	*Ailanthus excelsa*	20 - 50	500 - 1000
10.	Hale	*Wrightiatinctoria*	25 - 45	500 - 1000
11.	Uded	*Steriospermumchelanoides*	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	*Tectonagrandis*	20 - 50	500-5000
16.	Nandi	*Legarstroemialanceolata*	20 - 40	500 - 4000
17.	Honne	*Pterocarpus marsupium*	20 - 40	500 - 3000
18.	Mathi	*Terminalia alata*	20 -50	500 - 2000
19.	Shivane	*Gmelinaarboria*	20 -50	500 -2000
20.	Kindal	*T.Paniculata*	20 - 40	500 - 1500
21.	Beete	*Dalbargialatifolia*	20 - 40	500 - 1500
22.	Tare	*T. belerica*	20 - 40	500 - 2000
23.	Bamboo	*Bambusaarundinasia*	20 - 40	500 - 2500
24.	Bamboo	*Dendrocalamusstrictus*	20 – 40	500 – 2500
25.	Muthuga	*Butea monosperma*	20 - 40	400 - 1500
26.	Hippe	*Madhucalatifolia*	20 - 40	500 - 2000
27.	Sandal	*Santalum album*	20 - 50	400 - 1000
28.	Nelli	*Emblica officinalis*	20 - 40	500 - 2000
29.	Nerale	*Sizyziumcumini*	20 - 40	500 - 2000
30.	Dhaman	*Greviatilifolia*	20 - 40	500 - 2000
31.	Kaval	*Careyaarborea*	20 - 40	500 - 2000
32.	Harada	*Terminalia chebula*	20 - 40	500 - 2000

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Appendix I

Haligeri-2 Microwatershed

Soil Phase Information

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Halagera	3/1	0.01	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Halagera	4	0.7	SGRcB2	LMU-1	Very deep (>150 cm)	Sandy loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Habitation	Not Available	IIws	Graded bunding
Halagera	5	4.13	SGRcB2	LMU-1	Very deep (>150 cm)	Sandy loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIws	Graded bunding
Halagera	6	0.94	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	7	1.22	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Redgram (Rg)	Not Available	IIws	Graded bunding
Halagera	8	2.43	JNKiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Scrub land (Sl)	Not Available	IIes	Graded bunding
Halagera	9	5.53	JNKiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	10	4.77	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Halagera	11	1.66	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Halagera	12	4.23	YLRbB2	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	TCB
Halagera	13	4.3	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Fallow land (Fl)	Not Available	IIIes	TCB
Halagera	14	4.43	YLRbB2	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	TCB
Halagera	15	3.81	KBDhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	16	5.23	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	17	7.82	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	18	5	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	19	4.64	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	20	4.21	Waterbody	Others	Others	Others	Others	Others	Others	Others	Redgram (Rg)	Not Available	Others	Others
Halagera	21	0.18	Waterbody	Others	Others	Others	Others	Others	Others	Others	Cotton (Ct)	Not Available	Others	Others
Halagera	22	9.09	DSBcB2	LMU-6	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	23	0.67	SGRcB2	LMU-1	Very deep (>150 cm)	Sandy loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIws	Graded bunding
Halagera	24	3.45	SGRcB2	LMU-1	Very deep (>150 cm)	Sandy loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIws	Graded bunding
Halagera	25	0.58	DSBhB2	LMU-6	Shallow (25-50 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IVes	TCB

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Halagera	28	0.03	DSBhB2	LMU-6	Shallow (25-50 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IVes	TCB
Halagera	29	6.83	DSBhB2	LMU-6	Shallow (25-50 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IVes	TCB
Halagera	30	0.34	YLRbB2	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	TCB
Halagera	31	1.19	YLRbB2	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	TCB
Halagera	32	6.37	DSBhB2	LMU-6	Shallow (25-50 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IVes	TCB
Halagera	33	2.13	YLRbB2	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	TCB
Halagera	34	4.42	YLRbB2	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	35	4.02	HLGcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Halagera	36	3.68	HLGcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	37	7.09	HLGcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	38	5.79	HLGcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	39	4.78	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Jowar (Jw)	Not Available	IIIes	Graded bunding
Halagera	40	4.68	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Jowar (Jw)	Not Available	IIIes	Graded bunding
Halagera	41	8.44	HLGcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	42	3.85	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	Graded bunding
Halagera	43	5.49	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	Graded bunding
Halagera	44	7.88	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Jowar+Redgram (Jw+Rg)	Not Available	IIIes	Graded bunding
Halagera	45	3.47	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	46	1.78	HLGbB3	LMU-5	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	47	1.05	RO	RO	RO	RO	RO	RO	RO	RO	Redgram (Rg)	Not Available	RO	RO
Halagera	48	3.25	RO	RO	RO	RO	RO	RO	RO	RO	Redgram (Rg)	Not Available	RO	RO
Halagera	49	2.11	RO	RO	RO	RO	RO	RO	RO	RO	Redgram (Rg)	Not Available	RO	RO
Halagera	50	7.9	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	51	6.43	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	52	6.19	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Halagera	53	6.66	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	54	2.77	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	55	5.15	HSLcB2	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	Graded bunding
Halagera	56	8.32	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	57	3.1	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	TCB
Halagera	58	7.99	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Halagera	59	15.85	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not Available	RO	RO
Halagera	60	8.36	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Halagera	61/1	7.54	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	61/2	0.23	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	61/3	0.22	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	62	2.13	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	TCB
Halagera	63	8.34	JNKcB2	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	64	4.13	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton+Jowar (Ct+Jw)	Not Available	IIes	TCB
Halagera	65	8.32	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Halagera	66	4.79	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	TCB
Halagera	67	2.65	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Halagera	68	2.1	KBDhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	69	4.98	KBDhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	70	2.49	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Fallow land (Fl)	Not Available	IIIes	TCB
Halagera	71	2.5	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	72	1.27	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	73	0.93	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	74	4.95	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton+Paddy+Redgram (Ct+Pd+Rg)	Not Available	IIIes	TCB
Halagera	75	0.59	YLRbB3	LMU-4	Moderately shallow	Loamy sand	Non gravelly	Low (51-100	Very gently	Severe	Cotton (Ct)	Not Available	IIIes	TCB

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
					(50-75 cm)		(<15%)	mm/m)	sloping (1-3%)					
Halagera	76	6.15	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	77	7.2	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	78	4.86	KBDhB2	LMU-3	Moderately deep (75-100 cm)	Sandy clay loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	79	3.24	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	80	3.24	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Halagera	81	6.04	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	82	7.22	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	83	1.68	YLRbB3	LMU-4	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	TCB
Halagera	84	6.28	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	85	4.19	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	86	4.48	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	87	1.94	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	88	6.06	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	89	7.16	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	90	4.89	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Halagera	91	4.18	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Halagera	92/1	4.78	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	Graded bunding
Halagera	92/2	0.1	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	Graded bunding
Halagera	92/3	0.87	HSLcB2	LMU-2	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	Graded bunding
Halagera	93	7.92	HSLcB2	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	Graded bunding
Halagera	94	8.17	HSLcB2	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	Graded bunding
Halagera	95	20.49	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not Available	RO	RO
Halagera	96	4.88	HSLcB2	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	Graded bunding
Halagera	97	4.78	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB

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
Halagera	98	2.64	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	99	2.56	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	100	1.19	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Halagera	101	6.77	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	102	4.25	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	TCB
Halagera	103	5	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Halagera	104	1.74	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Halagera	113	47.13	RO	RO	RO	RO	RO	RO	RO	RO	RO	Not Available	RO	RO
Halagera	240	0.44	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	241	7.37	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	242	4.69	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	243	6.07	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	244	7.88	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Groundnut+Paddy (Gn+Pd)	Not Available	IIIes	Graded bunding
Halagera	245	2.09	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	246	1.02	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	247	2.05	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	266	0	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	267	0.6	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	268	5.86	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Halagera	269	0.82	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	270	0.79	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	271	0.96	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	272	0.55	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	273	0.33	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding

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
Halagera	274	0.8	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	275	0.44	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	276	0.54	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	277	0.5	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	278	0.68	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	279	0.54	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	280	0.48	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	281	0.99	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	282	0.09	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	283	0.78	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	284	1.02	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	285	0.99	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	286	2.78	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	287	0.64	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	288	0.59	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	289	0.29	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	290	0.38	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	291	1.28	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	292	1.26	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	293	1.16	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	294	0.98	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	295	0.51	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	296	0	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	299	0.54	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Halagera	300	0.99	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	301	0.88	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	302	0.49	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	303	0.7	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	304	0.77	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	305	0.73	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	306	0.54	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	307	0.95	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	308	0.22	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	309	0.35	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	310	0.33	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	311	0.46	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	312	0	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	320	0.1	KDHiA1	LMU-1	Moderately deep (75-100 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	321	0.58	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	322	0.73	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	323	0.39	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	324	0.75	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	325	0.5	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	326	0.84	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	327	0.78	SGRiB2	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIws	Graded bunding
Halagera	328	0.42	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	329	1.08	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Halagera	350	0.02	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding

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
Halagera	351	0.12	SGRiA1	LMU-1	Very deep (>150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Paddy (Pd)	Not Available	IIw	Graded bunding
Jinatera	188	0.07	SBRcC3g1	LMU-5	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Very low (<50 mm/m)	Gently sloping (3-5%)	Severe	Jowar (Jw)	Not Available	IIIes	Graded bunding
Kuyyalura	125	0.01	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IVes	TCB
Kuyyalura	126	3.57	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IVes	TCB
Kuyyalura	127	3.39	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IVes	TCB
Kuyyalura	128	1.12	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IVes	TCB
Kuyyalura	129	5.7	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IVes	TCB
Kuyyalura	130	5.27	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IVes	TCB
Kuyyalura	149	1.19	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kuyyalura	150	2.83	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Kuyyalura	151	0.89	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kuyyalura	153	2.31	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kuyyalura	154	2.7	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kuyyalura	155	2.48	BDPiB3	LMU-7	Very shallow (<25 cm)	Sandy clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IVes	TCB
Kuyyalura	156	4.71	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kuyyalura	157	0.7	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kuyyalura	158	0.6	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram (Fl+Rg)	Not Available	IIes	Graded bunding
Kuyyalura	159	5.58	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kuyyalura	160	8.11	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kuyyalura	161	0.95	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Redgram (Fl+Rg)	Not Available	IIes	Graded bunding
Kuyyalura	162	0	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Mushturu	122	0.1	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Mushturu	123	2.75	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding

Village	Survey No	Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Mushturu	124	2.66	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Mushturu	125	1.06	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Mushturu	126	1.25	ANRiB2	LMU-2	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIes	Graded bunding
Pogalapura	82	0.04	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Scrubland+Fallow land (Sl+Fl)	Not Available	IIe	Graded bunding
Pogalapura	83	1.82	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIe	Graded bunding
Pogalapura	84	2.91	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Pogalapura	85	4.09	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIe	Graded bunding
Pogalapura	86	5.2	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land+Paddy (Fl+Pd)	Not Available	IIes	TCB
Pogalapura	87	2.99	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Pogalapura	88	2.77	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Pogalapura	89	1.73	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Pogalapura	90	5.14	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Pogalapura	91	0.61	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIe	Graded bunding
Pogalapura	92	2.48	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIe	Graded bunding
Pogalapura	93	1.94	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIe	Graded bunding
Pogalapura	94	1.54	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIe	Graded bunding
Pogalapura	95	6.95	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	TCB
Pogalapura	96	2.21	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIe	Graded bunding
Pogalapura	97	4.62	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIe	Graded bunding
Pogalapura	98	8.23	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton+Paddy (Ct+Pd)	Not Available	IIe	Graded bunding
Pogalapura	99	3.15	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIe	Graded bunding
Pogalapura	100	3	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Fallow land (Fl)	Not Available	IIe	Graded bunding
Pogalapura	101	1.51	MDRhB2	LMU-2	Very deep (>150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIe	Graded bunding
Pogalapura	102	1.74	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB

