

**GOVERNMENT OF INDIA
GEOLOGICAL SURVEY OF INDIA**



**LANDSLIDE HAZARD ZONATION OF
VIRAJPET-MADIKERE-SULYA ROAD SECTION
COORG DISTRICT, KARNATAKA
(Progress Report for Field Season 2012-13)
Code No.: LHZ/ SR/ KG/2012/121**

BY

**K.V.MARUTHI, SENIOR GEOLOGIST
K.V.CHANDRAN, SENIOR GEOLOGIST**

**Project: ENGINEERING GEOLOGY
State Unit: Karnataka and Goa**

**BANGALORE
2013**

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SUMMARY

The Landslide Hazard Zonation on Macro scale (1:25,000 scale) 1km on both side of the communication routes Virajpet-Madikeri (SH-89) and Madikeri-Sulya (SH-88) were taken up during FS 2012-13. A total area of 75 LKm and 150sq km was covered.

The investigation was carried using modified guidelines of GSI which includes preparation of thematic maps including Slope facet, Slope morphometry, lithology, structure, land use, land cover, relative relief, slope erosion condition, landslide incidences, average rainfall and finally preparation of Landslide Hazard Zonation map. Factors responsible for landslides and their ratings as envisaged in the guidelines were adhered to calculate the TEHD (total estimated hazard) value and finally classifying the zones.

During investigation it is observed that majority of the slides are debris slides occurred due to cutting of the natural slope for making road. The vertical cut slopes have failed due to heavy rain in the ghat section during monsoon. The maximum portion of the study area has a very gentle slope with general slope angle <15°. The lithology of the area is gneiss, schist and laterite. A total of 73 Landslide incidences recorded which includes landslides recorded in earlier Inventory studies and 6 new landslides. The landslide hazard zonation map has been prepared according to TEHD (total estimated hazard) value of each facet. The TEHD of the facet is calculated after adding the LHEF (Landslide Hazard evaluation Factor) values of all ten geo-environmental parameters encompassing the particular facet. The landslide Hazard map reveals that Major part of the area falls under the category of Low Hazard zone (LHZ)-55% followed by Very low hazard Zone (VLHZ)-36%, Moderate Hazard zone(MHZ)-9% and High hazard zone (HHZ)-1%. Very high hazard zone (VHHZ) is absent. The high hazard zone is restricted to the facets falling either side of SH-88 between Madikeri-Sulya. As majority of the slides in this area are due to slope cut for developmental activities. Cut slope angle and height plays a major role in all the slides. The recommendation suggested includes geometrical modification of the slope by grading by bench, bio-technical measures of slope protection and proper drainage.

**कर्नाटक राज्य के कूर्ग जिले में विराजपेट-मडिकेरी-सुल्या
भाग के मार्ग का भूस्खलन आपदा अनुक्षेत्र वर्गीकरण**

(कार्य सत्र 2012-13 का प्रगति प्रतिवेदन)

क्रमांक: भू जो अ व/द क्षे/क गो/2012/121

द्वारा

के.वी.मारुति, वरिष्ठ भूविज्ञानी

के.वी.चन्द्रन, वरिष्ठ भूविज्ञानी

सारांश

2012-13 कार्य सत्र के दौरान विराजपेट-मडिकेरी (राज्य मार्ग-89) व मडिकेरी-सुल्या (राज्य मार्ग-88) के दोनों ओर 1 किलोमीटर के क्षेत्र में 1:25,000 पैमाने पर भूस्खलन आपदा अनुक्षेत्र वर्गीकरण किया गया। कुल 75 किलोमीटर लम्बे व 150 वर्ग किलोमीटर क्षेत्र में यह कार्य सम्पादित किया गया।

भारतीय भूवैज्ञानिक सर्वेक्षण के संशोधित मार्गनिर्देशों के अनुसार यह अन्वेषण किया गया, जिसमें ढाल फलक, ढाल आकारमिति, संरचना, अश्मविज्ञान, भूमि उपयोग, भूमि आवरण, सापेक्ष ऊँचाई, ढाल अपरदन अवस्था, भूस्खलन आपतन, आनुपातिक वर्षा के विषयक मानचित्रों के निर्माण व अंत में आपदा अनुक्षेत्र वर्गीकरण मानचित्र को तैयार करने का कार्य शामिल हैं। कुल अनुमानित आपदा (टी ई एच डी) मूल्य के आकलन करने व अंत में संस्तरों के वर्गीकरण के लिए भूस्खलन के लिए उत्तरदायी घटकों व मार्गनिर्देशों के अनुसार अनुमातकों का सख्ती से पालन किया गया।

अन्वेषण के दौरान यह देखा गया है कि अधिकांश फिसलन स्थल मार्ग निर्माण के लिए प्राकृतिक ढाल के कटाव के कारण बने मलबे के रूप में हैं। मानसून के दौरान घाट सेक्शन में हुई भारी वर्षा, से खड़ी ढलान नष्ट-भ्रष्ट हो चुकी है। अध्ययन क्षेत्र के अधिकांश भागों में $<15^\circ$ तक बहुत ही मंद ढाल है। क्षेत्र में नाइस, शिस्ट व लैटराइट हैं। कुल 73 भूस्खलन आपतन रिकार्ड किए गए हैं। इनमें पूर्व तालिका अध्ययन के दौरान रिकार्ड किए गए भूस्खलन भी है व 6 नए भूस्खलन हैं। भूस्खलन आपदा अनुक्षेत्र वर्गीकरण मानचित्र हर एक फलक के मूल्य के अनुसार कुल अनुमानित आपदा के अनुसार तैयार किए गए हैं। फलक का टी ई एच डी प्रत्येक फलक को घेराबन्द करने वाले सभी भू-वातावरणीय मानदण्डों के भूस्खलन आपदा मूल्यांकन घटक (एल एच ई एफ) के कुल योग के बाद आकलित किया जाता है। भूस्खलन आपदा मानचित्र से यह स्पष्ट होता है कि क्षेत्र का मुख्य भाग निम्न आपदा जोन (एल एच जेड)-55%, उसके बाद अति निम्न आपदा जोन (वी एल एच जेड)-36%, साधारण आपदा जोन (एम एच जेड)-9% व उच्च आपदा जोन (एच एच जेड)-1% की श्रेणी में आता है। अति उच्च आपदा जोन पाए नहीं गए हैं। उच्च आपदा जोन मडिकेरी-सुल्या के बीच राज्य मार्ग-88 के दोनों ओर आने वाले फलकों में प्रतिबंधित है। इस क्षेत्र में अधिकांश फिसलन विकासात्मक प्रक्रियाओं के लिए बनाए गए ढाल के कारण बने हैं। सभी फिसलन में ढाल कोण व ऊँचाई

महत्वपूर्ण भूमिका निभाती है. कगार निर्माण द्वारा अनुपातन से ढाल का ज्यामितीय संशोधन, ढाल संरक्षण के जैव-तकनीकी उपाय व उचित अपवाह तंत्र की अनुशंसा दी जाती है.



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I. INTRODUCTION

Landslides in Western Ghat has been a continuing problem for years, causing disruption in communication routes, damaging properties and killing people. The road development, the shifting of agricultural practice from orthodox seasonal crops to plantation (cash crops) such as coffee, tea and rubber has put tremendous pressure on the natural slopes of the Western Ghats (Photo 1). With passing time the modification of slopes due to human interference in the natural slope has deteriorated the equilibrium attained by nature. While not every landslide results in catastrophe, the damage from many small ones may equal or exceed the impact of a single major failure. Thus, both large and small landslides are capable of causing significant damage and loss of life. With every passing monsoon over the Western Ghat number of landslides occurs in response to this trigger. The blockade and damage to the road, the disruption of traffic along important roads linking the prime cities creates lot of hardship for the public.

In India, preliminary studies in the field of landslide zonation were initiated by Oldham (1880), Middlemiss (1890) and Holland (1897). Seshagiri et.al. (1982) carried out 5 category landslide zonation by assigning Landslide Susceptibility Index (LSI) on the basis of percentage of Landslide in each category. Anbalagan (1992) used Lithology, structure, slope, relief, land use, land cover and ground water condition to prepare zonation. An Indian standard (BIS: IS; 14496 (part 2), 1998) was introduced as guidelines for preparation of macro scale Landslide Hazard Zonation (LHZ) map on scale 1:25,000 or 1:50,000. In Karnataka Mishra et al. (2010) carried out Zonation in a Geographical Information system (GIS) environment of Madikeri Township. Mishra et al. (2010)¹ also carried out a zonation in GIS environment of road corridor of Charmudi ghat section from Charmudi to Kotigehara, Kotigehara to Kalasa and Shiradi Ghat section from Sakleshpur to Uppinangadi.

I.1. PRESENT WORK

The Sampaji Ghat section between Madikeri-Sulya is an important route corridor which connects Dakshina Kannada and Coorg districts. The section is known to have several landslide occurrences which have caused several roads blockade in the past. Madikeri-Virajpet is an important state highway in Coorg district where several landslide incidences were reported. The landslide hazard Zonation (LHZ) of the area aims at identifying the landslide potential zones and ranking them in order of the degree of hazard from landslides. The Landslide Hazard Zonation in Macro scale (1:25,000 scale) 1km on both side of the communication routes Virajpet-Madikeri (SH-89) and Madikeri-Sulya

(SH-88) were taken up during FS 2012-13 under the annual programme (Code: LHZ/SR/KG/2012/121) of Mission IV related to Engineering geology and Geotechnical investigation programme of Landslide Hazard Evaluation. A total area of 75 LKm and 150sq km was covered.

I.2 LOCATION

Karnataka is bound by the Arabian Sea in the west, Goa and Maharashtra in the northwest and north, respectively and Tamilnadu and Kerala to the South. The Western Ghat belt known for its thickly vegetated forests and mineralization is an irregularly elongated NW-SE trending belt. In Karnataka, the Western Ghats extend from Coorg district in the south to Uttar Kannada district in the north. The area of investigation is demarcated approximately 1km on both sides of the communication routes Virajpet-Madikeri (SH-89) and Madikeri-Sulya (SH-88) falling in parts of toposheet no 48P/16/NW, 48P/15/SE, 48P/15/SW, 48P15/NW , 48P11/NE, 48 P/11/NW, 48P/10/SW, 48P/6/SW (Plate 1).

I.3.OBJECTIVES

The landslide hazard zonation (LHZ) of a corridor/ road section aims at identifying the landslide potential zones and ranking them in order of the degree of hazard. The objectives of the present study are as follows.

- 1) Preparation of thematic maps covering themes such as geology, land use, land cover, slope, aspects etc.
- 2) Preparation of Landslide Hazard Zonation/evaluation map.

I.4. NATURE AND QUANTUM OF WORK

Sl. No	Nature of work	Total workload envisaged	Work proposed for FS 2012-2013	Work completed
I	Preparation of thematic maps(on 1:25,000 scale)	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.
	a)Slope Facet Map	-do-	-do-	-do-
	b) Slope Morphometry	-do-	-do-	-do-
	c) Lithology	-do-	-do-	-do-
	d) Structure	-do-	-do-	-do-
	e) Land use /land cover Map	-do-	-do-	-do-
	f) Relative Relief Map	-do-	-do-	-do-
	g) Hydro geological Map	-do-	-do-	-do-
	h)Landslide Incidences Map	-do-	-do-	-do-
	i) Annual rainfall data	-do-	-do-	-do-
II	Preparation of Landslide hazard zonation/ Susceptibility map on macro scale (1: 25,000 scale) using BIS/ modified BIS code (GSI)	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.

1.5. PHYSIOGRAPHY AND DRAINAGE

The study area from Virajpet-Madikeri-Sulya section has an undulating topography with higher peaks found between Chettali and Madikeri. It has an average elevation of 500-700 m. Nurkalla betta (1386 m asl) west of Chettali is the highest peak of the study area, peak of 1335 m asl South east of Kattalekadu and peak of 1145 m asl south of Madikeri are some other major ones. The area has temperate climate and the forest type is semi evergreen forest

The major rivers in the study area are Cauvery River flowing in West to east direction cuts across the study area North of Siddapur. Sampaje *Hole*(*Nala or Halla*) which is flowing North West of Madikeri after Made village runs parallel to SH-88 up to Koynad and transforms in to Payaswani *Hole*. Balnad *Hole* from North direction meets Payaswani *Hole* West of Peraje and forms Payaswani River which runs parallel to SH-88. The drainage pattern of the area is mainly dendritic, sub-dendritic and trellis.

1.6. CLIMATE AND RAINFALL

The study area has a temperate climate. The area receives heavy rainfall during June to September with an average annual rainfall of nearly 2500mm. The area experiences a mild summer with maximum temperature of 30°C and minimum of 20°C and mild winter with maximum temperature of 20°C and minimum of 16°C.

1.7 ACKNOWLEDGEMENTS

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II. REGIONAL GEOLOGY

The area exposes the rocks belonging to Sargur Group, Peninsular Gneiss-I of PGC and Charnockite Group, which are intruded by granites, pegmatites and dolerite dykes.

The Sargur Group comprises garnet-sillimanite schist, kyanite bearing gneiss and amphibolites. The highly metamorphosed sediments, forming the garnet-sillimanite schist and kyanite gneiss occurs as narrow and discontinuous bands in the biotite gneiss. They are exposed at number of places in the northern part, northwest of Mercara, southwest of Mercara, north and east of Bhagamandala. In the central part of the area south east of Mercara and around Siddapur, a wide band of kyanite-mica gneiss $\pm$ sillimanite about 3 km wide trending NW-SE for about 25 km in strike length is exposed. The rock is medium grained, bluish grey consisting of quartz, plagioclase, feldspar, kyanite, sillimanite, muscovite-mica $\pm$ graphite. Enclaves of narrow amphibolite bands trending NW-SE are exposed in the Peninsular gneiss.

PG-I of PGC consists of biotite gneiss and migmatite characterized by compositional banding and are well exposed over a large area. Biotite gneiss is exposed in the north and central part. It is coarse grained, light coloured and comprises quartz, plagioclase and biotite. Pyroxene granulites and charnockites constitute another major rock suite in the area. The pyroxene granulite shows invariably a granulitic texture and banding consisting of hornblende, diopside, augite and plagioclase feldspar. The charnockites which are closely interbanded with the granulites are generally light coloured, with medium grained texture.

The regional trend of the foliation in biotite gneiss is NW-SE with dip of 50° - 60° towards south. The granites, gneiss and pyroxene-granulite in the area are used as building stones and road materials. Occurrence of mica is reported from southwest of Hosur in the northwestern part of the area. Occurrence of kyanite is reported from north of Jodpal in the northern part and 1.5 km SE of Mercara. The gneisses show well developed foliations. The strike of the foliation is varying from $N65^{\circ}W$ - $S65^{\circ}E$ to E-W with steep northerly dips of 60° - 70° . The gneisses show lineation trending N-S with plunge of 30° - 40° towards south. Minor antiform plunging 20° - 40° towards SW recorded within PGC in the north central part of the area

The Charnockite Group forms a major rock unit in the SW part and comprises hornblende diopside granulite, calc granulite and charnockite and pyroxene granulite. Hornblende diopside granulite is light green consisting mainly hornblende plagioclase and diopside. It occurs as a wide body bordering with PG-I in the western and southwestern part and is exposed 2 km south and southwest of Virarajendrapet, 1 km west of 1195 hill. Calc granulite is coarse grained, mesocratic consisting tremolite, calc plagioclase and quartz.