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
Pogalapura	103	0.66	DPLiB2	LMU-5	Moderately shallow (50-75 cm)	Sandy clay	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	TCB
Varkanahalli	36	4.28	RO	RO	RO	RO	RO	RO	RO	RO	Redgram+Greengram (Rg+Gg)	Not Available	RO	RO
Varkanahalli	37	1.53	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Scrub land (Sl)	Not Available	IIes	TCB
Varkanahalli	38/1	25.82	RO	RO	RO	RO	RO	RO	RO	RO	Greengram+Redgram+Groundnut+Paddy (Gg+Rg+Gn+Pd)	Not Available	RO	RO
Varkanahalli	39	1.54	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	TCB
Varkanahalli	41	0.05	YLRcB2g1	LMU-4	Moderately shallow (50-75 cm)	Sandy loam	Gravelly (15-35%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Greengram+Groundnut+Cotton (Gg+Gn+Ct)	Not Available	IIes	TCB

Appendix II

Haligeri2 Microwatershed

Soil Fertility Information

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Halagera	3/1	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Halagera	4	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	5	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	6	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	7	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	8	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	9	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	10	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	11	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	12	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	13	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	14	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	15	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	16	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	17	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	18	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	19	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	20	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Halagera	21	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Halagera	22	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	23	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	24	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	25	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	28	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Halagera	29	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	30	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	31	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	32	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	33	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	34	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	35	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	36	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	37	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	38	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	39	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	40	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	41	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	42	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	43	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	44	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	45	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	46	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	47	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Halagera	48	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Halagera	49	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Halagera	50	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	51	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	52	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	53	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	54	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Halagera	55	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	56	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	57	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	58	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	59	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Halagera	60	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	61/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	61/2	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	61/3	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	62	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	63	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	64	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	65	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	66	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	67	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	68	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	69	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	70	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	71	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	72	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	73	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	74	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	75	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	76	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	77	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Halagera	78	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	79	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	80	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	81	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	82	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	83	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	84	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	85	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	86	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	87	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Halagera	88	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	89	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	90	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	91	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	92/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	92/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	92/3	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	93	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	94	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Halagera	95	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Halagera	96	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	97	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	98	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	99	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	100	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Halagera	101	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	102	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	103	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	104	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	113	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Halagera	240	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	241	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	242	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	243	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	244	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	245	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	246	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	247	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	266	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	267	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	268	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	269	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	270	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	271	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	272	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	273	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	274	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	275	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	276	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	277	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Halagera	278	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	279	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	280	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	281	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	282	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	283	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	284	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	285	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	286	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	287	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	288	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	289	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	290	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	291	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	292	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	293	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	294	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	295	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	296	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	299	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	300	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	301	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	302	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	303	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	304	Strongly alkaline	Non saline	High (> 0.75	Medium (23 –	Medium (145 –	Medium (10 –	Medium (0.5	Sufficient	Sufficient (>	Sufficient (>	Deficient (<

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		(pH 8.4 – 9.0)	(<2 dsm)	%)	57 kg/ha)	337 kg/ha)	20 ppm)	– 1.0 ppm)	(>4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Halagera	305	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	306	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	307	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	308	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	309	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	310	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	311	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	312	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	320	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	321	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	322	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	323	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	324	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	325	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	326	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	327	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	328	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	329	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	350	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Halagera	351	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Jinatera	188	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	125	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	126	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	127	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Kuyyalura	128	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	129	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	130	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	149	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	150	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	151	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	153	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	154	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	155	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Kuyyalura	156	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	157	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	158	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	159	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	160	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	161	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kuyyalura	162	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Mushturu	122	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Mushturu	123	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Mushturu	124	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Mushturu	125	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Mushturu	126	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	82	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	83	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	84	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	85	Neutral (pH 6.5 –	Non saline	Medium (0.5 –	Low (< 23	Low (<145	Medium (10 –	Low (< 0.5	Sufficient	Sufficient (>	Sufficient (>	Deficient (<

Village	Survey No	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		7.3)	(<2 dsm)	0.75 %)	kg/ha)	kg/ha)	20 ppm)	ppm)	(>4.5 ppm)	1.0 ppm)	0.2 ppm)	0.6 ppm)
Pogalapura	86	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	87	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	88	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	89	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	90	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	91	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	92	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	93	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	94	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	95	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	96	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	97	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	98	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	99	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	100	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	101	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	102	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Pogalapura	103	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Varkanahalli	36	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Varkanahalli	37	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 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)
Varkanahalli	38/1	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO
Varkanahalli	39	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Varkanahalli	41	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Low (<145 kg/ha)	High (> 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Appendix III

Haligeri2 Microwatershed

Soil Suitability Information

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Halagera	3/1	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
Halagera	4	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	5	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	6	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	7	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	8	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	9	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	10	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	11	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	12	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	13	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	14	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	15	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S2g	S2g	S2g
Halagera	16	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	17	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	18	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	19	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	20	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Halagera	21	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Halagera	22	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3rt	N1r	S3r	S3r	N1r	S3r	N1rt	N1r	N1r	S3rt	S3rg	S3r	S3r	S3r	S3r	N1r	S3r	S3rg	S3rg	N1r	N1r
Halagera	23	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	24	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	25	N1rg	S3rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	S3rg	N1rg	S3rg	S3rg	N1rg	S3rg	N1rt	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Halagera	28	N1rg	S3rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	S3rg	N1rg	S3rg	S3rg	N1rg	S3rg	N1rt	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Halagera	29	N1rg	S3rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	S3rg	N1rg	S3rg	S3rg	N1rg	S3rg	N1rt	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Halagera	30	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Halagera	31	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	32	N1rg	S3rg	N1rg	S3rg	N1rg	S3rg	N1rg	N1rg	S3rg	N1rg	S3rg	S3rg	N1rg	S3rg	N1rt	N1rg	N1rg	S3rg	S3rg	S3rg	S3rg	S3rg	S3rg	N1rg	S3rg	S3rg	S3rg	N1rg	N1rg
Halagera	33	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	34	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	35	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	36	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	37	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	38	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	39	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	40	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	41	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	42	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	43	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	44	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	45	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	46	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	N1tz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Halagera	47	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
Halagera	48	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
Halagera	49	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
Halagera	50	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	51	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	52	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	53	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	54	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	55	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	56	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	57	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	58	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	59	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO	RO

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Halagera	60	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	61/1	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	61/2	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	61/3	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	62	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	63	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	64	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	65	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	66	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	67	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	68	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S2g	S2g	S2g
Halagera	69	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S2g	S2g	S2g
Halagera	70	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	71	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	72	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	73	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	74	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	75	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	76	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	77	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	78	S3rg	S3g	S3g	S3g	S3g	S3g	S3rg	S3g	S3g	S3g	S3g	S2g	S3g	S2g	S3g	S3rg	S3g	S2g	S2g	S3g	S3g	S3g	S3g	S3g	S2g	S2g	S2g	S2g	S2g
Halagera	79	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	80	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	81	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	82	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	83	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	84	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	85	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	86	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Halagera	87	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	88	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	89	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	90	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	91	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	92/1	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	92/2	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	92/3	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	93	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	94	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	95	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
Halagera	96	S3rz	S2tz	S2rz	S2tz	S2rz	S3tz	S3rz	S2rz	S3tz	S2rz	S2rz	S2tz	S2rz	S1	N1tz	S3rz	S2rz	S2z	S1	S2z	S2z	S2z	S2z	S2rz	S2z	S2t	S1	S2rz	S2rz
Halagera	97	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	98	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	99	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	100	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	101	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	102	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	103	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	104	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Halagera	113	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
Halagera	240	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	241	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	242	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	243	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	244	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	245	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	246	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	247	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Halagera	266	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	267	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	268	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t
Halagera	269	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	270	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	271	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	272	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	273	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	274	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	275	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	276	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	277	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	278	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	279	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	280	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	281	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	282	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	283	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	284	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	285	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	286	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	287	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	288	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	289	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	290	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	291	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	292	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	293	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	294	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Halagera	295	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	296	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	299	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	300	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	301	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	302	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	303	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	304	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	305	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	306	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	307	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	308	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	309	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	310	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	311	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	312	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	320	S3tw	S2tw	S3tw	S1	S3tw	S2r	S2tw	S2w	S1	S1	S2tw	S2tw	S3tw	S1	N1tz	S2tw	S2w	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	321	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	322	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	323	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	324	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	325	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	326	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	327	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S1	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S2t	S2t	S2tw	S3tw
Halagera	328	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	329	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	350	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Halagera	351	S3tw	S2tw	S3tw	S1	S3tw	S1	S2tw	S2w	S1	S2w	S3tw	S1	S3tw	S1	N1tw	S2tw	S2w	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2tw	S2t	S1	S1	S2tw	S3tw
Jinatera	188	N1r	S3t	S3rt	S3t	S3rt	N1t	N1r	S3rt	N1t	S3t	S3t	S3t	S3rt	S3t	S3rt	S3rt	S3rt	S3t	S3t	S3t	S3t	S3t	S3t	S3rt	S3t	S3t	S3t	S3t	S3t

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Kuyyalura	125	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	126	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	127	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	128	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	129	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	130	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	149	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	150	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	151	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	153	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	154	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	155	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r	N1r
Kuyyalura	156	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	157	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	158	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	159	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	160	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	161	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Kuyyalura	162	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Mushturu	122	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Mushturu	123	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Mushturu	124	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Mushturu	125	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Mushturu	126	S3tz	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S2t	S3t	S1	N1t	S2t	S1	S3tw	S1	S2tw	S2tw	S2tw	S2tw	S2t	S2tz	S2t	S2t	S2tw	S3tw
Pogalapura	82	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	83	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	84	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	85	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	86	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz

Village	Survey No	Mango	Maize	Sapota	Sorghum	Guava	Cotton	Tamarind	Lime	Bengal gram	Sunflower	Red gram	Amla	Jackfruit	Custard-apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulberry
Pogalapura	87	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	88	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	89	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	90	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	91	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	92	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	93	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	94	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	95	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	96	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	97	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	98	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	99	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	100	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	101	S3tz	S2tw	S3t	S1	S3t	S2z	S2t	S2z	S1	S2zw	S2tw	S2t	S3t	S1	N1t	S2t	S2z	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2t	S2tz	S1	S1	S2tw	S3tw
Pogalapura	102	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Pogalapura	103	N1rz	S2rz	S3rz	S2rz	S3rz	S2rz	N1rz	S3rz	S2rz	S3rz	S3rz	S2rz	S3rz	S2rz	S3rz	S3rz	S3rz	S2rz	S2r	S2rz	S2rz	S2rz	S2rz	S3rz	S2rz	S2r	S2r	S3rz	S3rz
Varkanahalli	36	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
Varkanahalli	37	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Varkanahalli	38/1	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
Varkanahalli	39	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r
Varkanahalli	41	N1r	S2rg	S3r	S2rg	S3r	S2rg	N1r	S3r	S2rg	S3rg	S3rg	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2rg	S2rg	S2rg	S2rg	S3r	S2r	S2r	S2r	S3r	S3r

RO- Rock outcrops, TCB-Trench cum bunding

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

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Chapter 1

SALIENT FINDINGS OF THE SURVEY

- *The data on households sampled for socio economic survey indicated that 45 farmers were sampled in Haligeri-2 micro-watershed among them 1 (2.22 %) were landless, 15 (33.33 %) were marginal farmers, 16 (35.56 %) were small farmers, 10 (22.22 %) were semi medium farmers and 3 (6.67 %) were medium farmers.*
- *The data indicated that there were 126 (61.17 %) men and 80 (38.83 %) women among the sampled households. The average family size of landless farmers' was 3.25, marginal farmers' was 6.02, small farmers' was 4.54, semi medium farmers' was 4.5 and medium farmers' was 11.*
- *The data indicated that, 36 (17.48 %) people were in 0-15 years of age, 89 (43.20 %) were in 16-35 years of age, 71 (34.47 %) were in 36-60 years of age and 10 (4.85 %) were above 61 years of age.*
- *The results indicated that Haligeri-2had 49.03 per cent illiterates, 14.08 per cent of them had primary school, 2.43 per cent of them had middle school and Diploma, 13.59 per cent of them had high school education, 8.74 per cent of them had PUC, 0.49 per cent of them had ITI, 4.37 per cent of them had Degree education and 0.49 per cent of them had Masters education.*
- *The results indicate that, 88.89 per cent of household heads were practicing agriculture and 2.22 per cent of the household heads were agricultural labourers and Housewives.*
- *The results indicate that agriculture was the major occupation for 72.33 per cent of the household members, 2.43 per cent were agricultural labourers, 0.49 per cent were Artisans and Government Service, 1.94 per cent were private service, 16.50 per cent were Student, 1.94 per cent were housewives and 3.88 per cent were children.*
- *The results show that, 100 per cent of the population in the micro watershed has not participated in any local institutions.*
- *The results indicate that 8.89 per cent of the households possess Thatched house, 68.89 per cent of the households possess Katcha house and 24.44 per cent of them possess Pucca/RCC house.*
- *The results show that 62.22 per cent of the households possess TV, 24.44 per cent of the households possess mixer/grinder and Motor Cycle, 4.44 per cent of the households possess Refrigerator, 6.67 per cent of the households possess Auto, 2.22 per cent of the households possess Tempo and Car/Four Wheeler and 100 per cent of the households possess mobile phones.*
- *The results show that the average value of television was Rs. 5,985, mixer/grinder was Rs. 1,936, Refrigerator was Rs. 9,000, motor cycle was Rs. 60,909, Auto was*

Rs. 125,000, Tempo was Rs. 3,00,000, Car/Four Wheeler was Rs. 4,00,000 and mobile phone was Rs. 1,993.