Thin capping of laterite measuring 5-8 m in thickness, occurs over the gneisses in the southwestern part. They are dark brown in colour and contain hematite, limonite, goethite and numerous quartz grains. (Awasthi & Krishnamurthy, 1980; Awasthi, 1981; Damodaran, 1954; Dey & Gourishankar, 1951; Iyengar, 1954; Gera & Kariyanna, 2007; Pazhamalainathan et.al, 1982; Pazhamalainathan et.al, 1982¹; Shafeeq Ahamed et.al, 1986)

III. METHODOLOGY

Landslide Hazard Zonation (LHZ) indicates the susceptibility of the defined sample slope units of an area to landslides in space and time. The spatial distribution of the landslides produces a susceptibility map which divides all the similar sample units into various classes.

III.1. THE BIS AND MODIFIED BIS CODE (BY GSI) FOR MACRO SCALE LANDSLIDE HAZARD ZONATION

In 1998, the BIS published guidelines for preparation of Landslide Hazard Zonation maps in mountainous terrains (Code No. IS 14496 (Part 2), 1998) which was later modified by GSI and circulated incorporating the few factors that were necessary to be included.

The BIS guidelines and modified BIS guidelines by GSI for macro level Landslide Hazard Zonation mapping on 1:25,000/50,000 scales are tabulated below.

A. BIS guidelines for Macrozonation (1:25,000 to 1:50,000 scale)

<i>Sl no</i>	<i>Causative factors</i>	<i>Maximum LHEF rating</i>
1	Lithology	2
2	Structure	2
3	Slope Morphometry	2
4	Relative relief	1
5	Land use and Land cover	2
6	Hydrological condition	1
	<i>Total</i>	<i>10</i>

B. Modified BIS guidelines by GSI for Macrozonation (1:25,000 to 1:50,000 scale)

<i>Sl no</i>	<i>Causative factors</i>	<i>Maximum LHEF rating</i>
1	Slope Morphometry	2
2	Lithology	2
3	Structure	2
4	Relative relief	1
5	Land cover	1
6	Land use	1
7	Rainfall	1
8	Hydrological condition	1
9	Landslide incidence	2
10	Slope erosion	1
	<i>Total</i>	<i>14</i>

As per the maximum LHEF (Landslide Hazard Evaluation Factor) rating the various types of Landslide hazard zones defined by the BIS guideline and modified BIS guidelines are as follows:

A.BIS guidelines (1989)

<i>Zone</i>	<i>TEHD Value</i>	<i>Description of zone</i>
I	<3.5	Very Low Hazard Zone(VLHZ)
II	3.5-5.0	Low Hazard Zone(LHZ)
III	5.1-6.0	Moderate Hazard Zone(MHZ)
IV	6.1-7.5	High Hazard Zone(HHZ)
V	>7.5	Very High Hazard Zone(VHHZ)

B.GSI modified guidelines

<i>Zone</i>	<i>TEHD Value</i>	<i>Description of zone</i>
I	<4.9	Very Low Hazard Zone(VLHZ)
II	4.91-7.0	Low Hazard Zone(LHZ)
III	7.1-8.4	Moderate Hazard Zone(MHZ)
IV	8.41-10.5	High Hazard Zone(HHZ)
V	>10.5	Very High Hazard Zone(VHHZ)

III.2. DETAILS OF THE TEN GEOENVIRONMENTAL PARAMETERS AND DISTRIBUTION OF LANDSLIDE HAZARD EVALUATION FACTOR VALUES FOR THE SUB CATEGORIES OF EACH GEOENVIRONMENTAL PARAMETERS.

The map units for data collection may have regular geometric shapes having specified dimensions or they may have irregular shapes having varied dimensions. The BIS defines the smallest map unit for zonation as “facet”. A facet is a part of the hill slope which has more or less similar characters of slope showing consistent direction and inclination. The facets are generally delimited by ridges, spurs, gullies and rivers. Details of the ten geoenvironmental parameters and distribution of landslide hazard evaluation factor values for subcategories of each geoenvironmental parameters as proposed by modified BIS by GSI are as follows.

III.2.1. Slope Morphometry (LHEF rating 2)

<i>Description</i>	<i>Category</i>	<i>Rating</i>	<i>Remarks (No. of contour lines of 20m interval over 100m length on 1:50,000)</i>	<i>Slope angle</i>
i. Escarpment/cliff	>45°	2.0	>25	>45°
ii. Steep slope	36°-45°	1.7	19-25	36°-45°
iii. Moderately steep slope	26°-35°	1.2	13-18	26°-35°
iv. Gentle slope	16°-25°	0.8	8-12	16°-25°
v. Very Gentle slope	<15°	0.5	<7	<15°

III.2.2. Lithology (LHEF rating 2)

Description		Category	Rating	Remarks (Correcting factor for weathering)
1.Type of rock	Type I	i. Quartzite/Limestone/BHQ etc	0.2	i. Highly weathered rock, discolored, joints open with weathered products <i>Correction Factor C1</i> ii. Moderately weathered rock discolored with fresh rock patches, weathering more along joint planes, but rock intact in nature. <i>Correction Factor C2</i> iii. Slightly weathered rock slightly discolored along joint planes but intact in nature <i>Correction Factor C3</i> <i>For rock type I- C1=4, C2=3,C3=2</i> <i>For rock type II C1=1.5, C2=1.25,C3=1.0</i>
		ii. Granite/Basalt/Charnockite etc	0.3	
		iii. Gneiss	0.4	
	Type II	i. Well cemented terrigenous sedimentary rocks dominantly sandstone with minor beds of claystone	1.0	
		ii. Poorly cemented terrigenous sedimentary rocks dominantly sand rock with minor clay shale beds	1.3	
	Type III	i. Slate and Phyllite	1.2	
		ii. Schist	1.3	
		iii. Shale with inter bedded clayey and non clayey rocks	1.8	
		iv. Highly weathered shale, phyllite and schist	2.0	
	2. Soil type	i. Older well compacted alluvial fill material(Old river terraces	0.6	
		ii. Clayey soil over bedrock	0.8	
		iii. Sandy soil over bedrock	1.2	
		iv. Older compacted colluvial material	1.4	
		v. Poorly compacted younger loose material or slide debris	2.0	

III.2.3. Structure (LHEF rating 2)

Description	Category	Rating	Remarks
Relationship of structural discontinuity with slope			Discontinuity refers to the planar discontinuity or line of intersection of two planar discontinuities which ever is important from point of view of stability α j- Dip direction of joint α i- Direction of intersection of two discontinuities α s-Direction of slope inclination β j-Dip of joint β i- Plunge of line of two
i. Relationship of parallelism between slope and discontinuity(RS)	I.>30°	0.20	
	II. 15°-30°	0.30	
	III. 5°-15°	0.40	
	IV. <5°	0.50	
Planar(α j- α 3) Wedge(α i- α 3) α			
ii. Relationship of discontinuity and	I.>15°	0.3	
	II. 0°-15°	0.5	

inclination of slope(RI)	III. -1°-(-15)°	0.8	discontinuities β s - Inclination of slope
Planar(β j - β s)	IV. >(-15)°	1.0	
Wedge(β i - β s)			
iii.Dip of discontinuity	I.<15°	0.20	
Planar(β j)(DP)	II. 16°-30°	0.25	
Wedge(β i)	III. 31°-45°	0.35	
	IV. >45°	0.50	
Depth of soil cover	<5m	0.65	Category I Very favourable
	6-10m	0.85	Category II favourable
	11-15m	1.20	Category III Fair
	16-20m	1.50	Category IV Unfavourable
	>20m	2.0	Category V Very unfavourable

III.2.4. Relative relief (LHEF rating 1)

Description	Category	Rating	Remarks
i. Low	<100m	0.3	In seismic zone II & III the maximum rating for relative relief be multiplied by 0.5.It is also considered 5.No correction is required for Zones IV & V
ii. Medium	101-300m	0.6	
iii. High	>300m	1.0	

III.2.5. Land cover (LHEF rating 1)

Description	Category	Rating	Remarks
i. Thickly vegetated forest area		0.4	
ii. Moderately vegetated area		0.6	
iii. Sparsely vegetated area with lesser ground cover		0.8	
iv. Barren land		1.0	

III.2.6. Land use (LHEF rating 1)

Description	Category	Rating
i. Agricultural land/populated flat land		0.2
ii. Moderately populated slope/village roads		0.5
iii. Thickly populated slope modified by large scale excavation		0.7
iv. Major communication routes involving extensive slope cutting		1.0

III.2.7. Hydrology (LHEF rating 1)

Description	Category	Rating	Remarks
i. Dry		0.2	
ii. Wet		0.5	
iii. Flowing/spring		1.0	

III.2.8. Average annual rainfall (LHEF rating 1)

Description	Category	Rating	Remarks
i. Low	<500mm	0.2	
ii. Medium	500-2000mm	0.4	
iii. High	>2000mm	0.6	
iv. History of cloud bursts		1.0	

III.2.9. Slope erosion condition (LHEF rating 1)

Description	Category	Rating	Remarks
i.	Deep gully erosion/rill erosion of hill slope	0.5	
ii.	Severe toe erosion by nala and river	1.0	

III.2.10. Landslide incidence (LHEF rating 2)

Description	Category	Rating	Remarks
i.	No landslide	0	
ii.	Dormant landslide	0.5	
iii.	One active landslide	1.0	
iv.	More than one slide or one very large active slide(material dislodged>100 cu.m)	2.0	

III.2.11. Total Estimated Hazard (TEHD) of each facet

Zone	TEHD Value	Description of zone
I	<4.9	Very Low Hazard Zone(VLHZ)
II	4.91-7.0	Low Hazard Zone(LHZ)
III	7.1-8.4	Moderate Hazard Zone(MHZ)
IV	8.41-10.5	High Hazard Zone(HHZ)
V	>10.5	Very High Hazard Zone(VHHZ)

IV. ASSESSMENT OF GEOENVIRONMENTAL PARAMETRES AND LANDSLIDE HAZARD ZONATION OF THE STUDY AREA

IV.1 SLOPE MORPHOMETRY (LHEF RATING 2)

Pre-field studies for the area included preparation of Slope facet Map (Plate 2) on 1:25,000 scale Survey of India toposheets, which were used as base maps. A total of 1673 facets were identified and marked on the toposheet. The blank areas in Plate 2 where no facets are marked are the low lying plain areas with no elevation. The field check in the Virajpet-Madikeri-Sulya road section was carried and the Facets were examined. Each slope facet represents a uniform slope and is bounded by ridge line, drainage or break in slope. The measured angle of slope inclination (in terms of tan of inclination) is marked and the direction of slope inclination is shown in each slope facet (Plate 3).

The slope ratings were given as per modified GSI guidelines (refer section III.2.1). The area of higher slopes around Virajpet and Siddapur are having Steep slope with slope ranging from 36° – 45° were given LHEF (Landslide Hazard evaluation Factor) rating of 1.2; the area under coffee plantations are either moderately steep slopes with 26° – 35° and gentle slopes 16° – 25° were given LHEF rating of 1.2 & 0.8 respectively(Annexure-III). The low lands between Virajpet and Siddapur, Sampaje and Sulya are having very gentle slope $<15^{\circ}$ were given LHEF rating of 0.5. Maximum number of facets belong to very gentle slopes (1225 facets) followed by Gentle slopes (403 facets) and moderately steep slopes (43 facets) with only 2 facets are having steep slope.

IV.2.LITHOLOGY (LHEF RATING 2)

IV.2.1.Type of rock: The parameter is mainly base on the available geological map and data added during the field investigation. Lithologically the studied area is represented by four different lithounits namely Migmatite /Granite gneiss/biotite gneiss, Kyanite mica gneiss with $\pm$ Silimanite, Garnet silimanite schist and laterite. The Lithology ratings were as per modified GSI guidelines (refer section III.2.2). The Gneisses were given rating of 0.4; schist's were given rating of 1.3. As there is no rating for laterite the rating was given as 1.0. These ratings are valid for normal rock conditions. For weathered conditions, correction factors C1, C2, and C3 are to be incorporated. The correction for weathering to be multiplied with the fresh rock rating. For rock Type-1, values for C1, C2 and C3 are 4, 3 and 2 respectively for highly weathered, moderately weathered and slightly weathered conditions. For rock type-2 these values are 1.5, 1.25, and 1.0 respectively for C1, C2 and C3. The final rock rating after weathering correction is given (refer Annexure-III).

IV.2.2.Soil type: The soil cover predominates over the Lithology and due rating has been given accordingly wherever soil cover is present. The major soil type is Sandy soil over bed rock with rating of 1.2 and poorly compacted younger loose material or slide debris with rating of 2.0. The soil cover are generally dark brown to dark reddish brown and black in colour due to the accumulation of high organic matter under the forest cover.

565 facets have gneiss, 67 facets have schist and 54 facets have laterite as Lithology. 987 facets do not have any litho exposure and are covered by soil. As it is difficult to show separately the soil covered facets only Lithology in general are shown in map (Plate 4) but due rating has been given accordingly wherever soil cover is present (refer Annexure-III).

IV.3.STRUCTURE (LHEF RATING 2)

The parameter is mainly based on the available geological map and data added during the field investigation. The structure ratings were as per modified GSI guidelines (refer section III.2.3). The structural element studied in the field includes dip direction of joint, dip of joint, direction of slope inclination, inclination of slope, plunge of intersection line of two discontinuities, direction of intersection of two discontinuities. The regional strike of bedding swerves from NNE-SSW to NNW-SSE with 10-85° westerly or easterly dips. The rocks are traversed by different set of joints. Very broadly, these can be classified in to four sets viz., J1-N50W/NE dipping with amount ranging from 22°-90°, J2-N30W/NE dipping with amount ranging from 26°-90°, J3- S60W/N to NE dipping with amount ranging from 70°-90° and J4-S50W/ N to NE dipping with amount ranging from 70°-90° (Photo3). Maximum of the hill slopes are dipping either NE or SW because of the fact that all the major hills are trending NE-SW (Plate 4).

IV.3.1.Relationship of Structural discontinuity with slope: Relationship between dip direction of slope and plunge direction shows that 447 facets give 0.2 rating value and 120 facets give 0.3 rating value. In case of Joint direction and slope direction 33 facets give 0.2 rating value.

IV.3.2. Relationship of discontinuity and inclination of slope: In the case of Joint dip amount and inclination of slope, only 27 facets give 0.3 rating and 11 facets give 0.5 rating. As far as plunge amount and slope inclination concerned 645 facets give 0.3 rating value.

IV.3.3. Dip of Discontinuity: A total of 24 facets are having >45° dip amount with rating of 0.5 and only 14 facets are having 16° -30° dip amounts with rating of 0.25. As far as plunge of discontinuity 525 facets are having >45° dip amount with rating of 0.5 and 135 facets are having 31° -45° dip amounts with rating of 0.35.

IV.3.4.Depth of soil cover: The depth of soil cover in the study area is <5m so uniform rating of 0.65 has been given (refer section III.2.3). The soil depth map is not prepared as the whole area falls in one zone but due rating has been assigned in computing TEHD (refer Annexure-III).

IV.4. RELATIVE RELIEF (LHEF RATING 1)

The relative relief of each slope unit i.e. facet has been derived from the 1:25,000 scale Survey of India toposheets. The relative relief ratings were as per modified GSI guidelines (refer section III.2.4). The relief of the area even though reaches up to 1386m above msl, the relative relief of the slopes in the study area lies in category I (low relative relief with <100m height) with 1156 facets with rating of 0.3 and Category II (Medium relative relief with 101m-300m height) with 517 facets with rating of 0.6. The modified BIS code envisages that the influence due to seismicity is to be included into the relative relief factor. As area lies in seismic zone II the rating for the area has been modified to 0.15 (for facets with 0.3 rating) and 0.3(for facets with 0.6 rating) and accordingly final relief rating has been given (refer Annexure-III ; Plate 5 & Plate 5a).