- *About 11.11 per cent of the households possess Bullock Cart, 31.11 per cent of the households possess Plough, 31.11 2.22 per cent of the households possess Seed/Fertilizer Drill, Transplanter/Grinder and Tractor, 4.44 per cent of the households possess Harvester, 8.89 per cent of the households possess Sprinkler, 20 per cent of them possess Sprayer and 53.33 per cent of them possess weeder.*
- *The results show that the average value of bullock cart was Rs. 16,000, plough was Rs. 6,214, Seed/Fertilizer Drill was Rs. 2,000, Transplanter/Grinder was Rs. 650,000, Tractor was Rs. 500,000, sprayer was Rs. 4,411, sprinkler was Rs. 7,700 and the average value of weeder was Rs. 189.*
- *The results indicate that, 13.33 per cent of the households possess bullocks, 8.89 per cent of the households possess local cow, 2.22 per cent of the households possess Crossbred cow and Goat and 4.44 per cent of the households possess Buffalo.*
- *The results indicate that, average own labour men available in the micro watershed was 2.13, average own labour (women) available was 1.20, average hired labour (men) available was 8.04 and average hired labour (women) available was 7.62.*
- *In case of marginal farmers, average own labour men available was 2.53, average own labour (women) was 1.07, average hired labour (men) was 7.27 and average hired labour (women) available was 6.93. In case of small farmers, average own labour men available was 2.25, average own labour (women) was 1.44, average hired labour (men) was 7.38 and average hired labour (women) available was 6.75. In case of semi medium farmers, average own labour men available was 1.40, average own labour (women) was 1.10, average hired labour (men) was 10 and average hired labour (women) available was 9.60. In case of medium farmers, average own labour men available was 2.33 and average own labour (women) was 1, average hired labour (men) was 11.67 and average hired labour (women) available was 11.67.*
- *The results indicate that, 97.78 per cent of the households opined that the hired labour was adequate.*
- *The results show that, 0.97 per cent of the population in the micro watershed has migrated.*
- *The results show that, average distance of migration was 600 kms and average duration of migration was 12 months.*
- *The results show that, 100 per cent of the population has migrated for the purpose of job/wage/work.*
- *The results indicate that, households of the Haligeri-2 micro-watershed possess 42.36 ha (69.16 %) of dry land, 16.06 ha (26.22 %) of irrigated land, 2.83 ha*

(4.63 %) of Permanent Fallow land. Marginal farmers possess 7.31 ha (100 %) of dry land and. Small farmers possess 12.23 ha (68.22 %) of dry land and 5.70 ha (31.78 %) of irrigated land. Semi medium farmers possess 10.27 ha (48.12 %) of dry land and 8.24 ha (38.60 %) of irrigated land and 2.83 ha (13.28 %) of Permanent Fallow land. Medium farmers possess 12.55 ha (85.52 %) of dry land and 2.12 ha (14.48 %) of irrigated land.

- *The results indicate that, the average value of dry land was Rs. 464,924.52, the average value of irrigated land was Rs. 722,076.62 and the average value of Permanent Fallow land was Rs. 141,142.86. In case of marginal famers, the average land value was Rs. 1,530,935.25 for dry land. In case of small famers, the average land value was Rs. 408,669.76 for dry land and Rs. 894,673.30 for irrigated land. In case of semi medium famers, the average land value was Rs. 214,189.99 for dry land and Rs. 691,842.76 for irrigated land and the average value of Permanent Fallow land was Rs. 141,142.86. In case of medium farmers, the average land value was Rs. 103,580.65 for dry land and Rs. 376,380.95 for irrigated land.*
- *The results indicate that, there were 7 functioning bore wells in the micro watershed.*
- *The results indicate that, bore well was the major irrigation source in the micro watershed for 17.78 per cent of the farmers and Open Well was the major irrigation source in the micro watershed for 6.67 per cent of the farmers.*
- *The results indicate that, the depth of bore well was found to be 12.67 meters and the depth of Open Well was found to be 4.13 meters.*
- *The results indicate that, small, semi medium farmers and medium farmers had an irrigated area of 4.87 ha, 4.88 ha and 2.02 ha respectively.*
- *The results indicate that, farmers have grown cotton (22.88 ha), Groundnut (6.48 ha), green gram (5.29 ha), Paddy (11.19 ha), Sorghum (1.21 ha) and red gram (11.84 ha). Marginal farmers have grown red gram, Groundnut, cotton and green gram. Small farmers have grown cotton, Sorghum, red gram, green gram and paddy. Semi medium farmers have grown cotton, Groundnut, paddy and Red gram. Medium farmers have grown cotton and red gram.*
- *The results indicate that, the cropping intensity in Haligeri-2 micro-watershed was found to be 99.70 per cent.*
- *The results indicate that, 73.33 per cent of the households have bank account and 64.44 per cent of the households have bank Savings.*
- *The results indicate that, 11.11 per cent of the households have availed credit from different sources.*
- *The results indicate that, the total cost of cultivation for Cotton was Rs. 71877.62. The gross income realized by the farmers was Rs. 195001.60. The net income*

from Cotton cultivation was Rs. 123123.98. Thus the benefit cost ratio was found to be 1: 2.71.

- *The results indicate that, the total cost of cultivation for green gram was Rs. 52884.93. The gross income realized by the farmers was Rs. 58336.08. The net income from green gram cultivation was Rs. 5451.16. Thus the benefit cost ratio was found to be 1: 1.1.*
- *The results indicate that, the total cost of cultivation for Red gram was Rs. 27561.73. The gross income realized by the farmers was Rs. 57974.01. The net income from Red gram cultivation was Rs. 30412.28. Thus the benefit cost ratio was found to be 1: 2.1.*
- *The results indicate that, the total cost of cultivation for Paddy was Rs. 59540.62. The gross income realized by the farmers was Rs. 93411.60. The net income from Paddy cultivation was Rs. 33870.98. Thus the benefit cost ratio was found to be 1: 1.57.*
- *The results indicate that, the total cost of cultivation for Sorghum was Rs. 23706.95. The gross income realized by the farmers was Rs. 65866.67. The net income from Sorghum cultivation was Rs. 42159.72. Thus the benefit cost ratio was found to be 1: 2.78.*
- *The results indicate that, the total cost of cultivation for Groundnut was Rs. 34959.62. The gross income realized by the farmers was Rs. 79494.55. The net income from Groundnut cultivation was Rs. 44534.93. Thus the benefit cost ratio was found to be 1: 2.27.*
- *The results indicate that, 15.56 per cent of the households opined that dry fodder was adequate and 11.11 per cent of the households opined that green fodder was adequate.*
- *The results indicate that the annual gross income was Rs. 35,000 for landless, Rs. 181,266.67 for marginal farmers, for small farmers it was Rs. 214,875, semi medium farmers it was Rs. 175,000 and medium farmers it was Rs. 440,000.*
- *The results indicate that the average annual expenditure is Rs. 10,339.62. For landless it was Rs. 15,000, marginal farmers it was Rs. 4,232.78, for small farmers it was Rs. 6,598.18, for semi medium farmers it was Rs. 10,705.36 and medium farmers it was Rs. 58,055.56.*
- *The results indicate that, households have planted 4 Mango trees in their field.*
- *The results indicate that, households have planted 59 Neem, 5 Banyan, 1 Banyan, 3 Teak and 4 tamarind trees in their field and 4 neem trees in their backyard.*
- *The results indicated that, households have an average investment capacity of Rs. 1,250 for land development.*
- *The results indicated that, Groundnut, Sorghum and Red gram was sold to the extent of 100 per cent, Paddy was sold to the extent of 93.84 per cent and Green gram was sold to the extent of 77.61 per cent.*

- *The results indicated that, about 86.67 per cent of the farmers sold their produce to local/village merchants and 8.89 per cent of the farmers sold their produce to Regulated Market.*
- *The results indicated that, 6.67 per cent of the households have used Head Load as a mode of transportation, 20 per cent of the households have used Cart as a mode of transportation, 57.78 per cent of the households have used Tractor as a mode of transportation and 11.11 per cent of the households have used Truck as a mode of transportation.*
- *The results indicated that, 68.89 per cent of the households have experienced soil and water erosion problems in the farm.*
- *The results indicated that, 68.89 per cent have shown interest in soil test.*
- *The results indicated that, 82.22 per cent of the households used firewood as a source of fuel, 4.44 per cent of the households used Kerosene as a source of fuel and 13.33 per cent of the households used LPG as a source of fuel.*
- *The results indicated that, piped supply was the major source of drinking water for 82.22 per cent of the households in the micro watershed and Bore Well was the major source of drinking water for 15.56 per cent of the households in the micro watershed.*
- *The results indicated that, Electricity was the major source of light for 95.56 per cent of the households in micro watershed and Kerosene Lamp was the major source of light for 2.22 per cent of the households in micro watershed.*
- *The results indicated that, 53.33 per cent of the households possess sanitary toilet facility.*
- *The results indicated that, 95.56 per cent of the sampled households possessed BPL cards and 2.22 per cent of the sampled households possessed APL cards .*
- *The results indicated that, 88.89 per cent of the households participated in NREGA programme.*
- *The results indicated that, cereals were adequate for 95.56 per cent of the households, Pulses were adequate for 88.89 per cent of the households, Oilseed were adequate for 15.56 per cent of the households, Vegetables were adequate for 8.89 per cent, Egg were adequate for 22.22 per cent, Fruits were adequate for 2.86 per cent, Milk was adequate for 24.44 per cent and Meat were adequate for 2.22 per cent.*
- *The results indicated that, Pulses were inadequate for 6.67 per cent, oilseeds were inadequate for 80 per cent, vegetables were inadequate for 86.67 per cent, milk were inadequate for 57.78 per cent, fruits were inadequate for 88.89 per cent, Milk were inadequate for 57.78 per cent, Egg were inadequate for 85.71 per cent of the households and 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 68.89 per cent of the households, Frequent incidence of pest and*

diseases were the constraint experienced by 82.22 per cent of the households, Wild animal menace on farm field (51.11 %), High cost of Fertilizers and plant protection chemicals (82.22 %), Lack of marketing facilities in the area (77.14 %), High rate of interest on credit (80 %), Inadequacy of irrigation water (64.44 %), Low price for the agricultural commodities (88.57 %), Lack of transport for safe transport of the Agril produce to the market (86.67 %), Source of Agri-technology information (Newspaper/ TV/Mobile) (26.67 %) and Less Rainfall (24.44 %).

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

Yadgir District is one of the 30 districts of Karnataka state in southern India. This district was carved out from the erstwhile Gulbarga district as the 30th district of Karnataka on 10 April 2010. Yadgir town is the administrative headquarters of the district. The district comprises of 3 taluks namely, Shahapur, Yadgiri and Shorapur (There are 16 hoblies, 117 Gram Panchayats, 4 Municipalities,8 Towns/ Urban agglomeration and 487 inhabited &32 un-inhabited villages The district occupies an area of 5,160.88 km².