IV.5.LANDCOVER (LHEF RATING 2)

The land cover in the studied area includes the following dense scrub, open scrub, cardamom plantation, coffee plantation, open jungle, rubber plantations, teak/soft wood plantation and fairly dense mixed jungle (Photo 2). The land cover ratings were as per modified GSI guidelines (refer section III.2.5). As per the modified BIS guideline the code fairly inadequate to bracket the land cover type in its fold. The coffee and cardamom plantation require high shadows, so long back once the thickly forested areas have been modified to accommodate the plantation. So the thickly covered slopes due to coffee and cardamom plantation hence have been put in the moderately vegetated forest area (Photo 5). The rubber plantations have also been put in moderately vegetated area with rating value of 0.6 (Photo 6). Areas around Virajpet and Siddapur, East of Koynad, South of Peraje, North of Gonadka are having dense mixed jungle come under thickly vegetated forest area with a rating of 0.4. Other areas are grouped as sparsely vegetated area with lesser ground cover with rating value of 0.8. No barren land found in the area (refer Annexure-III). 1082 facets are grouped under moderately vegetated area with rating of 0.6 followed by 327 facets under thickly vegetated forest area with rating of 0.4 and 264 facets with sparsely vegetated area with lesser ground cover with rating of 0.8 (Plate 6 & Plate 6a).

IV.6.LANDUSE (LHEF RATING 2)

The land use pattern of an area depends on two factors viz. the natural set up and the human interference. The natural factors include topography, rainfall and climate, and the human interference is mainly due to the density, occupation of people, extent of technological development and socio-economic factors. Physical factors and human activity influences land use pattern. The land use ratings were as per modified GSI guidelines (refer section III.2.6). The different land use type in this area are the agricultural land/populated flat land, major communication route involving extensive slope cutting , moderately populated slope/village road and thickly populated slope modified by large scale excavation.

In the Virajpet-Madikeri sector most of the lowland area are used for paddy cultivation and are grouped under Agricultural land/ sparsely populated land with a rating of 0.2 (Photo 7). The slopes which are extensively used for coffee plantations and the roads into the coffee estates have been grouped under moderately populated slope/ village roads with a rating of 0.5 (Photo 9). The area around major settlements like Virajpet, Siddapur, Madikeri and Sulya were grouped under thickly populated slope by large scale excavation with rating of 0.7(Photo 8).The area between Madikeri and Sampaje are grouped under Agricultural land/ sparsely populated land with a rating of 0.2. The area around the major road section SH-88 was grouped under thickly populated slope by large scale excavation with rating of 0.7(refer Annexure-III). 1473 facets are grouped under moderately populated slopes/village roads with rating of 0.5 followed by 88 facets under agricultural land with rating of 0.2, 63 facets under Major communication route involving extensive slope cutting, 26 facets under thickly populated slopes modified by large scale excavation and 23 facets with no particular Landuse (Plate 7 & Plate 7a).

IV.7.HYDROGEOLOGY (LHEF RATING 1)

The hydrogeology ratings were as per modified GSI guidelines (refer section III.2.7). Most of the area between Virajpet-Madikeri- Suliya is having wet or flowing conditions with rating of 0.5 & 1.0 respectively (refer Annexure-III). 1122 facets are having wet conditions with rating of 0.5 and 551 facets are having flowing/spring conditions with rating of 1.0. Dry condition is not observed in any facet as the ratings were given after the monsoon season so many of the facets which would have been dry in summer is wet after rainy season (Plate 8 & Plate 8a).

IV.8.AVERAGE ANNUAL RAINFALL (LHEF RATING 1)

Rainfall data from 4 stations are collected viz., Madikeri, Siddapur, Virajpet and Suliya rain gauge stations (Annexure-1). The Average Annual Rainfall between Virajpet-Madikeri sector it is seen that areas around Siddapur where rainfall is falling between 500-2000 mm the rating for facets will be 0.4 and for areas around Virajpet and Madikeri wherein average rainfall is > 2000 mm rating will be 0.6. The area around Madikeri and between Madikeri and suliya the average rainfall is > 2000 mm accordingly rating was given as 0.6 (refer Annexure-III). The distribution of rainfall over the study area and different rain gauge stations from 2002-2011 and annual rainfall of the four stations are shown in Fig 1-9 & Table 1.

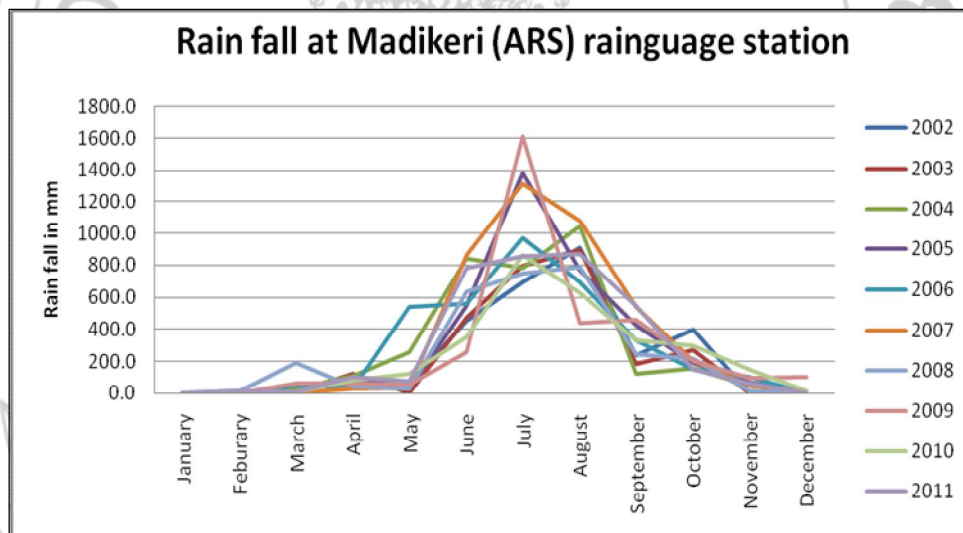


Fig 1: Distribution of rainfall pattern of Madikeri (ARS) rain gauge station from 2002 to 2011

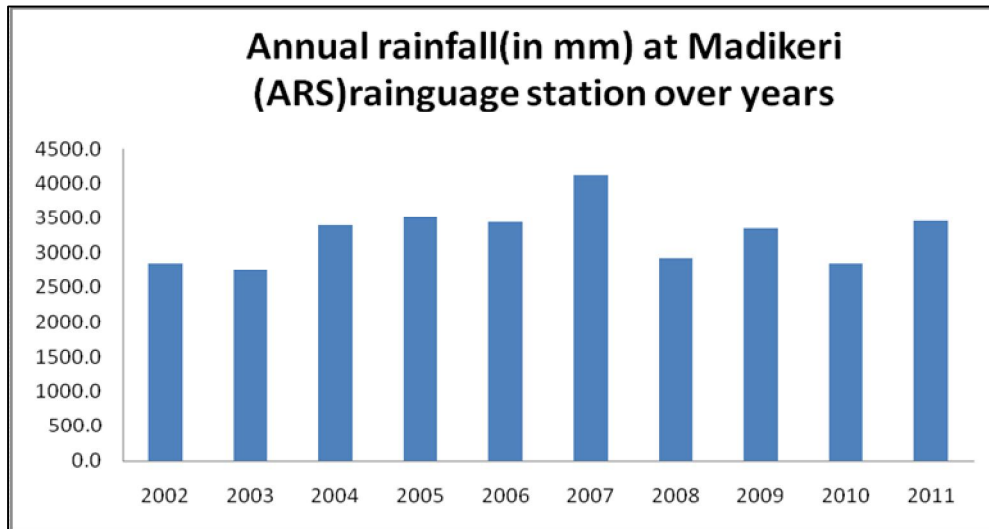


Fig 2: Annual rain fall (in mm) at Madikeri (ARS) rain gauge station from 2002 to 2011

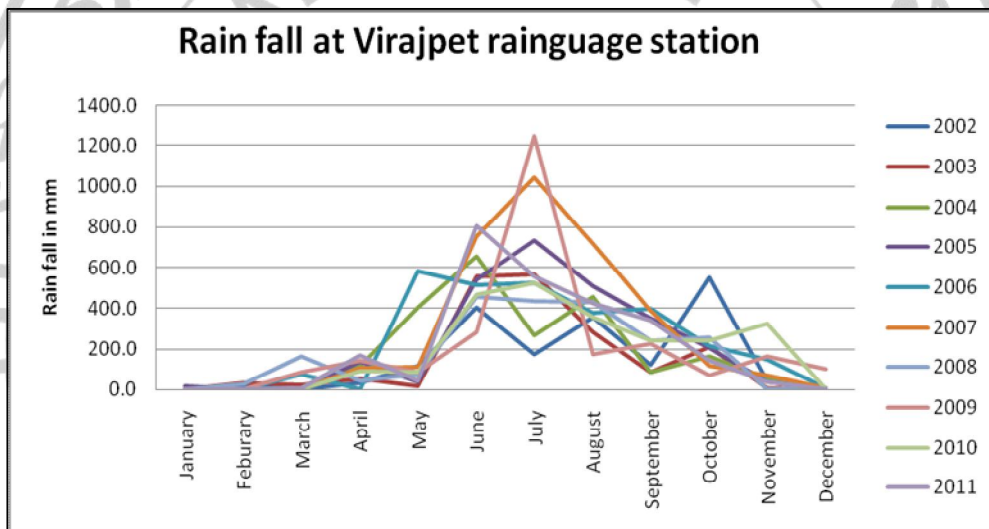


Fig 3: Distribution of rainfall pattern of Virajpet rain gauge station from 2002 to 2011

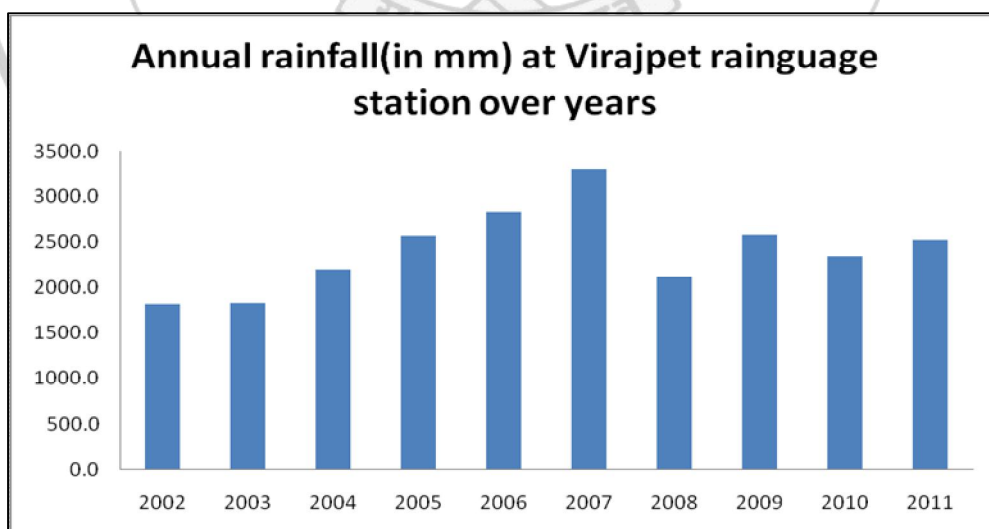


Fig 4: Annual rain fall (in mm) at Virajpet rain gauge station from 2002 to 2011

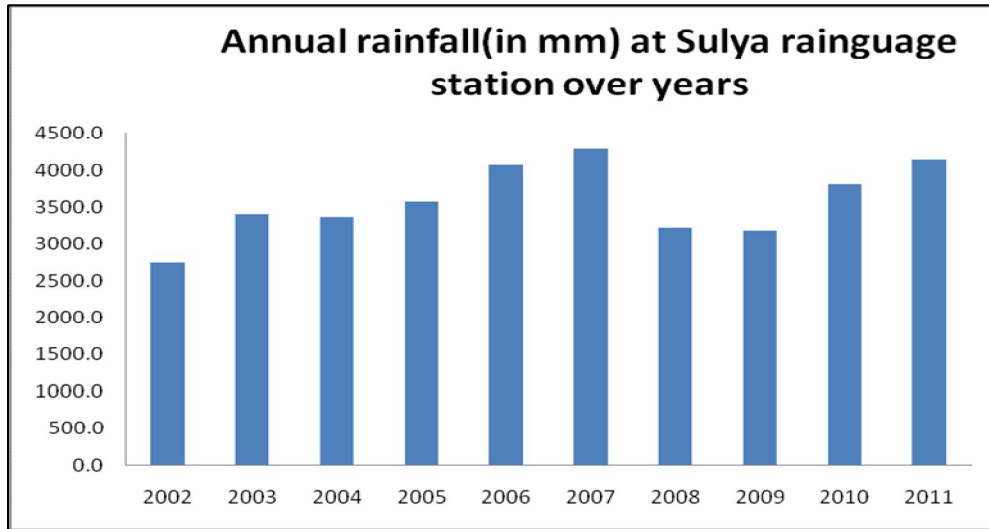


Fig 5: Distribution of rainfall pattern of Siddapur rain gauge station from 2002 to 2011

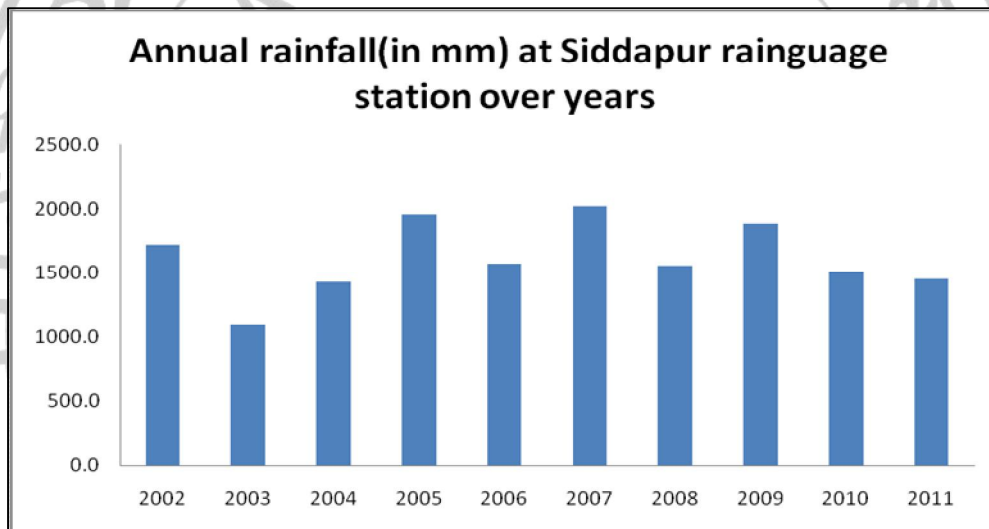


Fig 6: Annual rain fall (in mm) at Siddapur rain gauge station from 2002 to 2011

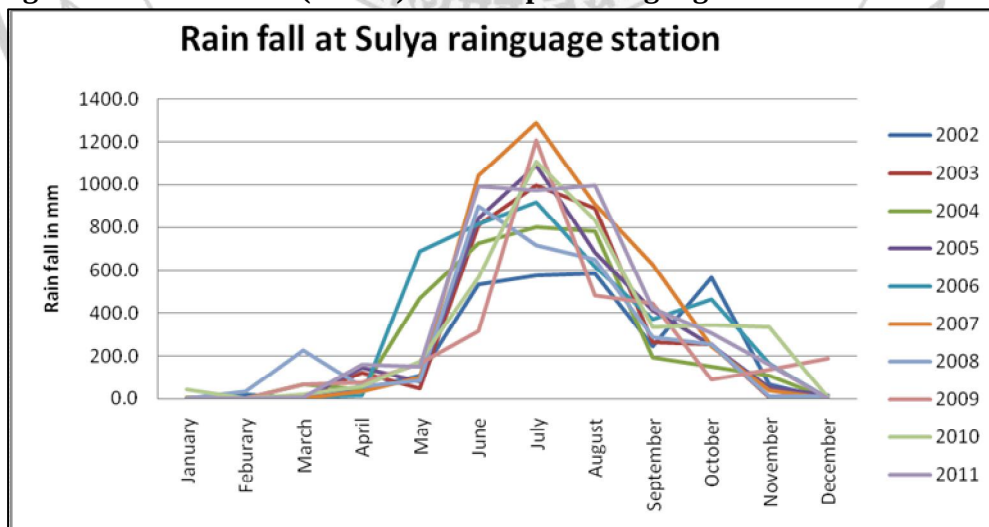


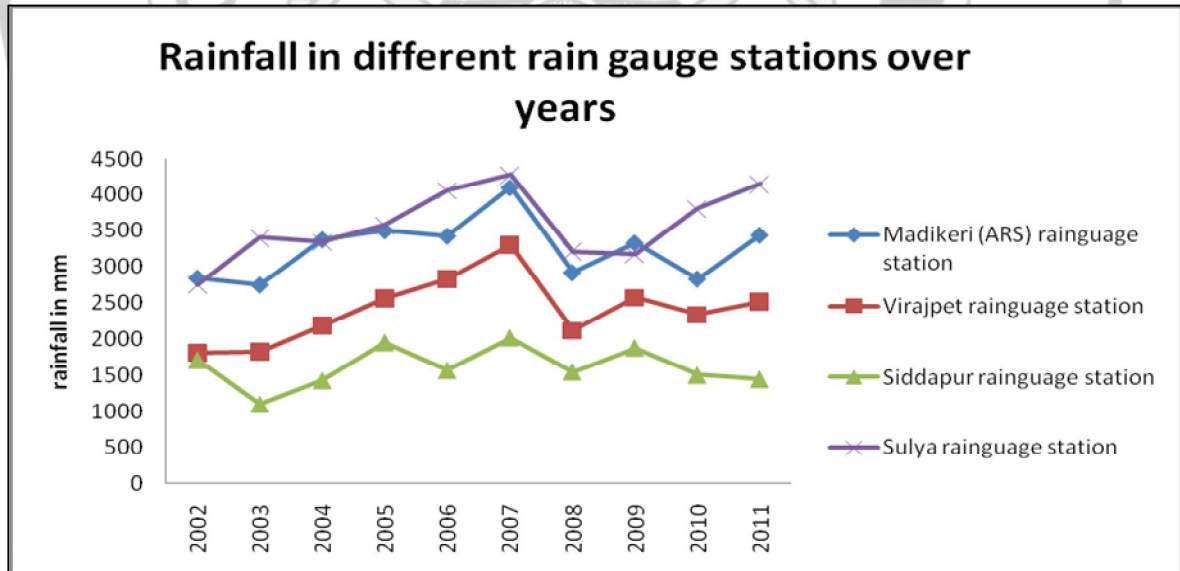
Fig 7: Distribution of rainfall pattern of Sulya rain gauge station from 2002 to 2011

Fig 8: Annual rain fall (in mm) at Sulya rain gauge station from 2002 to 2011

Table 1: Annual Rainfall in different rain gauge stations over years

Year	Madikeri (ARS) rainguage station	Virajpet rainguage station	Siddapur rainguage station	Sulya rainguage station
2002	2849.3	1809.6	1712.2	2747.7
2003	2754.2	1823.7	1097.6	3398.6
2004	3380.9	2190.0	1426.9	3344.6
2005	3504.5	2560.4	1956.5	3571.1
2006	3429.8	2824.2	1568.8	4061.5
2007	4110.2	3296.7	2020.37	4280.6
2008	2923.8	2117.9	1548.2	3207.6
2009	3334.8	2569.5	1878.5	3166.8
2010	2837.8	2336.8	1503.6	3806.4
2011	3441.8	2511.0	1445.5	4148.0
Average for 10 years	3256.7	2404.0	1615.8	3573.3

Fig 9: Annual Rain fall distribution in different rain gauge stations over years



IV.9.SLOPE EROSION CONDITION (LHEF RATING 1)

The slope erosion ratings were given as per modified GSI guidelines (refer section III.2.9). The western Ghats are relict mountains having very low relative relief, the deep gully/rill erosion of the slope is quite uncommon in such a matured hilly terrain with high land cover of the slopes, but anthropogenic activity in the form of slope cutting for construction of roads certain patches of SH-88 shows the gully erosion. 40 facets are affected by Deep gully erosion and rating of 0.5 has been assigned to them (Photo 10). Along the major rivers/ nalas like Cauvery and Payaswani 1-2 m toe erosion is observed. 260 facets are affected by Toe erosion by nala and river and rating of 1.0 has been assigned to them (Photo 11). As the slope erosion conditions are very shallow in depth the map cannot be prepared but the ratings where erosion is in process have duly assigned (refer Annexure-III).

IV.10. LANDSLIDE INCIDENCE (LHEF RATING 2)

The landslide incidence ratings were given as per modified GSI guidelines (refer section III.2.10). Earlier data on inventory (Mishra, 2007; Mishra & Pradhan, 2010; Maruthi et.al, 2010; Maruthi & Mishra, 2011) was checked and 6 new landslides identified between Madikeri-Suliya road section. A total of 73 Landslide incidences were recorded (Plate 9 & Palte 9a) and the unique slide ID numbers of inventory are given with all the inventory parameters in Annexure-2. 1676 facets have no landslides with rating of 0.0, 32 facets have dormant landslides with rating of 0.5, 10 facets have one active landslide with rating of 1.0 and 5 facets have more than one slide with rating of 2.0 (refer Annexure-III & Photo 4).

IV.11. TOTAL ESTIMATED HAZARD (TEHD) OF EACH FACET

The TEHD of the facet is calculated after adding the LHEF (Landslide Hazard evaluation Factor) values of all ten geo-environmental parameters encompassing the particular facet (Annexure-III & III A).

IV.12. LANDSLIDE HAZARD SUSCEPTIBILITY ZONATION

The TEHD values are indicative of susceptibility of a slope to failure. The TEHD values were regrouped to classify the investigated area in to i) Very low hazard zone ii) Low hazard zone iii) Moderate hazard zone iv) High hazard zone and v) Very high hazard zone and the final output Landslide Hazard Zonation map (Annexure-3, Table 2 & Plate 10).

The landslide Hazard map reveals that Major part of the area falls under the category of Low Hazard zone (LHZ)-55% followed by Very low hazard Zone (VLHZ)-35%, Moderate Hazard zone (MHZ)-9% and High hazard zone (HHZ)-1%. Very high hazard zone (VHHZ) is absent (Fig 13). The characteristics of different zones have been described below.

Very Low Hazard zone: This area is distributed all over and mainly includes the flat agricultural lands in the valleys and the low lying areas having very low relative relief.

Low Hazard zone: It also lies in majority part of the investigated area scattered.

Moderate Hazard zone: The moderately hazard zone lies along SH-88. It is mostly restricted to area between Madikeri-Sulya.

High Hazard zone: The high hazard zone is restricted to the facets falling either side of SH-88 between Madikeri-Sulya.

Very High Hazard Zone: The zone is not found in this area.

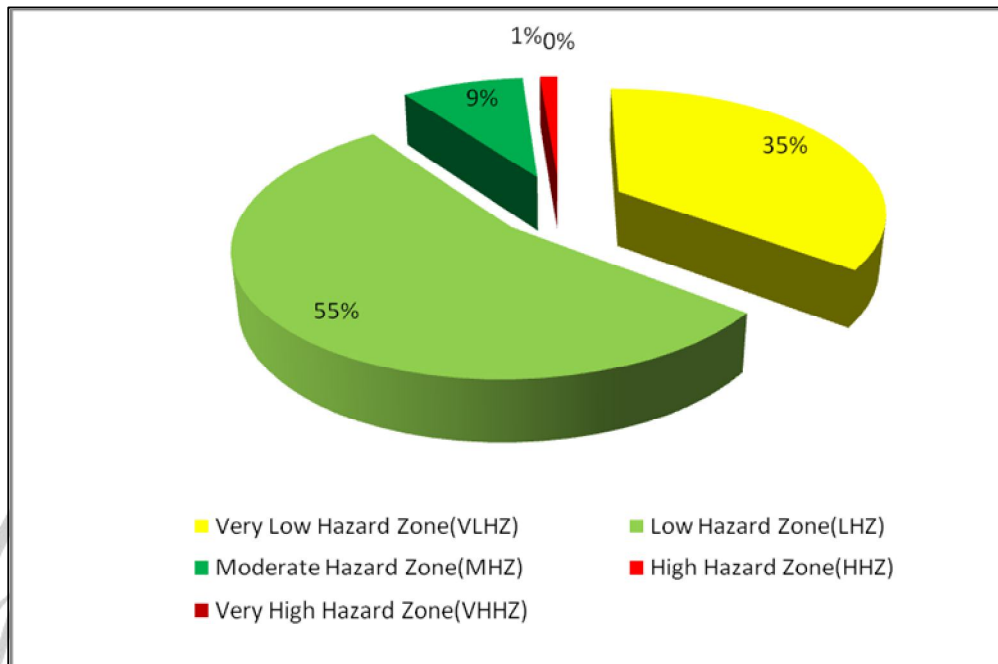


Fig 13: Pie diagram showing the hazard zone distribution

Type of Hazard zones	No.of facets	% of total facets
Very Low Hazard Zone(VLHZ)	592	35.39
Low Hazard Zone(LHZ)	914	54.63
Moderate Hazard Zone(MHZ)	146	8.73
High Hazard Zone(HHZ)	21	1.26
Very High Hazard Zone(VHHZ)	0	0.00

Table 2: Facets covered by different susceptibility classes in the investigated area

47 facets out of 146 facets which are grouped under Moderate hazard Zone(MHZ) are having TEHD value ranging between 7.05-7.20 can be converted to low hazard zone by effectively implementing the remedial measures like plantations of trees, slope modification in the form of benches and proper drainage facilities. Likewise 33 facets which are grouped under Low hazard zone (LHZ) are having TEHD value ranging from 6.9-7.0 is in the danger of going in to MHZ zones if remedial measures are not implemented.

V. DISCUSSION

Analysis pertaining to facets where the landslide incidences are observed (Table 3) reveals that maximum number of landslides have occurred in facet no 1008 (7 slides) followed by facet no 968 (5 slides), facet nos 740,834,1661 (3 slides each), facet nos 12,576,603,615,616,791,801,936,975 and 1524 (2 slides each) and single slide is noticed in 31 facets. Lithologically most of the slides occurred (35 slides) where lithology is gneiss/weathered gneiss followed by Schist's (3 slides) and Laterite (1 slide). 8 landslides are observed on the soil cover where bedrock is missing are mainly earth slumps. The slope morphometry studies indicate that, landslides occur in three slope categories viz., very gentle slope, gentle slopes and moderately gentle slope. Likewise under the Landcover parameters, the thickly vegetated forest area shows 11 landslide incidences mainly due to anthropogenic activity in the form of slope cutting while 32 slides occurred in moderately vegetated area and 4 slides in sparsely vegetated area. Landuse parameter indicates that 22 landslides observed in Major communication routes involving extensive slope cutting and 23 landslides in thickly populated slope modified by large scale excavation indicating the landslides are result of anthropogenic activity. In case of relief parameters, landslides occur in low and medium relief categories. Hydrologically, 31 landslides seen in wet conditions and 16 landslides in flowing conditions. Under slope erosion parameter 30 landslides are experiencing deep gully erosion and 16 landslides are affected by severe toe erosion by *nala* or river. All the landslides sites observed receive more than 2000 mm of rainfall. The above observations show that landslides usually are not caused by a single parameter but the resultant effect of many parameters. The analysis also validates the using various parameters for landslide hazard zonation. The result of zonation is satisfactory as out of 21 High hazard zones 18 zones recorded landslides i.e.86% of the HHZ zones are affected by landslides. The present study also reveals that the occurrence of landslides clearly shows that extensive slope cutting, a sub parameter of land use and rainfall are the major factors in inducing landslide and creating HHZ in the area.

The Macroscale LHZ map of the study area is a derivative and dynamic map incorporating various geoenvironmental parameters and the thematic maps covering themes like geology, structure, landuse, landcover, slope aspects, hydrology, rainfall etc. The landslide hazard map in general gives an overall picture of the slope condition with respect to its stability. The map can be very well utilized as base map for any future development activity or maintenance of the existing plan. However, any modification and change in the present condition of the parameter either individually or collectively may affect the present status of LHZ map.