Yadgir district is the second smallest district in the state, area wise is very rich in cultural traditions. The vast stretch of fertile black soil of the district is known for bumper red gram and jawar crops. The district is a "Daal bowl" of the state. The district is also known for cluster of cement industries and a distinct stone popularly known as "Malakheda Stone". Two main rivers, Krishna and Bhima, and a few tributaries flow in this region. Krishna and Bhima Rivers drain the district. They constitute the two major river basins of the district. Kagna and Amarja are the two sub - basins of Bhima River, which occur within the geographical area of the district

According to the 2011 census Yadgir district has a population of 1, 172,985, roughly equal to the nation of Timor-Lesteor the US state of Rhode Island. This gives it a ranking of 404th in India (out of a total of 640). The district has a population density of 224 inhabitants per square kilometre (580/sq mi). Its population growth rate over the decade 2001-2011 was 22.67%. Yadgir has a sex ratio of 984 females for every 1000 males, and a literacy rate of 52.36%.

Description of the micro watershed

Haligeri-2 micro-watershed in Haligeri sub-watershed (Yadgiri taluk and district) is located in between $16^0$44’241.177’’ to 16^0 42’37.083’’North latitudes and 77^0 13’51.905’’ to $77^0$12’12.251’’ East longitudes, covering an area of about 748.48 ha, bounded by Mylapura, Varakanahalli, Kuyyalura, Halagera and Pogalapura 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 45 households located in the micro-watershed were interviewed for the survey.

Chapter 4

SALIENT FEATURES OF THE SURVEY

This chapter deals with systematic presentation of results of the survey. Keeping in view the objectives, the salient features of the survey are presented under the following headings.

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Haligeri-2 micro-watershed is presented in Table 1 and it indicated that 45 farmers were sampled in Haligeri-2 micro-watershed among them 1 (2.22 %) were landless, 15 (33.33 %) were marginal farmers, 16 (35.56 %) were small farmers, 10 (22.22 %) were semi medium farmers and 3 (6.67 %) were medium farmers.

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

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	1	2.22	15	33.33	16	35.56	10	22.22	3	6.67	45	100

Population characteristics: The population characteristics of households sampled for socio-economic survey in Haligeri-2 micro-watershed is presented in Table 2. The data indicated that there were 126 (61.17 %) men and 80 (38.83 %) women among the sampled households. The average family size of landless farmers' was 3.25, marginal farmers' was 6.02, small farmers' was 4.54, semi medium farmers' was 4.5 and medium farmers' was 11.

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

Sl.No.	Particulars	LL (4)		MF (69)		SF (78)		SMF (43)		MDF (12)		All (206)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Men	1	25	47	68.12	45	57.69	26	60.47	7	58.33	126	61.17
2	Women	3	75	22	31.88	33	42.31	17	39.53	5	41.67	80	38.83
Total		4	100	69	100	78	100	43	100	12	100	206	100
Average		4		4.6		4.87		4.3		4		4.57	

Age wise classification of population: The age wise classification of household members in Haligeri-2 micro-watershed is presented in Table 3. The data indicated that, 36 (17.48 %) people were in 0-15 years of age, 89 (43.20 %) were in 16-35 years of age, 71 (34.47 %) were in 36-60 years of age and 10 (4.85 %) were above 61 years of age.

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

Sl.No.	Particulars	LL (4)		MF (69)		SF (78)		SMF (43)		MDF(12)		All (206)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years of age	0	0	9	13.04	11	14.10	14	32.56	2	16.67	36	17.48
2	16-35 years of age	2	50	34	49.28	33	42.31	17	39.53	3	25	89	43.20
3	36-60 years of age	2	50	21	30.43	32	41.03	10	23.26	6	50	71	34.47
4	> 61 years	0	0	5	7.25	2	2.56	2	4.65	1	8.33	10	4.85
Total		4	100	69	100	78	100	43	100	12	100	206	100

Education level of household members: Education level of household members in Haligeri-2 micro-watershed is presented in Table 4. The results indicated that Haligeri-2had 49.03 per cent illiterates, 14.08 per cent of them had primary school, 2.43 per cent of them had middle school and Diploma, 13.59 per cent of them had high school education, 8.74 per cent of them had PUC, 0.49 per cent of them had ITI, 4.37 per cent of them had Degree education and 0.49 per cent of them had Masters education.

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

Sl.No.	Particulars	LL (4)		MF (69)		SF (78)		SMF (43)		MDF(12)		All (206)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	4	100	35	50.72	41	52.56	13	30.23	8	66.67	101	49.03
2	Primary School	0	0	8	11.59	13	16.67	7	16.28	1	8.33	29	14.08
3	Middle School	0	0	3	4.35	2	2.56	0	0	0	0	5	2.43
4	High School	0	0	10	14.49	12	15.38	4	9.30	2	16.67	28	13.59
5	PUC	0	0	10	14.49	6	7.69	2	4.65	0	0	18	8.74
6	Diploma	0	0	0	0	2	2.56	3	6.98	0	0	5	2.43
7	ITI	0	0	0	0	1	1.28	0	0	0	0	1	0.49
8	Degree	0	0	2	2.90	1	1.28	6	13.95	0	0	9	4.37
9	Masters	0	0	1	1.45	0	0	0	0	0	0	1	0.49
10	Others	0	0	0	0	0	0	8	18.60	1	8.33	9	4.37
Total		4	100	69	100	78	100	43	100	12	100	206	100

Occupation of household heads: The data regarding the occupation of the household heads in Haligeri-2 micro-watershed is presented in Table 5. The results indicate that, 88.89 per cent of household heads were practicing agriculture and 2.22 per cent of the household heads were agricultural labourers and Housewives.

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

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	12	80	15	93.75	10	100	3	100	40	88.89
2	Agricultural Labour	1	100	0	0	0	0	0	0	0	0	1	2.22
3	Housewife	0	0	0	0	1	6.25	0	0	0	0	1	2.22
Total		1	100	12	100	16	100	10	100	3	100	42	100

Occupation of the household members: The data regarding the occupation of the household members in Haligeri-2 micro-watershed is presented in Table 6. The results indicate that agriculture was the major occupation for 72.33 per cent of the household members, 2.43 per cent were agricultural labourers, 0.49 per cent were Artisans and Government Service, 1.94 per cent were private service, 16.50 per cent were Student, 1.94 per cent were housewives and 3.88 per cent were children.

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

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

Sl. No.	Particulars	LL (4)		MF (69)		SF (78)		SMF (43)		MDF (12)		All (206)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	0	0	50	72.46	62	79.49	27	62.79	10	83.33	149	72.33
2	Agricultural Labour	4	100	0	0	1	1.28	0	0	0	0	5	2.43
3	Artisans	0	0	1	1.45	0	0	0	0	0	0	1	0.49
4	Government Service	0	0	1	1.45	0	0	0	0	0	0	1	0.49
5	Private Service	0	0	2	2.90	2	2.56	0	0	0	0	4	1.94
6	Student	0	0	14	20.29	11	14.10	8	18.60	1	8.33	34	16.50
7	Housewife	0	0	1	1.45	2	2.56	1	2.33	0	0	4	1.94
8	Children	0	0	0	0	0	0	7	16.28	1	8.33	8	3.88
Total		4	100	69	100	78	100	43	100	12	100	206	100

Table 7. Institutional Participation of household members in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (4)		MF (69)		SF (78)		SMF (43)		MDF (12)		All (206)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	No Participation	4	100	69	100	78	100	43	100	12	100	206	100
Total		4	100	69	100	78	100	43	100	12	100	206	100

Type of house owned: The data regarding the type of house owned by the households in Haligeri-2 micro-watershed is presented in Table 8. The results indicate that 8.89 per cent of the households possess Thatched house, 68.89 per cent of the households possess Katcha house and 24.44 per cent of them possess Pucca/RCC house.

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

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	1	100	1	6.67	2	12.50	0	0	0	0	4	8.89
2	Katcha	0	0	12	80	9	56.25	7	70	3	100	31	68.89
3	Pucca/RCC	0	0	2	13.33	6	37.50	3	30	0	0	11	24.44
Total		1	100	15	100	17	100	10	100	3	100	46	100

Durable Assets owned by the households: The data regarding the Durable Assets owned by the households in Haligeri-2 micro-watershed is presented in Table 9. The results show that 62.22 per cent of the households possess TV, 24.44 per cent of the households possess mixer/grinder and Motor Cycle, 4.44 per cent of the households possess Refrigerator, 6.67 per cent of the households possess Auto, 2.22 per cent of the households possess Tempo and Car/Four Wheeler and 100 per cent of the households possess mobile phones.

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Haligeri-2 micro-watershed is presented in Table 10. The results show that the average value of television was Rs. 5,985, mixer/grinder was Rs. 1,936, Refrigerator was Rs. 9,000, motor cycle was Rs. 60,909, Auto was Rs. 125,000, Tempo was Rs. 3,00,000, Car/Four Wheeler was Rs. 4,00,000 and mobile phone was Rs. 1,993.

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

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	0	0	8	53.33	9	56.25	8	80	3	100	28	62.22
2	Mixer/Grinder	0	0	2	13.33	4	25	5	50	0	0	11	24.44
3	Refrigerator	0	0	0	0	0	0	2	20	0	0	2	4.44
4	Motor Cycle	0	0	2	13.33	4	25	4	40	1	33.33	11	24.44
5	Auto	1	100	0	0	2	12.50	0	0	0	0	3	6.67
6	Tempo	0	0	1	6.67	0	0	0	0	0	0	1	2.22
7	Car/Four Wheeler	0	0	0	0	1	6.25	0	0	0	0	1	2.22
8	Mobile Phone	1	100	15	100	16	100	11	110	2	66.67	45	100

Table10. Average value of durable assets owned by households in Haligeri-2 micro-watershed

Average value (Rs.)

Sl. No.	Particulars	LL (1) (Rs.)	MF (15) (Rs.)	SF (16) (Rs.)	SMF (10) (Rs.)	MDF (3) (Rs.)	All (45) (Rs.)
1	Television	0	4,875	6,677	6,562	5,333	5,985
2	Mixer/Grinder	0	900	1,450	2,740	0	1,936
3	Refrigerator	0	0	0	9,000	0	9,000
4	Motor Cycle	0	60,000	63,750	65,000	35,000	60,909
5	Auto	90,000	0	142,500	0	0	125,000
6	Tempo	0	3,00,000	0	0	0	3,00,000
7	Car/Four Wheeler	0	0	4,00,000	0	0	4,00,000
8	Mobile Phone	1,200	1,568	2,107	2,621	1,200	1,993

Farm Implements owned: The data regarding the farm implements owned by the households in Haligeri-2 micro-watershed is presented in Table 11. About 11.11 per cent of the households possess Bullock Cart, 31.11 per cent of the households possess Plough, 31.11 2.22 per cent of the households possess Seed/Fertilizer Drill, Transplanter/Grinder and Tractor, 4.44 per cent of the households possess Harvester, 8.89 per cent of the households possess Sprinkler, 20 per cent of them possess Sprayer and 53.33 per cent of them possess weeder.

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

Sl. No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	0	0	2	13.33	2	12.50	1	10	0	0	5	11.11
2	Plough	0	0	4	26.67	6	37.50	4	40	0	0	14	31.11
3	Seed/Fertilizer Drill	0	0	1	6.67	0	0	0	0	0	0	1	2.22
4	Transplanter/Grinder	0	0	0	0	1	6.25	0	0	0	0	1	2.22
5	Tractor	0	0	0	0	0	0	0	0	1	33.33	1	2.22
6	Sprayer	0	0	2	13.33	2	12.50	4	40	1	33.33	9	20
7	Sprinkler	0	0	0	0	4	25	0	0	0	0	4	8.89
8	Weeder	1	100	9	60	6	37.50	5	50	3	100	24	53.33
9	Harvester	0	0	1	6.67	1	6.25	0	0	0	0	2	4.44
10	Blank	0	0	2	13.33	4	25	0	0	0	0	6	13.33

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Haligeri-2 micro-watershed is presented in Table

12. The results show that the average value of bullock cart was Rs. 16,000, plough was Rs. 6,214, Seed/Fertilizer Drill was Rs. 2,000, Transplanter/Grinder was Rs. 650,000, Tractor was Rs. 500,000, sprayer was Rs. 4,411, sprinkler was Rs. 7,700 and the average value of weeder was Rs. 189.

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

AverageValue (Rs.)