Table 3: Landslide hazard zonation in relation to landslides in the area

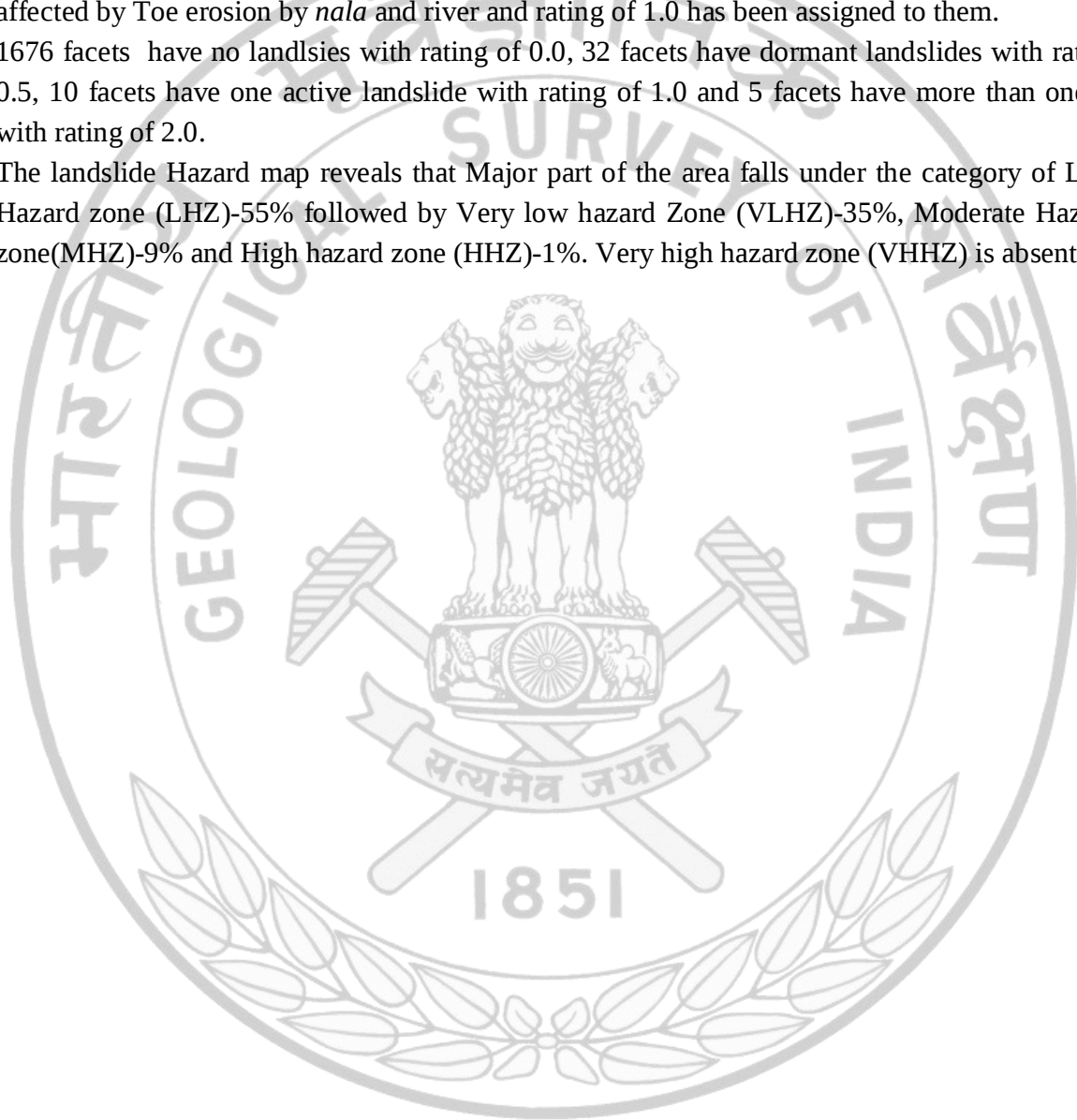
Facet no	Rock type	No of landslide incidence	Slope Rating	Final relief rating	Land cover Rating	Land use Rating	Hydrology Rating	landslide Rating	Erosion rating	Rain Rating	TEHD	Zonation
12	Soil	2	0.8	0.3	0.4	0.0	0.5	1.0	0.0	0.6	5.45	LHZ
549	Gneiss	1	0.8	0.3	0.6	0.5	0.5	0.5	0.5	0.6	6.7	LHZ
576	Gneiss	2	0.8	0.3	0.6	0.5	0.5	1.0	0.5	0.6	7.55	MHZ
580	Gneiss	1	0.8	0.2	0.6	0.5	0.5	0.5	0.5	0.6	6.6	LHZ
602	Gneiss	1	0.5	0.2	0.6	0.5	0.5	0.5	0.5	0.6	6.3	LHZ
603	Gneiss	2	0.5	0.2	0.6	0.5	0.5	1.0	0.5	0.6	6.9	LHZ
615	Gneiss	2	0.8	0.2	0.6	0.5	0.5	1.0	0.5	0.6	7.4	MHZ
616	Gneiss	2	0.5	0.2	0.6	0.5	0.5	1.0	0.5	0.6	6.9	LHZ
740	Soil	3	0.8	0.2	0.6	0.5	0.5	2.0	0.5	0.6	7.5	MHZ
741	Soil	1	0.5	0.2	0.6	0.5	1.0	0.5	0.5	0.6	6.2	LHZ
790	Schist	1	0.8	0.3	0.6	1.0	0.5	0.5	0.5	0.6	8.05	MHZ
791	Schist	2	0.8	0.3	0.6	1.0	0.5	1.0	0.5	0.6	8.35	MHZ
792	Gneiss	1	1.2	0.3	0.6	1.0	1.0	0.5	0.5	0.6	8.55	HHZ
793	Gneiss	1	0.8	0.3	0.6	1.0	1.0	0.5	0.5	0.6	8.15	MHZ
795	Gneiss	1	0.8	0.3	0.6	1.0	1.0	0.5	0.5	0.6	8.15	MHZ
801	Gneiss	2	0.5	0.3	0.8	0.5	1.0	1.0	0.5	0.6	9.05	HHZ
802	Gneiss	1	0.5	0.3	0.8	0.2	0.5	0.5	0.5	0.6	6.75	LHZ
807	Gneiss	1	0.8	0.3	0.6	0.5	0.5	0.5	0.5	0.6	7.15	MHZ
808	Gneiss	1	0.8	0.3	0.6	0.5	0.5	0.5	0.5	0.6	7.55	MHZ
834	Gneiss	3	0.5	0.3	0.6	0.5	0.5	2.0	0.5	0.6	8.75	HHZ
849	Gneiss	1	0.8	0.2	0.6	0.5	0.5	0.5	0.5	0.6	7.35	MHZ
868	Gneiss	1	0.5	0.3	0.6	0.5	1.0	0.5	0.5	0.6	7.85	MHZ
869	Gneiss	1	0.5	0.3	0.6	0.5	1.0	0.5	0.5	0.6	7.85	MHZ
910	Gneiss	1	1.2	0.2	0.6	1.0	1.0	0.5	0.5	0.6	8.8	HHZ
936	Gneiss	2	0.8	0.3	0.6	0.5	1.0	1.0	1.0	0.6	9	HHZ
950	Gneiss	1	0.5	0.3	0.6	1.0	1.0	0.5	1.0	0.6	8.95	HHZ
951	Gneiss	1	0.8	0.3	0.6	1.0	0.5	0.5	1.0	0.6	8.65	HHZ
953	Gneiss	1	0.8	0.3	0.6	1.0	0.5	0.5	1.0	0.6	8.85	HHZ
968	Gneiss	5	0.5	0.3	0.6	1.0	1.0	2.0	0.5	0.6	9.85	HHZ
975	Gneiss	2	0.8	0.3	0.6	1.0	1.0	1.0	1.0	0.6	9.25	HHZ
976	Gneiss	1	0.8	0.3	0.4	1.0	1.0	0.5	1.0	0.6	8.3	MHZ
1008	Gneiss	7	0.5	0.3	0.4	1.0	0.5	2.0	1.0	0.6	9.15	HHZ
1009	Gneiss	1	0.8	0.3	0.4	1.0	0.5	0.5	0.5	0.6	7.45	MHZ
1010	Gneiss	1	0.5	0.3	0.4	1.0	0.5	0.5	0.5	0.6	7.15	MHZ
1013	Gneiss	1	0.8	0.3	0.4	1.0	0.5	0.5	0.5	0.6	7.45	MHZ
1072	Gneiss	1	0.5	0.3	0.6	1.0	0.5	0.5	1.0	0.6	8.25	MHZ
1107	Schist	1	0.8	0.3	0.4	1.0	0.5	0.5	0.5	0.6	7.55	MHZ
1117	Gneiss	1	0.8	0.3	0.4	1.0	0.5	0.5	1.0	0.6	8.55	HHZ
1142	Gneiss	1	0.8	0.3	0.6	1.0	0.5	0.5	1.0	0.6	8.75	HHZ
1143	Gneiss	1	0.8	0.3	0.6	1.0	0.5	0.5	1.0	0.6	8.55	HHZ
1144	Gneiss	1	0.8	0.3	0.6	1.0	0.5	0.5	1.0	0.6	8.65	HHZ
1421	Soil	1	0.5	0.2	0.8	0.5	1.0	0.5	0.5	0.6	6.4	LHZ
1522	Soil	1	0.5	0.2	0.4	0.5	0.5	0.5	1.0	0.6	6	LHZ
1524	Soil	2	0.5	0.2	0.4	0.5	0.5	1.0	1.0	0.6	6.5	LHZ
1537	Soil	1	0.5	0.2	0.4	0.5	1.0	0.5	1.0	0.6	6.5	LHZ
1550	Soil	1	0.5	0.2	0.8	0.5	0.5	0.5	1.0	0.6	6.4	LHZ
1661	Laterite	3	0.5	0.2	0.6	0.5	1.0	2.0	0.5	0.6	8.75	HHZ

VI. SUMMARY

The landslide hazards, in general cannot be completely prevented, however, the intensity and severity of their impacts can be minimized if the problem is recognized before the development activity. The Landslide Hazard Zonation in Macro scale (1:25,000 scale) 1km on both side of the communication routes Virajpet-Madikeri (SH-89) and Madikeri-Sulya (SH-88) were taken up. A total area of 75 LKm and 150sq km was covered. The area of investigation is demarcated approximately 1km on both sides of the communication routes Virajpet-Madikeri (SH-89) and Madikeri-Sulya (SH-88) falling in parts of toposheet no 48P/16/NW, 48P/15/SE, 48P/15/SW, 48P15/NW , 48P11/NE, 48 P/11/NW, 48P/10/SW, 48P/6/SW.

1. During investigation it is observed that majority of the slides are debris slides occurred due to cutting of the natural slope for making road. The vertical cut slopes have failed due to heavy rain in the ghat section during monsoon.
2. Maximum number of facets belong to very gentle slopes $<15^{\circ}$ (1225 facets) followed by Gentle slopes $16^{\circ} - 25^{\circ}$ (403 facets) and moderately steep slopes $26^{\circ} - 35^{\circ}$ (43 facets) with only 2 facets are having steep slope $36^{\circ} - 45^{\circ}$.
3. Lithologically the studied area is represented by four different lithounits namely Migmatite / Granite gneiss/biotite gneiss, Kyanite mica gneiss with $\pm$ Silimanite, Garnet silimanite schist and laterite. The soil cover predominates over the Lithology and soil cover are generally dark brown to dark reddish brown and black in colour due to the accumulation of high organic matter under the forest cover. 565 facets have gneiss, 67 facets have schist and 54 facets have laterite as Lithology. 987 facets do not have any litho exposure and are covered by soil.
4. The regional strike of bedding swerves from NNE-SSW to NNW-SSE with $10-85^{\circ}$ westerly or easterly dips. The rocks are traversed by four different set of joints.
5. The relief of the area even though reaches up to 1386m above msl, the relative relief of the slopes in the study area lies in category I (low relative relief with <100 m height) with 1156 facets with rating of 0.3 and Category II (Medium relative relief with 101m-300m height) with 517 facets with rating of 0.6.
6. No barren land found in the area. 1082 facets are grouped under moderately vegetated area with rating of 0.6 followed by 327 facets under thickly vegetated forest area with rating of 0.4 and 264 facets with sparsely vegetated area with lesser ground cover with rating of 0.8.
7. 1473 facets are grouped under moderately populated slopes/village roads with rating of 0.5 followed by 88 facets under agricultural land with rating of 0.2, 63 facets under Major communication route involving extensive slope cutting, 26 facets under thickly populated slopes modified by large scale excavation and 23 facets with no particular Landuse
8. Most of the area between Virajpet-Madikeri- Sulya is having wet or flowing conditions with rating of 0.5 & 1.0 respectively. 1122 facets are having wet conditions with rating of 0.5 and 551 facets are having flowing/spring conditions with rating of 1.0.

9. The Average Annual Rainfall between Virajpet-Madikeri sector it is seen that areas around Siddapur where rainfall is falling between 500-2000 mm the rating for facets will be 0.4 and for areas around Virajpet and Madikeri wherein average rainfall is > 2000 mm rating will be 0.6. The area around Madikeri and between Madikeri and suliya the average rainfall is > 2000 mm accordingly rating was given as 0.6.
10. 40 facets are affected by Deep gully erosion and rating of 0.5 has been assigned to them. Along the major rivers/ nals like Cauvery and Payaswani 1-2 m toe erosion is observed. 260 facets are affected by Toe erosion by *nala* and river and rating of 1.0 has been assigned to them.
11. 1676 facets have no landslides with rating of 0.0, 32 facets have dormant landslides with rating of 0.5, 10 facets have one active landslide with rating of 1.0 and 5 facets have more than one slide with rating of 2.0.
12. The landslide Hazard map reveals that Major part of the area falls under the category of Low Hazard zone (LHZ)-55% followed by Very low hazard Zone (VLHZ)-35%, Moderate Hazard zone (MHZ)-9% and High hazard zone (HHZ)-1%. Very high hazard zone (VHHZ) is absent.



VII. RECOMMENDATIONS

Based on the present study the following recommendations are made and should be taken up by the town planners prior to start any development activities.

1. Proper drainage should be maintained. It is seen that at many places either drainage at toe is absent or not maintained properly (Photo12). The drainage on slope is also paramount; the water from the hill may be diverted in the following ways in order to minimize the slide

- i. Making contour drainage at the top of the slopes
- ii. The catch water drains in the sections
- iii. Inserting horizontal perforated pipes in to the slopes which will act as weep holes in the vertical slopes thus reducing the pore pressure by draining out the excess water. This is to be given at suitable interval as per the site condition.

2. Vertical cut slopes should be avoided in future as it does not give stability in such terrain. Due care should be given to the cut slopes made for road construction and plantations either during cutting of the slope following proper slope stability practices or after cutting by providing suitable retaining structures. Retaining structures like retaining wall, stone pitching and gabions are recommended as per the site condition and also geometrical modification of the slope by grading and bench.

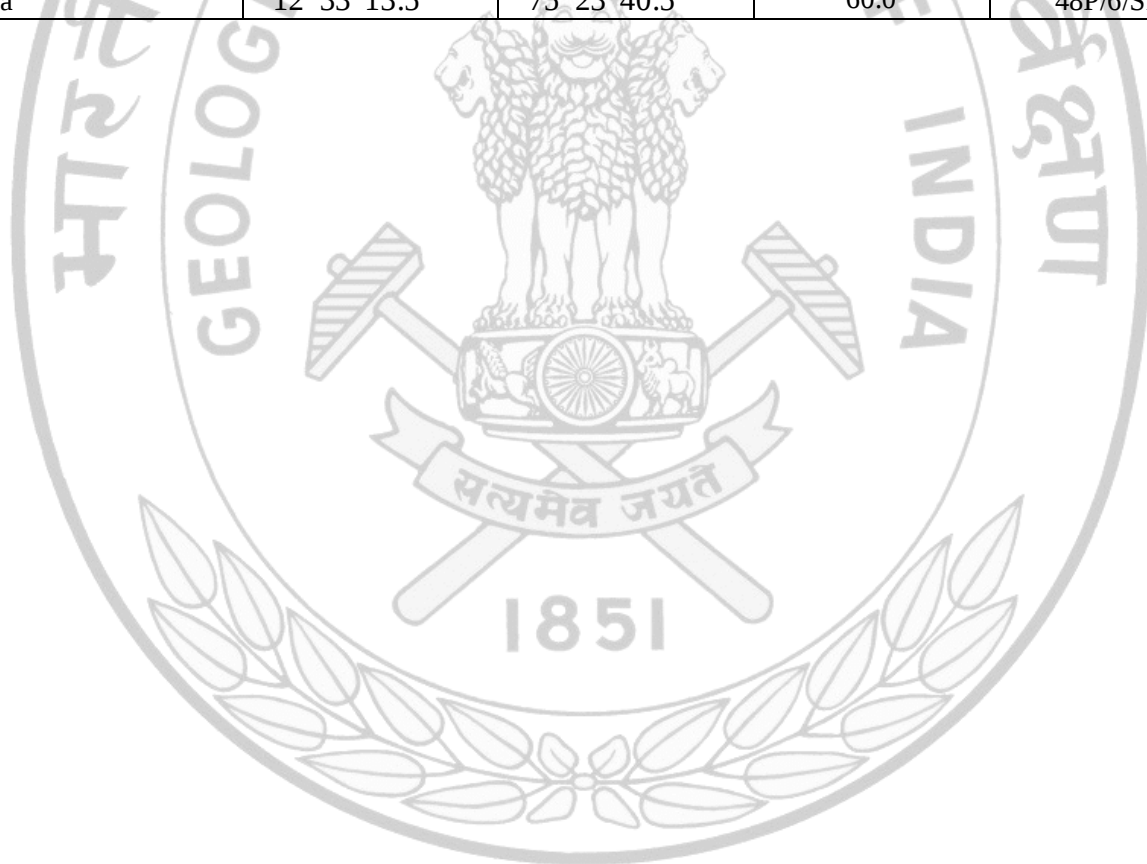
3. Plantations like vetriver may be planted which is best means to improve the slope stability conditions.

4. Spatial prediction of landslide potential slopes through landslide hazard zonation input is an important tool for disaster management. The different methods have their own merits and demerits. Since the landslide contributing factors vary from region to region, uniform rating criteria cannot be applied to different geo-environmental condition. The scheme of classifying factors responsible for landslides in Western Ghats should be worked out prior to taking up other landslide zonation projects in these areas.

(K.V.Maruthi) Senior Geologist	(K.V.Chandran) Senior Geologist
SCRUTINIZED BY (Shafeeq Ahamed) Director	

LOCALITY INDEX

Locality	Latitude	Longitude	Altitude	T. S. No.
Virajpet	12° 11' 45"	75° 48' 8.2"	925.4	48P/16/NW
Ammatti	12° 14' 15"	75° 51' 36"	929.0	48P/16/NW
Siddapur	12° 17' 54.8"	75° 52' 31.5"	886.0	48P/15/SE
Chettali	12° 22' 10.5"	75° 49' 56.2"	993.0	48P/15/SW
Kattalekadu	12° 23' 38.3"	75° 47' 43.5"	1155.0	48P/15/NW
Madikeri	12° 25' 1.2"	75° 44' 28.5"	1144.5	48P/11/NE
Made	12° 25' 14.3"	75° 41' 13.5"	839.1	48P/11/NE
Jodpal	12° 26' 0.0"	75° 39' 40.0"	630.0	48P/11/NE
Koynad	12° 28' 44.3"	75° 34' 51.8"	145.1	48P/11/NW
Sampaje	12° 29' 30.8"	75° 34' 2.3"	146.9	48P/11/NW
Kallagundi	12° 29' 55.5"	75° 32' 21"	138.3	48P/11/NW
Gonadka	12° 31' 21"	75° 30' 17.3"	124.8	48P/10/SW
Peraje	12° 31' 19.5"	75° 26' 6"	101.0	48P/6/SE
Sulya	12° 33' 13.5"	75° 23' 40.5"	60.0	48P/6/SE



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SYNOPSIS OF WORK DONE

1	Title of the report	LANDSLIDE HAZARD ZONATION OF VIRAJPET-MADIKERE-SULYA ROAD SECTION COORG DISTRICT, KARNATAKA.			
2	Item No.	Code No.: LHZ/SR/KG/2012/121			
3	Field Season	2012-2013			
4	Date of commencement	01.04.2012			
5	Date of completion	31.03.2013			
6	Officers Associated with investigation	K.V.Maruthi, Senior Geologist K.V.Chandran, Senior Geologist			
7	Quantum of work done				
	Sl. No	Nature of work	Total workload envisaged	Work proposed for FS 2012-2013	Work completed
	I	Preparation of thematic maps(on 1:25,000 scale)	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.
		a)Slope Facet Map	-do-	-do-	-do-
		b) Slope Morphometry	-do-	-do-	-do-
		c) Lithology	-do-	-do-	-do-
		d) Structure	-do-	-do-	-do-
		e) Land use /land cover Map	-do-	-do-	-do-
		f) Relative Relief Map	-do-	-do-	-do-
		g) Hydro geological Map	-do-	-do-	-do-
		h)Landslide Incidences Map	-do-	-do-	-do-
		i) Annual rainfall data	-do-	-do-	-do-
	II	Preparation of Landslide hazard zonation/ Susceptibility map on macro scale (1: 25,000 scale) using BIS/ modified BIS code (GSI)	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.	75 L Km/ 150sq.km.
8	Expenditure (1) POL (2) Wages (3) Misc.		Rs 3259=00 Rs 3298=14 Rs 23,615=00 (Including charges of hiring vehicle)		
9	Other information if any		--		

(K.V.Maruthi)
Senior Geologist

(K.V.Chandran)
Senior Geologist

(Shafeeq Ahamed)
Director

Annexure-I

RAINFALL DATA OF DIFFERENT RAINUAGE STATIONS OVER YEARS

Rainfall data (in mm) from Madikeri(ARS) rain gauge station over the years

Year- 2002												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	6.4	0.0	6.2	2.6	11.4	0.2	2.8	0.0	0.0
2	0.0	0.0	0.0	0.2	0.0	25.6	21.8	15.2	9.8	0.0	2.4	0.0
3	0.0	0.0	0.0	0.0	0.0	25.2	27.8	18.2	4.9	0.0	0.4	0.0
4	0.0	0.0	0.0	0.0	0.0	16.0	17.2	20.2	20.6	12.4	0.0	0.0
5	0.0	0.0	0.0	0.0	12.6	0.2	15.2	27.2	1.8	0.0	0.0	0.0
6	0.0	0.0	0.0	2.8	0.0	0.0	21.8	46.8	29.6	0.0	0.0	0.0
7	0.0	0.0	0.0	17.4	0.0	0.0	6.2	16.0	38.6	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	6.8	29.0	35.4	7.4	0.0	0.0
9	0.0	2.0	0.0	15.4	0.0	1.0	1.6	71.6	14.0	59.0	0.0	0.0
10	0.0	0.5	0.0	8.8	0.0	1.2	14.6	69.8	16.8	6.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	2.0	11.0	38.6	0.0	14.0	0.0	0.0
12	0.0	0.0	0.0	22.0	0.0	2.8	104.4	19.6	2.1	36.2	0.0	0.0
13	0.0	0.0	0.0	6.2	0.0	1.8	87.0	7.0	0.2	115.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	11.2	50.6	4.8	0.0	84.6	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	27.2	21.0	4.8	0.0	6.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	18.6	36.4	70.2	41.0	1.6	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	5.1	27.8	188.8	0.8	0.8	0.0	0.0
18	0.0	0.0	0.0	0.0	0.6	12.8	22.4	53.6	0.6	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	15.4	67.1	7.0	33.6	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	3.2	19.0	4.8	18.2	0.0	15.6	0.0	0.0
21	0.0	0.0	0.0	0.0	1.4	22.2	6.0	26.4	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	23.2	5.6	22.4	0.0	2.2	0.0	0.0
23	0.0	0.0	0.0	0.0	10.6	20.7	7.8	41.2	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	8.2	0.0	50.5	6.4	46.6	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	46.4	1.6	1.6	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	13.4	21.3	15.4	4.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	11.0	5.4	0.0	0.0	5.6	0.0	0.0
28	0.0	0.0	0.0	9.6	0.0	8.0	28.2	0.0	13.4	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	2.8	30.8	0.0	0.0	0.8	0.0	0.0
30	0.0	0.0	0.0	0.0	1.3	0.6	37.4	0.0	8.0	22.2	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	43.4	2.0	0.0	4.0	0.0	0.0
Total	0.0	2.5	0.0	97.0	58.5	449.7	696.0	908.8	237.8	396.2	2.8	0.0
Annual rainfall in mm					2849.3							

Year- 2003												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	9.2	12.6	4.8	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	2.0	13.7	20.2	17.4	2.4	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	2.8	5.4	18.4	35.8	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	11.2	6.6	12.4	6.2	0.0	0.0
5	0.0	2.4	0.0	0.0	0.0	0.0	26.6	12.8	6.5	16.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	59.6	66.4	5.0	12.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	10.8	44.0	19.6	41.2	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	7.2	46.0	5.4	1.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	10.6	36.0	10.4	37.0	1.6	0.0
10	0.0	0.0	0.0	0.0	0.0	0.6	7.2	26.4	13.0	6.0	0.1	0.0
11	0.0	0.0	0.0	1.6	0.0	0.0	17.0	3.2	7.2	2.6	0.0	0.0
12	0.0	0.0	0.0	1.8	0.0	0.0	36.8	0.8	5.6	14.4	0.0	0.0
13	0.0	0.0	0.0	1.6	0.0	2.0	57.6	15.4	11.0	0.2	0.0	0.0
14	0.0	0.0	0.0	0.2	0.0	14.8	45.2	49.2	23.6	12.2	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	19.7	76.4	15.6	1.2	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	7.2	79.4	25.6	0.5	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	7.4	35.8	5.0	7.8	8.6	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	6.3	21.8	18.6	1.2	0.1	0.0	0.0
19	0.0	0.0	0.0	1.8	0.0	13.2	15.2	9.4	4.4	11.2	0.0	0.0
20	0.0	0.0	2.6	0.4	0.0	106.0	26.8	22.8	0.5	3.0	0.0	0.0
21	0.0	0.0	6.6	30.4	0.0	76.0	0.8	59.0	0.0	3.6	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	64.0	5.0	104.4	0.0	17.2	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	37.0	32.2	115.6	0.0	29.5	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	65.4	46.2	87.8	0.0	12.0	0.0	0.0
25	0.0	0.0	0.0	4.8	0.0	0.5	25.0	26.6	1.2	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	4.4	32.0	8.0	1.2	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	6.4	17.6	21.0	1.8	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	31.8	17.2	14.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	44.0	0.0	3.6	40.6	3.6	0.6	0.0	0.0	0.0
30	0.0	0.0	0.0	32.4	0.0	5.0	5.8	9.0	0.4	0.0	0.6	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	3.6	6.8	0.0	0.0	0.0	0.0
Total	0.0	2.4	9.2	119.	0.0	473.3	796.9	897.8	181.1	272.2	2.3	0.0
Annual rainfall in mm					2754.2							

Year- 2004												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	14.6	13.8	0.0	36.2	12.0	0.0	0.0	15.6	0.0
2	0.0	0.0	0.0	4.8	2.6	3.0	23.8	10.8	0.0	4.4	0.2	0.0
3	0.0	0.0	0.0	10.8	0.0	0.6	13.0	64.2	0.0	3.4	0.0	0.0
4	0.0	0.0	0.0	0.4	11.0	0.8	75.6	223.6	0.0	5.6	0.0	0.0
5	0.0	0.0	0.0	0.3	10.4	6.2	45.0	127.8	0.0	17.6	0.0	0.0
6	0.0	0.0	0.0	1.6	1.8	3.0	1.4	71.8	0.0	2.0	1.6	0.0
7	0.0	0.0	0.0	0.6	26.0	3.2	0.0	59.4	0.5	0.0	18.5	0.0
8	0.0	0.0	0.0	0.0	8.4	6.4	1.7	8.8	3.4	0.0	0.2	0.0
9	0.0	0.0	0.0	0.0	13.4	19.0	1.6	9.8	7.0	0.0	9.5	0.0
10	0.0	0.0	0.0	0.0	3.0	79.8	3.7	8.0	12.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	70.0	2.8	3.6	36.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	64.0	7.4	4.8	9.6	4.8	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	72.0	5.8	38.0	14.0	6.4	4.4	0.0
14	0.0	0.0	0.0	0.0	0.0	102.0	20.8	30.8	3.0	29.8	0.0	0.0
15	0.0	0.0	0.0	0.0	9.0	126.8	46.8	22.4	7.6	23.5	0.0	0.0
16	0.0	0.0	0.0	0.0	31.4	69.6	48.8	48.8	13.4	10.6	0.0	0.0
17	0.0	0.0	0.0	0.0	11.0	47.8	15.4	37.4	0.0	5.0	0.0	0.0
18	0.0	0.0	0.0	0.0	17.8	28.0	2.2	25.0	2.5	11.2	0.0	0.0
19	0.0	0.0	0.0	0.0	19.8	14.8	1.2	37.8	0.0	14.4	0.0	0.0
20	0.0	0.0	0.0	0.2	6.2	1.0	3.4	46.0	0.2	0.0	0.0	0.0
21	0.0	0.0	0.0	0.6	8.8	2.8	8.0	5.2	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	21.8	4.4	1.2	18.6	12.6	7.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	17.7	2.0	36.0	27.8	0.2	1.0	0.0	0.0
24	0.0	0.0	0.0	4.6	3.8	2.0	93.8	23.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.2	0.0	12.8	4.5	72.8	9.0	2.8	0.0	0.0	0.0
26	0.0	0.0	2.0	8.6	15.6	17.2	45.6	24.0	0.4	0.0	0.0	0.0
27	0.0	0.0	0.4	0.0	6.0	17.8	55.2	40.6	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	30.0	26.8	9.6	0.6	0.0	0.0	0.0
29	0.0	0.0	3.4	0.0	0.0	18.0	19.8	1.6	1.2	5.8	0.0	0.0
30	0.0	0.0	21.6	41.0	0.0	28.6	29.6	0.5	0.0	3.8	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	2.4	0.0	0.0
Total	0.0	0.0	27.6	109.	254.7	842.1	778.8	1044.7	121.4	151.7	50.0	0.0
Annual rainfall in mm					3380.9							

Year- 2005												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.8	0.0	0.0	0.0	1.0	96.8	90.0	0.4	0.0	7.6	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	70.0	94.4	1.0	0.0	2.8	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	26.7	18.4	38.5	0.0	16.2	0.0
4	0.0	0.0	0.0	6.2	0.0	0.0	31.0	54.2	0.0	0.0	3.4	0.0
5	0.0	0.0	0.0	0.4	0.0	0.0	44.8	31.4	33.8	0.0	0.0	0.0
6	0.0	0.0	0.0	0.1	0.0	4.6	22.6	15.6	4.0	2.8	8.2	0.0
7	0.0	0.0	0.0	6.0	0.0	5.0	39.6	14.6	14.2	0.6	0.0	0.0
8	0.0	0.0	2.0	0.0	0.0	0.5	12.4	2.8	3.8	1.6	0.4	0.0
9	0.0	0.0	0.0	0.8	0.0	2.6	62.4	9.0	46.2	3.4	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	7.4	93.8	26.6	16.0	0.8	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	16.6	43.4	55.0	42.8	0.8	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	5.6	27.6	31.4	21.0	30.4	0.6	0.0
13	0.0	0.0	0.0	0.0	0.0	0.2	15.6	9.0	46.0	29.8	3.1	0.0
14	0.0	0.0	0.0	17.2	0.0	0.8	2.6	44.0	34.0	45.6	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	1.2	6.0	28.2	13.0	0.1	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.6	0.1	53.7	8.1	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	11.2	8.2	38.2	1.4	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	21.0	26.0	36.7	0.6	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	43.4	4.4	9.0	0.2	1.2	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	26.4	36.0	12.3	22.0	1.6	0.0	0.0
21	0.0	0.0	0.0	1.5	0.0	100.6	11.4	0.0	65.0	3.4	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	67.4	14.8	15.1	10.8	3.2	0.1	0.0
23	0.0	0.0	0.0	6.4	0.2	44.2	20.3	0.0	0.6	45.6	10.2	0.0
24	0.0	0.0	0.0	23.6	1.8	9.4	103.6	0.6	0.6	0.8	0.8	0.0
25	0.0	0.0	0.0	0.0	0.0	19.0	126.0	7.0	1.4	0.2	15.6	0.0
26	0.0	0.0	0.0	0.6	26.8	24.2	83.8	11.4	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	25.8	2.4	33.6	67.4	0.0	0.0	2.6	0.0	0.0
28	0.0	0.0	0.0	2.0	0.0	31.6	67.4	12.8	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	26.0	64.4	13.4	0.0	1.2	0.0	0.0
30	0.0	0.0	0.0	0.0	1.5	41.8	45.9	3.4	0.0	15.6	0.0	0.0
31	1.0	0.0	0.0	0.0	0.0	0.0	105.0	27.6	0.0	0.0	0.0	0.0
Total	1.0	0.8	2.0	90.6	32.7	545.9	1380.0	765.8	425.4	191.3	69.0	0.0
Annual rainfall in mm					3504.5							