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
1	Bullock Cart	0	15,000	15,000	20,000	0	16,000
2	Plough	0	5,125	9,250	2,750	0	6,214
3	Seed/Fertilizer Drill	0	2,000	0	0	0	2,000
4	Transplanter/Grinder	0	0	650,000	0	0	650,000
7	Tractor	0	0	0	0	500,000	500,000
8	Sprayer	0	2,000	11,600	2,625	2,000	4,411
9	Sprinkler	0	0	7,700	0	0	7,700
10	Weeder	200	200	175	186	180	189
11	Harvester	0	200	2,700,000	0	0	540,160

Livestock possession by the households: The data regarding the Livestock possession by the households in Haligeri-2 micro-watershed is presented in Table 13. The results indicate that, 13.33 per cent of the households possess bullocks, 8.89 per cent of the households possess local cow, 2.22 per cent of the households possess Crossbred cow and Goat and 4.44 per cent of the households possess Buffalo.

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

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock	0	0	1	6.67	5	31.25	0	0	0	0	6	13.33
2	Local cow	0	0	1	6.67	2	12.50	0	0	1	33.33	4	8.89
3	Crossbred cow	0	0	0	0	1	6.25	0	0	0	0	1	2.22
4	Buffalo	0	0	0	0	1	6.25	0	0	1	33.33	2	4.44
5	Goat	0	0	0	0	1	6.25	0	0	0	0	1	2.22
6	blank	1	100	14	93.33	10	62.50	10	100	1	33.33	36	80

Average Labour availability: The data regarding the average labour availability in Haligeri-2 micro-watershed is presented in Table 14. The results indicate that, average own labour men available in the micro watershed was 2.13, average own labour (women) available was 1.20, average hired labour (men) available was 8.04 and average hired labour (women) available was 7.62.

In case of marginal farmers, average own labour men available was 2.53, average own labour (women) was 1.07, average hired labour (men) was 7.27 and average hired labour (women) available was 6.93. In case of small farmers, average own labour men available was 2.25, average own labour (women) was 1.44, average hired labour (men) was 7.38 and average hired labour (women) available was 6.75. In case of semi medium farmers, average own labour men available was 1.40, average own labour (women) was 1.10, average hired labour (men) was 10 and average hired labour (women) available was

9.60. In case of medium farmers, average own labour men available was 2.33 and average own labour (women) was 1, average hired labour (men) was 11.67 and average hired labour (women) available was 11.67.

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

Sl. No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		N	N	N	N	N	N
1	Hired labour Female	0	6.93	6.75	9.60	11.67	7.62
2	Own Labour Female	1	1.07	1.44	1.10	1	1.20
3	Own labour Male	1	2.53	2.25	1.40	2.33	2.13
4	Hired labour Male	0	7.27	7.38	10	11.67	8.04

Adequacy of Hired Labour: The data regarding the adequacy of hired labour in Haligeri-2 micro-watershed is presented in Table 15. The results indicate that, 97.78 per cent of the households opined that the hired labour was adequate.

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

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate	0	0	15	100	16	100	10	100	3	100	44	97.78

Migration among the households: The data regarding the migration among the household members in Haligeri-2 micro-watershed is presented in Table 16. The results show that, 0.97 per cent of the population in the micro watershed has migrated.

Table 16. Migration among the households in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (4)		MF (69)		SF (78)		SMF (43)		MDF (12)		All (206)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Migration	0	0	1	1.45	1	1.28	0	0	0	0	2	0.97

Average distance and duration of migration: The data regarding the average distance and duration of migration of household members in Haligeri-2 micro-watershed is presented in Table 17. The results show that, average distance of migration was 600 kms and average duration of migration was 12 months.

Table 17. Average distance and duration of migration of households in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (0)	MF (1)	SF (1)	SMF (0)	MDF (0)	All (2)
		N	N	N	N	N	N
1	Avg. Distance (kms)	0	600	600	0	0	600
2	Avg. Duration (months)	0	12	12	0	0	12

Purpose of migration by household members: The data regarding the Purpose of migration by household members in Haligeri-2 micro-watershed is presented in Table 18. The results show that, 100 per cent of the population has migrated for the purpose of job/wage/work.

Table 18. Purpose of migration of households in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (0)		MF (1)		SF (1)		SMF (0)		MDF (0)		All (2)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Job/wage/work	0	0	1	100	1	100	0	0	0	0	2	100
Total		0	100	1	100	1	100	0	100	0	100	2	100

Distribution of land (ha): The data regarding the distribution of land (ha) in Haligeri-2 micro-watershed is presented in Table 19. The results indicate that, households of the Haligeri-2 micro-watershed possess 42.36 ha (69.16 %) of dry land, 16.06 ha (26.22 %) of irrigated land, 2.83 ha (4.63 %) of Permanent Fallow land. Marginal farmers possess 7.31 ha (100 %) of dry land and. Small farmers possess 12.23 ha (68.22 %) of dry land and 5.70 ha (31.78 %) of irrigated land. Semi medium farmers possess 10.27 ha (48.12 %) of dry land and 8.24 ha (38.60 %) of irrigated land and 2.83 ha (13.28 %) of Permanent Fallow land. Medium farmers possess 12.55 ha (85.52 %) of dry land and 2.12 ha (14.48 %) of irrigated land.

Table 19. Distribution of land (Ha) in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
1	Dry	0	0	7.31	100	12.23	68.22	10.27	48.12	12.55	85.52	42.36	69.16
2	Irrigated	0	0	0	0	5.70	31.78	8.24	38.60	2.12	14.48	16.06	26.22
3	Permanent Fallow	0	0	0	0	0	0	2.83	13.28	0	0	2.83	4.63
Total		0	100	7.31	100	17.93	100	21.34	100	14.67	100	61.25	100

Average land value (Rs./ha): The data regarding the average land value (Rs./ha) in Haligeri-2 micro-watershed is presented in Table 20. The results indicate that, the average value of dry land was Rs. 464,924.52, the average value of irrigated land was Rs. 722,076.62 and the average value of Permanent Fallow land was Rs. 141,142.86. In case of marginal famers, the average land value was Rs. 1,530,935.25 for dry land. In case of small famers, the average land value was Rs. 408,669.76 for dry land and Rs. 894,673.30 for irrigated land. In case of semi medium famers, the average land value was Rs. 214,189.99 for dry land and Rs. 691,842.76 for irrigated land and the average value of Permanent Fallow land was Rs. 141,142.86. In case of medium farmers, the average land value was Rs. 103,580.65 for dry land and Rs. 376,380.95 for irrigated land.

Table 20. Average land value (Rs./ha) in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		N	N	N	N	N	N
1	Dry	0	1,530,935.25	408,669.76	214,189.99	103,580.65	464,924.52
2	Irrigated	0	0	894,673.30	691,842.76	376,380.95	722,076.62
3	Permanent Fallow	0	0	0	141,142.86	0	141,142.86

Status of bore wells: The data regarding the status of bore wells in Haligeri-2 micro-watershed is presented in Table 21. The results indicate that, there were 7 functioning bore wells in the micro watershed.

Table 21. Status of bore wells in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		N	N	N	N	N	N
1	De-functioning	0	0	0	0	0	0
2	Functioning	0	0	4	2	1	7

Source of irrigation: The data regarding the source of irrigation in Haligeri-2 micro-watershed is presented in Table 22. The results indicate that, bore well was the major irrigation source in the micro watershed for 17.78 per cent of the farmers and Open Well was the major irrigation source in the micro watershed for 6.67 per cent of the farmers.

Table 22. Source of irrigation in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bore Well	0	0	0	0	4	25	3	30	1	33.33	8	17.78
2	Open Well	0	0	0	0	3	18.75	0	0	0	0	3	6.67

Depth of water (Avg. in meters): The data regarding the depth of water in Haligeri-2 micro-watershed is presented in Table 23. The results indicate that, the depth of bore well was found to be 12.67 meters and the depth of Open Well was found to be 4.13 meters.

Table 23. Depth of water (Avg. in meters) in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		N	N	N	N	N	N
1	Bore Well	0	0	19.62	16.46	30.48	12.67
2	Open Well	0	0	11.62	0	0	4.13

Irrigated Area (ha): The data regarding the irrigated area (ha) in Haligeri-2 micro-watershed is presented in Table 24. The results indicate that, small, semi medium farmers and medium farmers had an irrigated area of 4.87 ha, 4.88 ha and 2.02 ha respectively.

Table 24. Irrigated Area (ha) in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
1	Kharif	0	0	4.87	4.88	2.02	11.77
Total		0	0	4.87	4.88	2.02	11.77

Cropping pattern: The data regarding the cropping pattern in Haligeri-2 micro-watershed is presented in Table 25. The results indicate that, farmers have grown cotton (22.88 ha), Groundnut (6.48 ha), green gram (5.29 ha), Paddy (11.19 ha), Sorghum (1.21 ha) and red gram (11.84 ha). Marginal farmers have grown red gram, Groundnut, cotton and green gram. Small farmers have grown cotton, Sorghum, red gram, green gram and paddy. Semi medium farmers have grown cotton, Groundnut, paddy and Red gram. Medium farmers have grown cotton and red gram.

Table 25. Cropping pattern in Haligeri-2 micro-watershed (Area in ha)

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
1	Kharif - Cotton	0	4.26	7.10	4.14	7.39	22.88
2	Kharif - Groundnut	0	0.81	2.02	3.64	0	6.48
3	Kharif - Green gram	0	1.21	4.07	0	0	5.29
4	Kharif - Paddy	0	0.06	2.88	8.24	0	11.19
5	Kharif - Red gram	0	0.81	1.31	2.43	7.29	11.84
6	Kharif - Sorghum	0	0	1.21	0	0	1.21
Total		0	7.15	18.60	18.45	14.68	58.88

Cropping intensity: The data regarding the cropping intensity in Haligeri-2 micro-watershed is presented in Table 26. The results indicate that, the cropping intensity in Haligeri-2 micro-watershed was found to be 99.70 per cent.

Table 26. Cropping intensity (%) in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
1	Cropping Intensity	0	97.79	100	99.91	100	99.70

Possession of Bank account and savings: The data regarding the possession of bank account and saving in Haligeri-2 micro-watershed is presented in Table 27. The results indicate that, 73.33 per cent of the households have bank account and 64.44 per cent of the households have bank Savings.

Table 27. Possession of bank account and savings in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Account	1	100	12	80	11	68.75	7	70	2	66.67	33	73.33
2	Savings	1	100	11	73.33	10	62.50	6	60	1	33.33	29	64.44

Borrowing status: The data regarding the borrowing status in Haligeri-2 micro-watershed is presented in Table 28. The results indicate that, 11.11 per cent of the households have availed credit from different sources.

Table 28. Borrowing status in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Credit Availed	0	0	1	6.67	3	18.75	1	10	0	0	5	11.11

Cost of cultivation of Cotton: The data regarding the cost of cultivation of Cotton in Haligeri-2 micro-watershed is presented in Table 29. The results indicate that, the total cost of cultivation for Cotton was Rs. 71877.62. The gross income realized by the farmers was Rs. 195001.60. The net income from Cotton cultivation was Rs. 123123.98. Thus the benefit cost ratio was found to be 1: 2.71.

Table 29. Cost of Cultivation of Cotton in Haligeri-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	54.79	8667.96	12.06
2	Bullock		Pairs/day	3.83	2873.78	4
3	Tractor		Hours	4.61	4146.41	5.77
4	Machinery		Hours	4.71	4239.66	5.90
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	20.49	2409.38	3.35
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	3.83	11502.79	16
8	Fertilizer + micronutrients		Quintal	8.18	6764.95	9.41
9	Pesticides (PPC)		Kgs / liters	4.29	2147.33	2.99
10	Irrigation		Number	5.64	348.45	0.48
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	327.77	0.46
14	Land revenue and Taxes			0	0.78	0
II	**Cost B1**					
16	Interest on working capital				2738.93	3.81
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				46168.20	64.23
III	**Cost B2**					
18	Rental Value of Land				263.49	0.37
19	**Cost B2 = (Cost B1 + Rental value)**				46431.69	64.60
IV	**Cost C1**					
20	Family Human Labour			70.58	18911.60	26.31
21	**Cost C1 = (Cost B2 + Family Labour)**				65343.29	90.91
V	**Cost C2**					
22	**Cost C2 = (Cost C1 + Risk Premium)**				65343.29	90.91
VI	**Cost C3**					
23	Managerial Cost				6534.33	9.09
24	**Cost C3 = (Cost C2 + Managerial Cost)**				71877.62	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		40.34	194966.59	
		b) Main Crop Sales Price (Rs.)			4833.33	
	By Product	c) Main Product (q)		0.74	35.01	
		d) Main Crop Sales Price (Rs.)			47.62	
b.	Gross Income (Rs.)				195001.60	
c.	Net Income (Rs.)				123123.98	
d.	Cost per Quintal (Rs./q.)				1781.89	
e.	Benefit Cost Ratio (BC Ratio)				1:2.71	

Cost of Cultivation of Green gram: The data regarding the cost of cultivation of green gram in Haligeri-2 micro-watershed is presented in Table 30. The results indicate that, the total cost of cultivation for green gram was Rs. 52884.93. The gross income realized by the farmers was Rs. 58336.08. The net income from green gram cultivation was Rs. 5451.16. Thus the benefit cost ratio was found to be 1: 1.1.

Table 30. Cost of Cultivation of green gram in Haligeri-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	43.98	8520.69	16.11
2	Bullock		Pairs/day	1.24	926.25	1.75
3	Tractor		Hours	5.34	4150.57	7.85
4	Machinery		Hours	2.87	2421.57	4.58
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	13.49	1919.77	3.63
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	14	2799.33	5.29
8	Fertilizer + micronutrients		Quintal	4.72	4237.22	8.01
9	Pesticides (PPC)		Kgs / liters	2.26	1300.92	2.46
10	Irrigation		Number	2.47	741	1.40
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	14212.49	26.87
14	Land revenue and Taxes			0	2.47	0
II	**Cost B1**					
16	Interest on working capital				1230.91	2.33
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				42463.19	80.29
III	**Cost B2**					
18	Rental Value of Land				255.56	0.48
19	**Cost B2 = (Cost B1 + Rental value)**				42718.75	80.78
IV	**Cost C1**					
20	Family Human Labour			21.83	5358.12	10.13
21	**Cost C1 = (Cost B2 + Family Labour)**				48076.87	90.91
V	**Cost C2**					
22	Risk Premium				0.33	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				48077.21	90.91
VI	**Cost C3**					
24	Managerial Cost				4807.72	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				52884.93	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		12.24	58336.08	
		b) Main Crop Sales Price (Rs.)			4766.67	
b.	Gross Income (Rs.)				58336.08	
c.	Net Income (Rs.)				5451.16	
d.	Cost per Quintal (Rs./q.)				4321.25	
e.	Benefit Cost Ratio (BC Ratio)				1:1.1	

Cost of cultivation of Red gram: The data regarding the cost of cultivation of Red gram in Haligeri-2 micro-watershed is presented in Table 31. The results indicate that, the total cost of cultivation for Red gram was Rs. 27561.73. The gross income realized by the farmers was Rs. 57974.01. The net income from Red gram cultivation was Rs. 30412.28. Thus the benefit cost ratio was found to be 1: 2.1.

Table 31. Cost of Cultivation of Red gram in Haligeri-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	43.27	8548.37	31.02
2	Bullock		Pairs/day	0	0	0
3	Tractor		Hours	7.34	5331.08	19.34
4	Machinery		Hours	1.19	832.48	3.02
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	14.45	1733.57	6.29
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	6.59	1318.10	4.78
8	Fertilizer + micronutrients		Quintal	3.35	3378.18	12.26
9	Pesticides (PPC)		Kgs / liters	0.64	636.56	2.31
10	Irrigation		Number	0	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	133.20	0.48
14	Land revenue and Taxes			0	3.29	0.01
II	**Cost B1**					
16	Interest on working capital				848.09	3.08
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				22762.94	82.59
III	**Cost B2**					
18	Rental Value of Land				333.33	1.21
19	**Cost B2 = (Cost B1 + Rental value)**				23096.27	83.80
IV	**Cost C1**					
20	Family Human Labour			8.71	1958.85	7.11
21	**Cost C1 = (Cost B2 + Family Labour)**				25055.12	90.91
V	**Cost C2**					
22	Risk Premium				1	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				25056.12	90.91
VI	**Cost C3**					
24	Managerial Cost				2505.61	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				27561.73	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		14.96	57974.01	
		b) Main Crop Sales Price (Rs.)			3875	
b.	Gross Income (Rs.)				57974.01	
c.	Net Income (Rs.)				30412.28	
d.	Cost per Quintal (Rs./q.)				1842.23	
e.	Benefit Cost Ratio (BC Ratio)				1:2.1	

Cost of cultivation of Paddy: The data regarding the cost of cultivation of Paddy in Haligeri-2 micro-watershed is presented in Table 32. The results indicate that, the total cost of cultivation for Paddy was Rs. 59540.62. The gross income realized by the farmers was Rs. 93411.60. The net income from Paddy cultivation was Rs. 33870.98. Thus the benefit cost ratio was found to be 1: 1.57.

Table 32. Cost of Cultivation of Paddy in Haligeri-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	36.96	6742.99	11.33
2	Bullock		Pairs/day	0.18	105.86	0.18
3	Tractor		Hours	2.59	2346.60	3.94
4	Machinery		Hours	2.59	2346.60	3.94
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	60.80	18856.37	31.67
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	4.94	988	1.66
8	Fertilizer + micronutrients		Quintal	3.64	2780.84	4.67
9	Pesticides (PPC)		Kgs / liters	2.57	1374.80	2.31
10	Irrigation		Number	0.61	184.27	0.31
11	Depreciation charges			0	12061.83	20.26
12	Land revenue and Taxes			0	0.47	0
II	**Cost B1**					
13	Interest on working capital				2880.02	4.84
14	**Cost B1 = (Cost A1 + sum of 15 and 16)**				50668.64	85.10
III	**Cost B2**					
15	Rental Value of Land				228.57	0.38
16	**Cost B2 = (Cost B1 + Rental value)**				50897.21	85.48
IV	**Cost C1**					
17	Family Human Labour			13.63	3230.48	5.43
18	**Cost C1 = (Cost B2 + Family Labour)**				54127.69	90.91
V	**Cost C2**					
19	Risk Premium				0.14	0
20	**Cost C2 = (Cost C1 + Risk Premium)**				54127.84	90.91
VI	**Cost C3**					
21	Managerial Cost				5412.78	9.09
22	**Cost C3 = (Cost C2 + Managerial Cost)**				59540.62	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		64.22	91749	
		b) Main Crop Sales Price (Rs.)			1428.57	
	By Product	c) Main Product (q)		4.48	1662.60	
		d) Main Crop Sales Price (Rs.)			371.43	
b.	Gross Income (Rs.)				93411.60	
c.	Net Income (Rs.)				33870.98	
d.	Cost per Quintal (Rs./q.)				927.07	
e.	Benefit Cost Ratio (BC Ratio)				1:1.57	

Cost of cultivation of Sorghum: The data regarding the cost of cultivation of Sorghum in Haligeri-2 micro-watershed is presented in Table 33. The results indicate that, the total cost of cultivation for Sorghum was Rs. 23706.95. The gross income realized by the farmers was Rs. 65866.67. The net income from Sorghum cultivation was Rs. 42159.72. Thus the benefit cost ratio was found to be 1: 2.78.

Table 33. Cost of Cultivation of Sorghum in Haligeri-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	39.52	7533.50	31.78
2	Bullock		Pairs/day	0	0	0
3	Tractor		Hours	7.41	5187	21.88
4	Machinery		Hours	0	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	16.47	1976	8.34
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	3.29	658.67	2.78
8	Fertilizer + micronutrients		Quintal	2.47	2964	12.50
9	Pesticides (PPC)		Kgs / liters	0	0	0
10	Irrigation		Number	0	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	0.02	0
14	Land revenue and Taxes			0	3.29	0.01
II	**Cost B1**					
16	Interest on working capital				671.96	2.83
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				18994.44	80.12
III	**Cost B2**					
18	Rental Value of Land				333.33	1.41
19	**Cost B2 = (Cost B1 + Rental value)**				19327.77	81.53
IV	**Cost C1**					
20	Family Human Labour			9.88	2223	9.38
21	**Cost C1 = (Cost B2 + Family Labour)**				21550.77	90.90
V	**Cost C2**					
22	Risk Premium				1	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				21551.77	90.91
VI	**Cost C3**					
24	Managerial Cost				2155.18	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				23706.95	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		16.47	65866.67	
		b) Main Crop Sales Price (Rs.)			4000	
b.	Gross Income (Rs.)				65866.67	
c.	Net Income (Rs.)				42159.72	
d.	Cost per Quintal (Rs./q.)				1439.69	
e.	Benefit Cost Ratio (BC Ratio)				1:2.78	

Cost of cultivation of Groundnut: The data regarding the cost of cultivation of Groundnut in Haligeri-2 micro-watershed is presented in Table 34. The results indicate that, the total cost of cultivation for Groundnut was Rs. 34959.62. The gross income realized by the farmers was Rs. 79494.55. The net income from Groundnut cultivation was Rs. 44534.93. Thus the benefit cost ratio was found to be 1: 2.27.

Table 34. Cost of Cultivation of Groundnut in Haligeri-2 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	41.24	8305.38	23.76
2	Bullock		Pairs/day	0	0	0
3	Tractor		Hours	6.66	5029.19	14.39
4	Machinery		Hours	2.85	2301.90	6.58
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	19.90	3231.58	9.24
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	3.61	722.70	2.07
8	Fertilizer + micronutrients		Quintal	4.77	4277.22	12.23
9	Pesticides (PPC)		Kgs / liters	1.20	891.94	2.55
10	Irrigation		Number	2.47	494	1.41
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	212.70	0.61
14	Land revenue and Taxes			0	2.47	0.01
II	**Cost B1**					
16	Interest on working capital				1094.90	3.13
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				26563.99	75.98
III	**Cost B2**					
18	Rental Value of Land				333.33	0.95
19	**Cost B2 = (Cost B1 + Rental value)**				26897.33	76.94
IV	**Cost C1**					
20	Family Human Labour			19.76	4883.40	13.97
21	**Cost C1 = (Cost B2 + Family Labour)**				31780.72	90.91
V	**Cost C2**					
22	Risk Premium				0.75	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				31781.47	90.91
VI	**Cost C3**					
24	Managerial Cost				3178.15	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				34959.62	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		20.51	79494.55	
		b) Main Crop Sales Price (Rs.)			3875	
b.	Gross Income (Rs.)				79494.55	
c.	Net Income (Rs.)				44534.93	
d.	Cost per Quintal (Rs./q.)				1704.12	
e.	Benefit Cost Ratio (BC Ratio)				1:2.27	

Adequacy of fodder: The data regarding the adequacy of fodder in Haligeri-2 micro-watershed is presented in Table 35. The results indicate that, 15.56 per cent of the households opined that dry fodder was adequate and 11.11 per cent of the households opined that green fodder was adequate.

Table 35. Adequacy of fodder in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	0	0	1	6.67	5	31.25	0	0	1	33.33	7	15.56
2	Adequate-Green Fodder	0	0	1	6.67	3	18.75	0	0	1	33.33	5	11.11

Annual gross income: The data regarding the annual gross income in Haligeri-2 micro-watershed is presented in Table 36. The results indicate that the annual gross income was Rs. 35,000 for landless, Rs. 181,266.67 for marginal farmers, for small farmers it was Rs. 214,875, semi medium farmers it was Rs. 175,000 and medium farmers it was Rs. 440,000.

Table 36. Annual gross income in Haligeri-2 micro-watershed

(Avg. value in Rs.)

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0	30,000	9,375	0	0	13,333.33
2	Business	0	0	1,250	6,000	0	1,777.78
3	Wage	35,000	33,866.67	65,437.50	24,500	23,333.33	42,333.33
4	Agriculture	0	117,400	138,062.50	144,500	416,666.67	148,111.11
5	Goat Farming	0	0	750	0	0	266.67
Income(Rs.)		35,000	181,266.67	214,875	175,000	440,000	205,822.22

Average annual expenditure: The data regarding the average annual expenditure in Haligeri-2 micro-watershed is presented in Table 37. The results indicate that the average annual expenditure is Rs. 10,339.62. For landless it was Rs. 15,000, marginal farmers it was Rs. 4,232.78, for small farmers it was Rs. 6,598.18, for semi medium farmers it was Rs. 10,705.36 and medium farmers it was Rs. 58,055.56.