Year- 2006												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	67.7	32.0	13.8	6.6	1.8	11.6	0.0
2	0.0	0.0	0.0	0.0	0.0	22.8	45.8	11.4	4.2	20.8	43.6	0.0
3	0.0	0.0	0.0	0.0	11.2	37.4	118.6	14.2	0.0	4.6	1.2	0.0
4	0.0	0.0	0.0	0.0	0.0	34.6	79.4	36.8	0.8	18.4	1.0	0.0
5	0.0	0.0	2.5	3.5	35.9	2.8	22.6	27.8	0.0	3.2	15.2	0.0
6	0.0	0.0	10.8	0.0	19.8	3.6	12.8	13.8	0.0	45.6	2.0	0.0
7	0.0	0.0	4.6	8.2	0.0	0.0	14.8	10.0	0.0	0.4	2.8	0.0
8	0.0	0.0	30.8	0.0	14.8	27.4	43.2	2.2	0.0	7.0	0.4	0.0
9	0.0	0.0	0.4	0.0	0.8	0.4	17.4	0.6	0.0	3.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	1.0	7.0	40.6	47.0	1.4	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	11.2	33.2	48.0	7.8	3.5	0.0	2.5
12	0.0	0.0	0.0	0.0	6.0	14.2	31.7	85.0	7.0	10.4	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	20.2	48.0	13.6	0.0	0.0	0.0
14	0.0	0.0	0.0	1.4	0.0	0.0	39.0	56.0	23.0	0.0	0.0	0.0
15	0.0	0.0	0.0	16.0	0.0	1.6	67.0	58.0	13.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.4	0.0	0.0	55.0	60.6	32.0	0.0	0.0	0.0
17	0.0	0.0	0.0	5.6	0.0	4.4	17.2	41.6	19.9	3.2	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.8	14.4	28.4	32.8	0.0	0.8	0.0
19	0.0	0.0	0.0	0.0	27.6	4.0	45.4	22.4	13.8	1.2	16.2	0.0
20	0.0	0.0	0.0	0.0	0.0	3.4	32.0	5.8	10.4	0.0	0.6	0.0
21	0.0	0.0	0.0	0.0	20.8	1.2	21.2	10.4	9.0	4.2	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	25.0	9.8	0.4	16.8	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	3.0	4.0	0.8	0.2	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	42.6	9.2	0.0	0.2	0.0	4.6	0.0
25	0.0	0.0	0.0	0.0	3.4	38.6	2.0	1.0	7.1	0.0	0.5	0.0
26	0.0	0.0	0.0	0.0	8.6	49.4	62.0	9.8	32.0	3.6	0.0	0.0
27	0.0	0.0	0.0	0.0	11.0	25.2	46.0	2.4	2.5	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	98.2	38.9	37.0	3.8	0.0	1.6	0.8	0.0
29	0.0	0.0	0.0	0.0	94.0	49.0	15.6	10.8	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	106.4	49.8	8.0	8.8	33.0	16.2	0.0	0.0
31	0.0	0.0	0.0	0.0	80.6	0.0	5.2	18.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	49.1	35.1	539.1	560.0	968.7	691.2	332.7	150.1	101.	2.5
Annual rainfall in mm					3429.8							

Year- 2007												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	De
1	0.0	0.0	0.0	0.0	0.0	0.0	207.0	26.6	24.6	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	14.0	0.0	93.4	8.0	13.0	9.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	62.4	40.2	32.8	1.0	0.0	0.0
4	0.0	0.0	0.0	0.0	9.8	0.0	58.0	21.8	35.8	6.8	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	45.4	124.0	13.8	0.2	0.6	0.0
6	0.0	0.0	0.0	0.0	1.5	8.4	59.0	126.4	53.0	1.2	0.0	0.0
7	0.0	0.0	0.0	0.0	6.8	0.6	96.4	91.0	8.6	0.0	47.5	0.0
8	0.0	0.0	0.0	0.0	0.0	0.3	38.4	71.0	8.6	0.6	1.8	0.0
9	0.0	0.0	0.0	0.0	0.0	9.6	56.2	74.2	0.2	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	28.6	125.4	18.8	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	45.8	76.0	1.4	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	28.8	67.2	1.8	0.0	0.0	0.0
13	0.0	0.0	0.0	2.5	0.0	9.0	22.2	11.6	15.8	0.0	0.0	0.0
14	0.0	0.0	0.0	6.6	0.0	2.2	19.8	2.0	2.0	0.0	0.0	0.0
15	0.0	0.0	0.0	3.6	0.0	48.0	16.0	0.0	38.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	7.0	53.8	0.0	46.8	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	16.4	166.4	0.0	10.0	16.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	5.0	88.6	7.0	44.6	52.6	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	19.6	31.8	6.0	7.2	0.8	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	31.0	0.8	1.6	7.0	11.0	0.0	5.0
21	0.0	0.0	0.0	0.0	0.0	17.6	19.8	31.2	8.9	2.0	0.0	0.0
22	0.0	0.0	0.0	8.8	0.0	32.6	2.2	56.4	6.4	19.2	0.0	0.0
23	0.0	0.0	0.0	4.8	0.0	259.9	2.0	3.0	26.6	62.0	0.0	0.0
24	0.0	0.0	0.0	0.1	0.0	95.0	2.0	19.2	32.4	0.8	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	35.2	2.0	5.4	48.5	0.6	0.0	0.0
26	0.0	0.0	0.0	0.0	0.5	16.0	2.0	2.0	20.8	0.2	0.0	0.0
27	0.0	0.0	0.0	0.0	1.8	35.8	7.2	19.0	6.6	4.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	34.8	14.4	2.8	3.2	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	37.2	19.0	20.4	2.4	12.8	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	138.4	11.2	10.6	0.0	1.0	0.0	0.0
31	0.0	0.0	0.0	0.0	1.8	0.0	11.6	26.5	0.0	3.0	0.0	0.0
Total	0.0	0.0	0.0	26.4	36.2	859.6	1312.2	1076.5	539.6	204.8	49.9	5.0
Annual rainfall in mm					4110.2							

Year- 2008												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	26.0	47.2	14.6	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	19.8	19.2	35.2	12.0	0.0	0.0	0.0
3	0.0	0.0	0.0	6.8	0.0	33.8	7.0	23.6	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	9.4	0.0	0.0	11.4	35.8	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	1.4	7.0	20.2	0.3	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	1.5	9.2	10.8	0.0	27.8	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	18.6	19.4	24.2	1.4	25.4	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	1.8	45.0	5.8	25.0	7.6	0.0	0.0
9	0.0	0.0	0.0	0.0	7.2	17.8	25.6	42.2	43.6	6.4	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	14.8	16.8	93.2	50.6	8.2	0.0	0.0
11	0.0	0.0	0.0	0.0	5.4	12.8	9.0	67.8	12.0	1.4	0.0	0.0
12	0.0	3.5	0.0	0.0	0.0	66.5	9.6	54.0	8.6	9.2	0.0	0.0
13	0.0	2.8	22.5	0.0	0.0	34.6	3.4	104.6	25.0	7.4	0.0	0.0
14	0.0	10.0	0.2	0.0	0.0	11.8	3.6	57.4	14.8	6.0	0.0	0.0
15	0.0	0.0	12.2	0.0	0.0	73.6	2.8	25.0	16.2	2.8	0.0	0.0
16	0.0	0.0	29.0	0.6	0.0	6.2	5.9	11.2	2.0	0.4	0.0	0.0
17	0.0	0.0	7.4	0.0	0.0	30.2	2.2	12.2	3.6	0.8	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	13.4	0.8	4.0	0.4	0.0	5.4	0.0
19	0.0	0.0	0.0	0.0	0.0	49.2	2.0	3.0	0.0	4.0	0.0	0.0
20	0.0	0.0	44.2	0.0	0.0	5.2	0.6	1.0	12.0	23.0	0.0	0.0
21	0.0	0.0	25.0	5.6	0.0	16.0	0.0	0.2	0.8	4.0	0.0	0.0
22	0.0	0.0	39.8	0.0	2.0	10.4	1.0	13.6	0.1	8.6	0.0	0.0
23	0.0	0.0	0.0	19.0	0.0	21.0	5.2	7.0	0.0	4.8	4.4	0.0
24	0.0	0.0	0.1	2.0	12.0	12.8	5.2	6.2	0.0	27.0	1.0	0.0
25	0.0	0.0	1.8	0.0	0.0	13.2	34.5	0.1	2.4	35.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	16.8	33.2	0.4	0.0	9.4	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	17.6	63.4	37.6	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	36.8	148.2	4.6	0.0	0.0	0.4	0.0
29	0.0	0.0	4.8	0.0	0.0	37.0	73.2	0.0	0.0	0.0	0.8	0.0
30	0.0	0.0	0.0	0.0	0.5	40.4	73.0	13.6	0.0	0.0	0.0	0.0
31	0.0	0.0	0.8	0.0	0.0	0.0	84.0	28.5	0.0	0.0	0.0	0.0
Total	0.0	16.3	187.	43.4	27.1	635.0	747.4	790.2	245.4	219.2	12.0	0.0
Annual rainfall in mm					2923.8							

Year- 2009												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	3.0	0.0	30.6	29.6	17.6	42.4	0.0	0.0
2	0.0	0.0	0.0	0.0	2.0	3.5	30.8	28.0	41.4	74.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	1.0	43.0	14.6	15.4	12.4	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.2	55.6	17.0	44.6	49.4	0.0	0.0
5	0.0	0.0	0.0	0.0	20.8	5.0	95.8	5.4	70.0	2.8	0.0	0.6
6	0.0	0.0	0.0	0.0	0.0	36.0	98.0	7.6	63.4	0.8	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	44.0	77.6	9.6	58.4	0.8	1.2	0.0
8	0.0	0.0	0.0	0.0	0.0	17.8	49.2	8.2	23.2	0.4	14.2	0.0
9	0.0	0.0	0.0	0.0	4.8	8.0	37.2	14.0	0.8	0.0	5.2	0.0
10	0.0	0.0	0.0	0.0	0.0	0.4	103.4	28.0	2.6	0.0	50.2	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	26.6	33.6	3.4	0.0	3.8	0.0
12	0.0	0.0	43.8	0.0	0.0	0.0	30.6	29.2	0.8	0.0	0.8	0.0
13	0.0	0.0	2.6	0.0	0.0	7.0	8.8	12.8	0.6	7.5	0.0	0.0
14	0.0	0.0	0.5	0.0	0.0	0.6	48.2	2.0	28.8	13.6	0.1	0.0
15	0.0	0.0	0.3	0.0	0.0	9.2	128.2	1.8	3.2	1.0	4.5	0.0
16	0.0	0.0	0.0	0.0	0.0	0.2	267.4	3.0	3.8	0.0	0.6	0.0
17	0.0	0.0	0.0	0.0	0.0	4.2	112.2	30.5	0.8	0.0	2.8	0.0
18	0.0	0.0	0.0	0.0	7.0	6.2	114.2	5.4	4.2	0.0	0.0	0.0
19	0.0	0.0	0.0	0.1	7.2	14.8	27.8	10.8	23.2	0.0	0.0	0.0
20	0.0	0.0	0.0	7.8	2.0	6.1	32.4	0.1	4.2	0.0	0.6	0.0
21	0.0	0.0	0.0	0.4	0.0	1.6	17.8	0.0	0.6	0.0	9.0	0.0
22	0.0	0.0	0.0	0.0	2.0	3.8	17.2	30.0	2.2	0.0	0.0	0.0
23	0.0	0.0	0.0	27.4	0.2	6.2	6.6	8.6	0.0	0.0	0.0	0.0
24	0.0	0.0	2.4	0.0	0.0	26.6	1.0	40.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.8	0.0	0.2	11.0	1.0	13.0	3.8	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	2.0	20.2	1.0	12.0	5.8	0.0	0.0	0.8
27	0.0	0.0	0.2	17.2	2.4	3.8	0.4	29.0	0.2	0.0	0.0	22.2
28	0.0	0.0	11.4	0.0	2.4	1.8	29.4	1.6	4.0	0.0	0.0	35.4
29	0.0	0.0	0.0	0.0	0.0	1.0	55.2	2.2	23.4	0.0	0.0	32.6
30	0.0	0.0	0.0	4.6	0.0	16.6	42.2	1.2	5.4	0.0	0.0	11.0
31	0.0	0.0	0.0	0.0	0.0	0.0	18.6	9.0	0.0	0.0	0.0	0.2
Total	0.0	0.0	62.0	57.5	56.0	256.8	1608.0	437.8	455.8	205.1	93.0	102.8
Annual rainfall in mm					3334.8							

Year- 2010												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	4.8	0.0	4.6	27.2	0.0	9.0	7.2	0.0
2	0.0	0.0	0.0	0.0	11.0	0.0	12.2	10.6	2.8	13.6	15.8	0.0
3	0.0	0.0	0.0	0.0	18.8	15.0	15.6	6.8	16.6	68.4	4.8	11.4
4	0.0	0.0	0.0	0.6	0.0	0.0	19.4	45.4	30.2	62.0	7.4	0.0
5	0.0	0.0	0.0	0.0	0.0	0.6	21.0	27.0	1.2	39.8	36.6	0.0
6	0.0	0.0	0.0	0.0	0.0	4.0	38.8	5.6	18.2	11.4	26.6	0.0
7	0.0	0.0	0.0	0.0	9.4	2.0	21.4	18.6	8.2	0.0	0.8	0.0
8	0.0	0.0	0.0	0.0	0.0	2.8	12.0	18.2	42.4	1.8	1.8	0.0
9	0.0	0.0	0.0	11.8	9.2	0.8	0.6	13.6	28.6	6.4	0.2	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.4	14.4	0.0	9.6	0.0
11	0.0	0.0	0.0	0.0	11.6	1.0	1.6	16.8	30.6	0.0	9.0	0.0
12	0.0	0.0	0.0	0.0	16.0	3.6	0.0	5.0	0.0	0.0	6.6	0.0
13	0.0	0.0	0.0	0.8	0.0	42.5	13.8	8.4	3.4	1.2	0.0	0.0
14	1.2	0.0	0.0	0.0	0.0	61.8	7.6	7.0	9.4	1.0	0.0	0.0
15	0.0	0.0	0.0	3.2	0.0	39.6	1.6	0.6	5.4	2.6	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	11.4	9.0	9.0	17.6	0.6	0.0	0.0
17	0.0	0.0	5.0	1.2	1.8	9.8	15.4	26.6	9.8	1.8	2.6	0.0
18	0.0	0.0	0.0	1.0	0.0	9.4	21.6	28.6	2.0	11.0	13.2	0.0
19	0.0	0.0	0.0	0.1	3.2	8.4	36.8	9.4	0.0	2.2	0.0	0.0
20	0.0	0.0	0.0	0.0	17.8	8.4	43.4	2.2	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	1.4	1.6	38.6	5.6	0.0	1.2	0.0	0.0
22	0.0	0.0	0.0	0.1	0.0	0.0	52.4	17.0	13.2	17.0	0.0	0.0
23	0.0	0.0	0.0	28.6	0.0	27.4	35.0	3.6	5.8	13.0	1.8	0.0
24	0.0	0.0	0.0	0.8	0.6	22.4	11.0	37.6	0.6	1.4	0.0	0.0
25	0.0	0.0	0.0	0.0	0.4	22.8	26.4	49.4	14.6	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	16.2	14.0	18.0	36.4	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	14.4	58.4	44.0	5.8	4.2	2.6	0.0
28	0.0	0.0	0.0	20.2	0.0	8.0	76.6	18.6	12.6	15.4	0.0	0.0
29	0.0	0.0	0.0	12.8	0.0	14.6	92.4	14.4	0.0	0.0	2.4	0.0
30	0.0	0.0	0.0	0.0	0.0	2.4	112.5	20.4	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	15.2	0.0	50.8	80.8	0.0	10.2	0.0	0.0
Total	1.2	0.0	5.0	81.2	121.2	350.9	864.5	628.4	329.8	295.2	149.0	11.4
Annual rainfall in mm					2837.8							