Table 37. Average annual expenditure in Haligeri-2 micro-watershed

(Avg value in Rs.)

Sl.No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0	36,666.67	30,000	0	0	3,111.11
2	Business	0	0	8,000	17,500	0	955.56
3	Wage	15,000	10,625	27,133.33	8,928.57	7,500	14,877.78
4	Agriculture	0	16,200	38,437.50	80,625	166,666.67	44,511.11
5	Goat Farming	0	0	2,000	0	0	44.44
Total		15,000	63,491.67	105,570.83	107,053.57	174,166.67	465,282.74
Average		15,000	4,232.78	6,598.18	10,705.36	58,055.56	10,339.62

Horticultural species grown: The data regarding Horticultural species grown in Haligeri-2 micro-watershed is presented in Table 38. The results indicate that, households have planted 4 Mango trees in their field.

Table 38: Horticultural species grown in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Mango	0	0	0	0	0	0	0	0	4	0	4	0

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

Forest species grown: The data regarding forest species grown in Haligeri-2 micro-watershed is presented in Table 39. The results indicate that, households have planted 59 Neem, 5 Banyan, 1 Banyan, 3 Teak and 4 tamarind trees in their field and 4 neem trees in their backyard.

Table 39: Forest species grown in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Teak	0	0	0	0	0	0	0	0	3	0	3	0
2	Neem	1	0	14	2	14	2	11	0	19	0	59	4
3	Tamarind	0	0	0	0	2	0	0	0	2	0	4	0
4	Banyan	1	0	1	0	3	0	0	0	0	0	5	0

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

Average Additional investment capacity: The data regarding average additional investment capacity in Haligeri-2 micro-watershed is presented in Table 40. The results indicated that, households have an average investment capacity of Rs. 1,250 for land development.

Table 40: Average Additional investment capacity in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)	MF (15)	SF (16)	SMF (10)	MDF (3)	All (45)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Land development	0	0	1,250	0	0	1,250

Marketing of the agricultural produce: The data regarding marketing of the agricultural produce in Haligeri-2 micro-watershed is presented in Table 41. The results indicated that, Groundnut, Sorghum and Red gram was sold to the extent of 100 per cent, Paddy was sold to the extent of 93.84 per cent and Green gram was sold to the extent of 77.61 per cent.

Table 41. Marketing of the agricultural produce in Haligeri-2 micro-watershed

Sl. No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Cotton	523.0	2.0	521.0	99.62	4833.33
2	Green gram	67.0	15.0	52.0	77.61	4766.67
3	Groundnut	112.0	0.0	112.0	100.0	3875.0
4	Paddy	730.0	45.0	685.0	93.84	1428.57
5	Redgram	165.0	0.0	165.0	100.0	3875.0
6	Sorghum	20.0	0.0	20.0	100.0	4000.0

Marketing Channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Haligeri-2 micro-watershed is presented in Table 42. The results indicated that, about 86.67 per cent of the farmers sold their produce to local/village merchants and 8.89 per cent of the farmers sold their produce to Regulated Market.

Table 42. Marketing Channels used for sale of agricultural produce in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Local/village Merchant	0	0	12	80	16	100	8	80	3	100	39	86.67
2	Regulated Market	0	0	3	20	1	6.25	0	0	0	0	4	8.89

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Haligeri-2 micro-watershed is presented in Table 43. The results indicated that, 6.67 per cent of the households have used Head Load as a mode of transportation, 20 per cent of the households have used Cart as a mode of transportation, 57.78 per cent of the households have used Tractor as a mode of transportation and 11.11 per cent of the households have used Truck as a mode of transportation.

Table 43. Mode of transport of agricultural produce in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Head Load	0	0	3	20	0	0	0	0	0	0	3	6.67
2	Cart	0	0	6	40	3	18.75	0	0	0	0	9	20
3	Tractor	0	0	5	33.33	12	75	7	70	2	66.67	26	57.78
4	Truck	0	0	1	6.67	2	12.50	1	10	1	33.33	5	11.11

Incidence of soil and water erosion problems: The data regarding incidence of soil and water erosion problems in Haligeri-2 micro-watershed is presented in Table 44. The results indicated that, 68.89 per cent of the households have experienced soil and water erosion problems in the farm.

Table 44. Incidence of soil and water erosion problems in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Soil and water erosion problems in the farm	0	0	12	80	10	62.50	7	70	2	66.67	31	68.89

Interest shown towards soil testing: The data regarding Interest shown towards soil testing in Haligeri-2 micro-watershed is presented in Table 45. The results indicated that, 68.89 per cent have shown interest in soil test.

Table 45. Interest shown towards soil testing in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	0	0	12	80	10	62.50	7	70	2	66.67	31	68.89

Usage pattern of fuel for domestic use: The data regarding usage pattern of fuel for domestic use in Haligeri-2 micro-watershed is presented in Table 46. The results indicated that, 82.22 per cent of the households used firewood as a source of fuel, 4.44 per cent of the households used Kerosene as a source of fuel and 13.33 per cent of the households used LPG as a source of fuel.

Table 46. Usage pattern of fuel for domestic use in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	1	100	14	93.33	13	81.25	6	60	3	100	37	82.22
2	Kerosene	0	0	1	6.67	1	6.25	0	0	0	0	2	4.44
3	LPG	0	0	1	6.67	2	12.50	3	30	0	0	6	13.33

Source of drinking water: The data regarding source of drinking water in Haligeri-2 micro-watershed is presented in Table 47. The results indicated that, piped supply was the major source of drinking water for 82.22 per cent of the households in the micro watershed and Bore Well was the major source of drinking water for 15.56 per cent of the households in the micro watershed.

Table 47. Source of drinking water in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	1	100	12	80	13	81.25	9	90	2	66.67	37	82.22
2	Bore Well	0	0	3	20	3	18.75	0	0	1	33.33	7	15.56

Source of light: The data regarding source of light in Haligeri-2 micro-watershed is presented in Table 48. The results indicated that, Electricity was the major source of light for 95.56 per cent of the households in micro watershed and Kerosene Lamp was the major source of light for 2.22 per cent of the households in micro watershed.

Table 48. Source of light in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Kerosene Lamp	1	100	0	0	0	0	0	0	0	0	1	2.22
2	Electricity	0	0	15	100	16	100	9	90	3	100	43	95.56

Existence of Sanitary toilet facility: The data regarding existence of sanitary toilet facilit**y** in Haligeri-2 micro-watershed is presented in Table 49. The results indicated that, 53.33 per cent of the households possess sanitary toilet facility.

Table 49. Existence of Sanitary toilet facility in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	1	100	10	66.67	7	43.75	5	50	1	33.33	24	53.33

Possession of PDS card: The data regarding possession of PDS card in Haligeri-2 micro-watershed is presented in Table 50. The results indicated that, 95.56 per cent of the sampled households possessed BPL cards and 2.22 per cent of the sampled households possessed APL cards.

Table 50. Possession of PDS card in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	APL	0	0	0	0	1	6.25	0	0	0	0	1	2.22
2	BPL	1	100	15	100	15	93.75	9	90	3	100	43	95.56

Participation in NREGA program: The data regarding participation in NREGA programme in Haligeri-2 micro-watershed is presented in Table 51. The results indicated that, 88.89 per cent of the households participated in NREGA programme.

Table 51. Participation in NREGA programme in Haligeri-2 micro-watershed

Sl. No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	1	100	13	86.67	15	93.75	9	90	2	66.67	40	88.89

Adequacy of food items: The data regarding adequacy of food items in Haligeri-2 micro-watershed is presented in Table 52. The results indicated that, cereals were adequate for 95.56 per cent of the households, Pulses were adequate for 88.89 per cent of the households, Oilseed were adequate for 15.56 per cent of the households, Vegetables were adequate for 8.89 per cent, Egg were adequate for 22.22 per cent, Fruits were adequate for 2.86 per cent, Milk was adequate for 24.44 per cent and Meat were adequate for 2.22 per cent.

Table 52. Adequacy of food items in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	1	100	14	93.33	16	100	9	90	3	100	43	95.56
2	Pulses	1	100	13	86.67	14	87.50	9	90	3	100	40	88.89
3	Oilseed	0	0	1	6.67	3	18.75	3	30	0	0	7	15.56
4	Vegetables	0	0	0	0	3	18.75	1	10	0	0	4	8.89
5	Milk	0	0	2	13.33	6	37.50	2	20	1	33.33	11	24.44
6	Egg	0	0	2	13.33	5	31.25	2	20	1	33.33	10	22.22
7	Meat	0	0	0	0	1	6.25	0	0	0	0	1	2.22

Table 53. Response on Inadequacy of food items in Haligeri-2 micro-watershed

Sl.No.	Particulars	LL (1)		MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Pulses	0	0	1	6.67	2	12.50	0	0	0	0	3	6.67
2	Oilseed	1	100	13	86.67	13	81.25	6	60	3	100	36	80
3	Vegetables	1	100	14	93.33	13	81.25	8	80	3	100	39	86.67
4	Fruits	1	100	13	86.67	15	93.75	8	80	3	100	40	88.89
5	Milk	1	100	11	73.33	7	43.75	5	50	2	66.67	26	57.78
6	Egg	1	100	12	80	8	50	3	30	2	66.67	26	57.78
7	Meat	1	100	13	86.67	11	68.75	6	60	3	100	34	75.56

Response on Inadequacy of food items: The data regarding inadequacy of food items in Haligeri-2 micro-watershed is presented in Table 53. The results indicated that, Pulses were inadequate for 6.67 per cent, oilseeds were inadequate for 80 per cent, vegetables

were inadequate for 86.67 per cent, milk were inadequate for 57.78 per cent, fruits were inadequate for 88.89 per cent, Milk were inadequate for 57.78 per cent, Egg were inadequate for 85.71 per cent of the households and Meat was inadequate for 97.14 per cent of the households.

Farming constraints: The data regarding farming constraints experienced by households in Haligeri-2 micro-watershed is presented in Table 54. The results indicated that, lower fertility status of the soil was the constraint experienced by 68.89 per cent of the households, Frequent incidence of pest and diseases were the constraint experienced by 82.22 per cent of the households, Wild animal menace on farm field (51.11 %), High cost of Fertilizers and plant protection chemicals (82.22 %), Lack of marketing facilities in the area (77.14 %), High rate of interest on credit (80 %), Inadequacy of irrigation water (64.44 %), Low price for the agricultural commodities (88.57 %), Lack of transport for safe transport of the Agril produce to the market (86.67 %), Source of Agri-technology information(Newspaper/TV/Mobile) (26.67 %) and Less Rainfall (24.44 %).

Table 54. Farming constraints Experienced in Haligeri-2 micro-watershed

Sl. No.	Particulars	MF (15)		SF (16)		SMF (10)		MDF (3)		All (45)	
		N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	12	80	11	68.75	6	60	2	66.67	31	68.89
2	Wild animal menace on farm field	11	73.33	6	37.50	5	50	1	33.33	23	51.11
3	Frequent incidence of pest and diseases	13	86.67	15	93.75	6	60	3	100	37	82.22
4	Inadequacy of irrigation water	11	73.33	10	62.50	6	60	2	66.67	29	64.44
5	High cost of Fertilizers and plant protection chemicals	14	93.33	13	81.25	7	70	3	100	37	82.22
6	High rate of interest on credit	15	100	15	93.75	8	80	2	66.67	40	88.89
7	Low price for the agricultural commodities	13	86.67	11	68.75	6	60	3	100	33	73.33
8	Lack of marketing facilities in the area	14	93.33	15	93.75	8	80	2	66.67	39	86.67
9	Inadequate extension services	9	60	8	50	5	50	1	33.33	23	51.11
10	Lack of transport for safe transport of the Agril produce to the market.	14	93.33	16	100	7	70	3	100	40	88.89
11	Less rainfall	3	20	5	31.25	2	20	1	33.33	11	24.44
12	Source of Agri-technology information(Newspaper/TV/Mobile)	4	26.67	5	31.25	2	20	1	33.33	12	26.67

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

The data on households sampled for socio economic survey indicated that 45 farmers were sampled in Haligeri-2 micro-watershed among them 1 (2.22 %) were landless, 15 (33.33 %) were marginal farmers, 16 (35.56 %) were small farmers, 10 (22.22 %) were semi medium farmers and 3 (6.67 %) were medium farmers.

The data indicated that there were 126 (61.17 %) men and 80 (38.83 %) women among the sampled households. The average family size of landless farmers' was 3.25, marginal farmers' was 6.02, small farmers' was 4.54, semi medium farmers' was 4.5 and medium farmers' was 11.

The data indicated that, 36 (17.48 %) people were in 0-15 years of age, 89 (43.20 %) were in 16-35 years of age, 71 (34.47 %) were in 36-60 years of age and 10 (4.85 %) were above 61 years of age.

The results indicated that Haligeri-2had 49.03 per cent illiterates, 14.08 per cent of them had primary school, 2.43 per cent of them had middle school and Diploma, 13.59 per cent of them had high school education, 8.74 per cent of them had PUC, 0.49 per cent of them had ITI, 4.37 per cent of them had Degree education and 0.49 per cent of them had Masters education.

The results indicate that, 88.89 per cent of household heads were practicing agriculture and 2.22 per cent of the household heads were agricultural labourers and Housewives.

The results indicate that agriculture was the major occupation for 72.33 per cent of the household members, 2.43 per cent were agricultural labourers, 0.49 per cent were Artisans and Government Service, 1.94 per cent were private service, 16.50 per cent were Student, 1.94 per cent were housewives and 3.88 per cent were children.

The results show that, 100 per cent of the population in the micro watershed has not participated in any local institutions. The results indicate that 8.89 per cent of the households possess Thatched house, 68.89 per cent of the households possess Katcha house and 24.44 per cent of them possess Pucca/RCC house.

The results show that 62.22 per cent of the households possess TV, 24.44 per cent of the households possess mixer/grinder and Motor Cycle, 4.44 per cent of the households possess Refrigerator, 6.67 per cent of the households possess Auto, 2.22 per cent of the households possess Tempo and Car/Four Wheeler and 100 per cent of the households possess mobile phones.

The results show that the average value of television was Rs. 5,985, mixer/grinder was Rs. 1,936, Refrigerator was Rs. 9,000, motor cycle was Rs. 60,909, Auto was Rs. 125,000, Tempo was Rs. 3,00,000, Car/Four Wheeler was Rs. 4,00,000 and mobile phone was Rs. 1,993.

About 11.11 per cent of the households possess Bullock Cart, 31.11 per cent of the households possess Plough, 31.11 2.22 per cent of the households possess Seed/Fertilizer Drill, Transplanter/Grinder and Tractor, 4.44 per cent of the households possess Harvester, 8.89 per cent of the households possess Sprinkler, 20 per cent of them possess Sprayer and 53.33 per cent of them possess weeder.

The results show that the average value of bullock cart was Rs. 16,000, plough was Rs. 6,214, Seed/Fertilizer Drill was Rs. 2,000, Transplanter/Grinder was Rs. 650,000, Tractor was Rs. 500,000, sprayer was Rs. 4,411, sprinkler was Rs. 7,700 and the average value of weeder was Rs. 189.

The results indicate that, 13.33 per cent of the households possess bullocks, 8.89 per cent of the households possess local cow, 2.22 per cent of the households possess Crossbred cow and Goat and 4.44 per cent of the households possess Buffalo.

The results indicate that, average own labour men available in the micro watershed was 2.13, average own labour (women) available was 1.20, average hired labour (men) available was 8.04 and average hired labour (women) available was 7.62.

In case of marginal farmers, average own labour men available was 2.53, average own labour (women) was 1.07, average hired labour (men) was 7.27 and average hired labour (women) available was 6.93. In case of small farmers, average own labour men available was 2.25, average own labour (women) was 1.44, average hired labour (men) was 7.38 and average hired labour (women) available was 6.75. In case of semi medium farmers, average own labour men available was 1.40, average own labour (women) was 1.10, average hired labour (men) was 10 and average hired labour (women) available was 9.60. In case of medium farmers, average own labour men available was 2.33 and average own labour (women) was 1, average hired labour (men) was 11.67 and average hired labour (women) available was 11.67.

The results indicate that, 97.78 per cent of the households opined that the hired labour was adequate. The results show that, 0.97 per cent of the population in the micro watershed has migrated. The results show that, average distance of migration was 600 kms and average duration of migration was 12 months.

The results show that, 100 per cent of the population has migrated for the purpose of job/wage/work. The results indicate that, households of the Haligeri-2 micro-watershed possess 42.36 ha (69.16 %) of dry land, 16.06 ha (26.22 %) of irrigated land, 2.83 ha (4.63 %) of Permanent Fallow land. Marginal farmers possess 7.31 ha (100 %) of dry land and. Small farmers possess 12.23 ha (68.22 %) of dry land and 5.70 ha (31.78 %) of irrigated land. Semi medium farmers possess 10.27 ha (48.12 %) of dry land and 8.24 ha (38.60 %) of irrigated land and 2.83 ha (13.28 %) of Permanent Fallow land. Medium farmers possess 12.55 ha (85.52 %) of dry land and 2.12 ha (14.48 %) of irrigated land.

The results indicate that, the average value of dry land was Rs. 464,924.52, the average value of irrigated land was Rs. 722,076.62 and the average value of Permanent Fallow land was Rs. 141,142.86. In case of marginal famers, the average land value was Rs. 1,530,935.25 for dry land. In case of small famers, the average land value was Rs. 408,669.76 for dry land and Rs. 894,673.30 for irrigated land. In case of semi medium famers, the average land value was Rs. 214,189.99 for dry land and Rs. 691,842.76 for irrigated land and the average value of Permanent Fallow land was Rs. 141,142.86. In case of medium farmers, the average land value was Rs. 103,580.65 for dry land and Rs. 376,380.95 for irrigated land.

The results indicate that, there were 7 functioning bore wells in the micro watershed. The results indicate that, bore well was the major irrigation source in the micro watershed for 17.78 per cent of the farmers and Open Well was the major irrigation source in the micro watershed for 6.67 per cent of the farmers.

The results indicate that, the depth of bore well was found to be 12.67 meters and the depth of Open Well was found to be 4.13 meters. The results indicate that, small, semi medium farmers and medium farmers had an irrigated area of 4.87 ha, 4.88 ha and 2.02 ha respectively.

The results indicate that, farmers have grown cotton (22.88 ha), Groundnut (6.48 ha), green gram (5.29 ha), Paddy (11.19 ha), Sorghum (1.21 ha) and red gram (11.84 ha). Marginal farmers have grown red gram, Groundnut, cotton and green gram. Small farmers have grown cotton, Sorghum, red gram, green gram and paddy. Semi medium farmers have grown cotton, Groundnut, paddy and Red gram. Medium farmers have grown cotton and red gram.

The results indicate that, the cropping intensity in Haligeri-2 micro-watershed was found to be 99.70 per cent. The results indicate that, 73.33 per cent of the households have bank account and 64.44 per cent of the households have bank Savings. The results indicate that, 11.11 per cent of the households have availed credit from different sources.

The results indicate that, the total cost of cultivation for Cotton was Rs. 71877.62. The gross income realized by the farmers was Rs. 195001.60. The net income from Cotton cultivation was Rs. 123123.98. Thus the benefit cost ratio was found to be 1: 2.71.

The results indicate that, the total cost of cultivation for green gram was Rs. 52884.93. The gross income realized by the farmers was Rs. 58336.08. The net income from green gram cultivation was Rs. 5451.16. Thus the benefit cost ratio was found to be 1: 1.1.

The results indicate that, the total cost of cultivation for Red gram was Rs. 27561.73. The gross income realized by the farmers was Rs. 57974.01. The net income from Red gram cultivation was Rs. 30412.28. Thus the benefit cost ratio was found to be 1: 2.1.

The results indicate that, the total cost of cultivation for Paddy was Rs. 59540.62. The gross income realized by the farmers was Rs. 93411.60. The net income from Paddy cultivation was Rs. 33870.98. Thus the benefit cost ratio was found to be 1: 1.57.

The results indicate that, the total cost of cultivation for Sorghum was Rs. 23706.95. The gross income realized by the farmers was Rs. 65866.67. The net income from Sorghum cultivation was Rs. 42159.72. Thus the benefit cost ratio was found to be 1: 2.78.

The results indicate that, the total cost of cultivation for Groundnut was Rs. 34959.62. The gross income realized by the farmers was Rs. 79494.55. The net income from Groundnut cultivation was Rs. 44534.93. Thus the benefit cost ratio was found to be 1: 2.27.

The results indicate that, 15.56 per cent of the households opined that dry fodder was adequate and 11.11 per cent of the households opined that green fodder was adequate.The results indicate that the annual gross income was Rs. 35,000 for landless, Rs. 181,266.67 for marginal farmers, for small farmers it was Rs. 214,875, semi medium farmers it was Rs. 175,000 and medium farmers it was Rs. 440,000.

The results indicate that the average annual expenditure is Rs. 10,339.62. For landless it was Rs. 15,000, marginal farmers it was Rs. 4,232.78, for small farmers it was Rs. 6,598.18, for semi medium farmers it was Rs. 10,705.36 and medium farmers it was Rs. 58,055.56.

The results indicate that, households have planted 4 Mango trees in their field. The results indicate that, households have planted 59 Neem, 5 Banyan, 1 Banyan, 3 Teak and 4 tamarind trees in their field and 4 neem trees in their backyard. The results indicated that, households have an average investment capacity of Rs. 1,250 for land development.

The results indicated that, Groundnut, Sorghum and Red gram was sold to the extent of 100 per cent, Paddy was sold to the extent of 93.84 per cent and Green gram was sold to the extent of 77.61 per cent.

The results indicated that, about 86.67 per cent of the farmers sold their produce to local/village merchants and 8.89 per cent of the farmers sold their produce to Regulated Market.

The results indicated that, 6.67 per cent of the households have used Head Load as a mode of transportation, 20 per cent of the households have used Cart as a mode of transportation, 57.78 per cent of the households have used Tractor as a mode of transportation and 11.11 per cent of the households have used Truck as a mode of transportation.

The results indicated that, 68.89 per cent of the households have experienced soil and water erosion problems in the farm. The results indicated that, 68.89 per cent have shown interest in soil test.

The results indicated that, 82.22 per cent of the households used firewood as a source of fuel, 4.44 per cent of the households used Kerosene as a source of fuel and 13.33 per cent of the households used LPG as a source of fuel.

The results indicated that, piped supply was the major source of drinking water for 82.22 per cent of the households in the micro watershed and Bore Well was the major source of drinking water for 15.56 per cent of the households in the micro watershed.

The results indicated that, Electricity was the major source of light for 95.56 per cent of the households in micro watershed and Kerosene Lamp was the major source of light for 2.22 per cent of the households in micro watershed.

The results indicated that, 53.33 per cent of the households possess sanitary toilet facility. The results indicated that, 95.56 per cent of the sampled households possessed BPL cards and 2.22 per cent of the sampled households possessed APL cards .

The results indicated that, 88.89 per cent of the households participated in NREGA programme. The results indicated that, cereals were adequate for 95.56 per cent of the households, Pulses were adequate for 88.89 per cent of the households, Oilseed were adequate for 15.56 per cent of the households, Vegetables were adequate for 8.89 per cent, Egg were adequate for 22.22 per cent, Fruits were adequate for 2.86 per cent, Milk was adequate for 24.44 per cent and Meat were adequate for 2.22 per cent.

The results indicated that, Pulses were inadequate for 6.67 per cent, oilseeds were inadequate for 80 per cent, vegetables were inadequate for 86.67 per cent, milk were inadequate for 57.78 per cent, fruits were inadequate for 88.89 per cent, Milk were inadequate for 57.78 per cent, Egg were inadequate for 85.71 per cent of the households and 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 68.89 per cent of the households, Frequent incidence of pest and diseases were the constraint experienced by 82.22 per cent of the households, Wild animal menace

on farm field (51.11 %), High cost of Fertilizers and plant protection chemicals (82.22 %), Lack of marketing facilities in the area (77.14 %), High rate of interest on credit (80 %), Inadequacy of irrigation water (64.44 %), Low price for the agricultural commodities (88.57 %), Lack of transport for safe transport of the Agril produce to the market (86.67 %), Source of Agri-technology information(Newspaper/TV/Mobile) (26.67 %) and Less Rainfall (24.44 %).