Year- 2011												
Month	Jan	Feb	Ma	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	2.4	0.0	2.6	15.8	46.8	0.0	0.3	0.0
2	0.0	0.0	0.0	0.0	0.0	5.4	29.0	27.0	107.6	0.0	14.8	0.0
3	0.0	0.0	0.0	0.0	0.0	26.8	3.8	68.0	81.0	2.4	17.2	0.0
4	0.0	0.0	0.0	0.0	0.0	31.6	4.4	64.0	65.8	0.0	10.2	0.2
5	0.0	0.0	0.0	0.0	0.0	27.0	20.0	45.0	7.4	0.0	1.6	0.0
6	0.0	0.0	0.0	0.0	0.0	20.0	19.4	92.2	6.2	0.0	1.2	0.0
7	0.0	0.0	0.0	0.0	0.0	16.2	35.2	49.6	18.8	0.0	7.8	0.0
8	0.0	0.0	0.0	0.0	0.0	15.0	11.4	60.0	8.6	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	7.4	13.0	36.0	10.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	12.8	4.6	18.0	10.2	4.8	0.0	0.0
11	0.0	0.0	0.0	7.2	0.0	6.4	18.8	16.6	25.0	6.2	0.0	0.0
12	0.0	0.0	0.0	2.4	2.8	30.0	11.6	25.2	14.0	4.6	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	12.6	30.0	43.2	9.6	12.6	0.0	0.0
14	0.0	0.0	0.0	2.6	1.2	22.6	41.4	4.0	14.0	0.0	0.0	0.0
15	0.0	0.0	0.0	12.4	0.0	24.6	49.4	10.8	24.6	4.8	0.0	0.0
16	0.0	0.0	0.0	0.2	1.2	13.4	40.8	1.4	31.8	7.0	0.0	0.0
17	0.0	0.0	0.0	2.0	0.0	31.2	58.0	5.2	5.6	0.4	0.0	0.0
18	0.0	0.0	0.0	0.0	43.4	94.2	54.8	4.0	4.5	4.8	0.0	0.0
19	0.0	0.0	0.0	11.6	0.0	22.4	70.0	25.8	31.0	0.2	0.0	0.0
20	0.0	0.0	0.0	8.6	0.0	2.4	47.2	11.0	8.0	0.0	0.0	0.0
21	0.0	0.0	0.0	7.8	0.0	0.0	23.8	39.8	3.5	3.6	0.0	0.0
22	0.0	0.0	0.0	7.4	0.0	0.0	38.0	3.6	4.4	5.2	0.0	0.0
23	0.0	0.0	0.0	12.8	0.0	48.8	18.6	15.8	2.8	0.0	0.0	0.0
24	0.0	0.0	1.4	9.8	0.2	28.8	64.8	10.0	0.4	44.0	0.0	0.0
25	0.0	11.6	0.0	0.0	0.0	46.2	56.4	15.2	0.0	5.4	0.0	0.0
26	0.0	0.0	0.0	14.2	3.4	69.8	13.0	11.6	0.0	5.8	1.2	0.0
27	0.0	0.0	6.6	0.0	8.2	84.2	16.0	44.6	0.4	0.0	4.6	0.0
28	0.0	0.0	0.0	0.0	8.4	64.4	5.7	19.4	0.0	26.0	0.0	0.0
29	0.0	0.0	0.0	0.0	1.0	10.4	7.8	9.0	0.0	0.0	0.4	0.0
30	0.0	0.0	0.0	0.0	0.0	3.4	5.0	36.6	0.0	12.8	1.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	38.8	38.0	0.0	0.2	0.0	0.0
Total	0.0	11.6	8.0	99.0	72.2	778.0	853.3	866.4	542.0	150.8	60.3	0.2
Annual rainfall in mm					3441.8							

Rainfall data (in mm) from Virajpet rain gauge station over the years

Year- 2002												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	33.8	0.0	26.4	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	1.4	0.0	50.2	2.4	5.6	8.8	0.0	44.2	0.0
3	0.0	0.0	0.0	0.0	0.0	43.4	6.4	8.4	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	5.2	2.6	6.6	4.8	20.2	0.0	0.0
5	0.0	0.0	0.0	0.0	18.4	0.0	2.4	14.6	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	3.4	26.8	13.2	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	2.8	0.0	4.2	12.8	0.0	0.0	0.0
8	0.0	11.4	0.0	0.0	0.0	26.4	0.0	12.0	9.6	0.0	0.0	0.0
9	0.0	5.2	0.0	16.8	0.0	0.0	0.0	28.2	2.4	34.6	0.0	0.0
10	0.0	0.0	0.0	0.0	8.8	0.0	2.6	25.8	29.6	4.8	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	3.6	28.4	0.0	30.4	0.0	0.0
12	0.0	0.0	0.0	6.4	0.0	0.0	50.8	11.6	0.0	44.2	0.0	0.0
13	0.0	0.0	0.0	0.0	16.6	2.2	9.6	7.2	0.0	100.8	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	19.4	8.2	12.6	0.0	240.8	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	16.8	0.0	5.2	0.0	33.2	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	15.8	0.0	30.4	6.8	1.4	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	6.6	0.0	54.2	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	5.4	0.0	2.4	23.4	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	21.8	15.8	0.0	8.8	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	5.6	18.6	2.6	2.4	0.0	9.2	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	13.4	4.4	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	21.2	4.2	3.8	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	16.4	1.2	6.4	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	33.2	19.4	3.6	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	32.4	1.6	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	37.4	11.2	10.2	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	7.2	0.0	9.8	3.4	0.0	0.0	7.6	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	5.6	2.6	0.0	27.6	7.4	0.0	0.0
29	0.0	0.0	0.0	0.0	3.6	0.0	8.6	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	1.6	6.4	0.0	2.2	11.6	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	14.8	0.0	0.0	3.2	0.0	0.0
Total	0.0	16.6	0.0	31.8	117.6	401.8	173.8	356.6	117.8	549.4	44.2	0.0
Annual rainfall in mm					1809.6							

Year- 2003

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	13.2	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	12.6	6.8	8.2	9.6	21.8	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	5.8	12.8	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	11.4	14.4	4.2	10.8	0.0	0.0
5	0.0	0.0	0.0	0.0	7.6	0.0	58.6	0.0	1.2	17.4	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	57.4	10.2	2.6	1.2	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	27.6	4.6	14.8	65.2	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8	1.2	5.6	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	7.8	10.6	1.4	4.8	6.2	0.0
10	0.0	0.0	0.0	15.8	8.2	1.6	5.2	1.2	12.2	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	21.6	8.8	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	22.6	9.6	1.4	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	28.4	38.8	9.2	2.4	0.0	0.0	0.0
15	0.0	14.6	0.0	0.0	0.0	53.8	37.4	3.4	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	15.2	68.2	6.8	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	25.4	45.4	0.0	0.0	3.8	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	45.8	2.8	12.6	3.6	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	27.6	9.8	8.2	3.4	0.0	0.0	0.0
20	0.0	0.0	0.0	17.2	0.0	73.6	4.6	1.2	0.0	32.4	0.0	0.0
21	0.0	0.0	9.8	0.0	0.0	81.4	5.2	16.4	0.0	8.6	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	52.2	0.0	24.2	4.8	14.8	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	52.8	18.6	28.4	1.6	13.4	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	29.6	9.4	25.6	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	6.4	0.0	1.2	6.2	8.8	0.0	0.0	0.0	0.0
26	0.0	7.8	0.0	0.0	0.0	4.8	6.8	11.2	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	14.2	12.4	11.8	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	11.8	16.6	15.5	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	10.6	0.0	2.2	49.2	4.2	0.0	0.0	0.0	0.0
30	0.0	0.0	9.6	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	18.4	6.8	0.0	0.0	0.0	0.0
Total	0.0	30.6	19.4	50.0	15.8	556.8	567.4	282.9	82.0	212.6	6.2	0.0
Annual rainfall in mm					1823.7							

Year- 2004												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	28.8	24.6	0.0	0.0	4.2	0.0	0.0	29.8	0.0
2	0.0	0.0	0.0	0.0	8.2	15.4	10.8	2.4	0.0	1.6	7.6	0.0
3	0.0	0.0	0.0	10.4	0.0	20.2	10.4	48.4	0.0	2.2	0.0	0.0
4	0.0	0.0	0.0	0.0	4.8	2.0	31.6	106.0	0.0	40.4	0.0	0.0
5	0.0	0.0	0.0	7.8	28.8	2.6	17.4	66.2	0.0	2.2	0.0	0.0
6	0.0	0.0	0.0	4.6	7.6	2.4	0.0	22.4	3.6	0.0	0.0	0.0
7	0.0	0.0	0.0	4.4	40.4	2.8	0.0	24.8	3.8	0.0	13.8	0.0
8	0.0	0.0	0.0	0.0	24.6	24.2	1.6	16.4	1.2	0.0	0.0	0.0
9	0.0	0.0	0.0	20.2	11.8	42.6	0.0	1.6	11.6	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	7.4	69.4	8.4	1.2	15.2	11.6	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	41.4	0.0	0.0	10.4	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	47.6	3.2	11.8	11.4	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	44.8	2.8	13.2	9.6	43.8	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	68.6	4.8	22.8	0.0	7.4	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	108.2	4.2	15.2	1.8	30.2	0.0	0.0
16	0.0	0.0	0.0	0.0	33.6	87.4	18.6	12.4	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	24.2	35.6	14.2	11.8	0.0	5.2	0.0	0.0
18	0.0	0.0	0.0	0.0	2.8	16.8	4.8	8.2	0.0	3.8	0.0	0.0
19	0.0	0.0	0.0	0.0	108.6	8.6	2.6	31.4	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	11.4	0.0	18.6	16.6	0.0	3.4	0.0	0.0
21	0.0	0.0	0.0	0.0	3.8	0.0	6.2	0.0	1.6	0.0	0.0	0.0
22	0.0	0.0	0.0	24.4	0.0	0.0	7.4	0.0	0.0	4.8	0.0	0.0
23	0.0	0.0	0.0	0.0	8.2	0.0	2.6	4.8	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	12.6	0.0	0.0	10.2	2.6	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	30.8	0.0	14.8	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	15.4	0.0	15.0	5.2	0.0	5.4	0.0	0.0
27	0.0	0.0	0.0	0.0	2.4	5.2	10.8	2.8	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	2.2	5.6	4.8	3.8	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	1.8	2.8	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	30.4	0.0	19.6	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	113.2	401.2	653.2	268.0	456.2	85.0	162.0	51.2	0.0
Annual rainfall in mm					2190.0							

Year- 2005												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	87.2	70.6	0.0	0.0	1.4	0.0
2	0.0	0.0	0.0	0.0	5.4	0.0	44.6	92.8	27.2	0.0	2.2	0.0
3	0.0	0.0	0.0	0.0	0.0	23.8	20.2	12.2	28.8	8.8	2.6	0.0
4	0.0	0.0	0.0	30.8	0.0	0.0	3.6	38.4	30.4	0.0	9.4	0.0
5	0.0	0.0	0.0	0.0	0.0	21.4	25.4	10.4	10.2	1.4	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	16.2	9.8	8.6	5.6	15.2	0.0	0.0
7	0.0	0.0	0.0	7.6	0.0	6.8	23.4	6.8	0.0	14.8	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	5.6	22.6	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	6.6	3.2	33.2	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	5.8	8.2	5.6	4.6	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	10.6	3.4	2.8	14.6	6.8	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	4.8	15.2	1.2	43.8	14.2	0.0	0.0
13	0.0	0.0	0.0	12.8	15.2	0.0	13.4	1.6	27.2	14.6	6.8	0.0
14	0.0	0.0	0.0	2.4	0.0	0.0	0.0	7.7	28.4	21.6	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	8.2	7.6	27.6	39.6	27.4	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	1.8	0.0	64.4	4.2	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	27.4	2.4	26.7	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	21.6	21.8	20.6	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	28.2	2.2	1.2	0.0	6.2	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	48.6	5.4	15.4	12.2	1.4	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	101.4	0.0	20.6	21.8	5.8	0.0	0.0
22	0.0	0.0	0.0	5.2	0.0	55.8	8.6	13.6	4.6	1.6	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	25.2	7.6	0.0	0.0	23.6	0.0	0.0
24	0.0	0.0	0.0	18.8	0.0	4.6	76.8	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	6.8	44.8	0.0	6.2	5.2	13.6	0.0
26	4.8	0.0	0.0	14.6	0.0	3.6	101.2	20.4	0.0	0.0	0.0	0.0
27	8.6	0.0	0.0	18.6	0.0	8.4	36.4	0.0	2.6	4.8	0.0	0.0
28	0.0	0.0	0.0	22.4	0.0	23.4	31.2	16.8	1.8	0.0	0.0	0.0
29	0.0	0.0	0.0	4.8	4.6	14.4	24.4	11.6	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	12.2	68.6	29.6	2.8	0.0	6.8	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	71.8	0.0	0.0	1.6	0.0	0.0
Total	13.4	0.0	0.0	138.0	37.4	537.4	732.8	508.4	352.6	204.4	36.0	0.0
Annual rainfall in mm					2560.4							

Year- 2006												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	64.4	37.4	5.4	0.0	7.6	25.2	0.0
2	0.0	0.0	0.0	0.0	0.0	28.6	23.2	2.6	0.0	3.8	1.6	0.0
3	0.0	0.0	0.0	0.0	8.8	21.8	73.6	3.2	1.4	1.6	11.6	0.0
4	0.0	0.0	0.0	0.0	8.2	52.4	43.4	16.8	0.0	1.2	2.8	0.0
5	0.0	0.0	0.0	0.0	0.0	4.6	31.6	29.2	0.0	3.2	5.4	0.0
6	0.0	0.0	26.4	0.0	0.0	1.2	7.4	24.8	0.0	3.4	6.4	0.0
7	0.0	0.0	12.6	0.0	0.0	0.0	13.8	8.4	0.0	12.6	4.2	0.0
8	0.0	0.0	32.2	0.0	0.0	4.8	10.4	0.0	0.0	1.4	3.2	0.0
9	0.0	0.0	0.0	0.0	0.0	18.2	1.8	1.6	0.0	2.6	0.0	0.0
10	0.0	0.0	3.4	0.0	7.6	0.0	0.0	2.8	10.0	8.8	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	5.6	6.6	36.4	7.7	10.4	0.0	7.2
12	0.0	0.0	0.0	0.0	16.2	0.0	13.8	76.4	27.4	43.6	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	16.5	26.2	39.2	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	13.4	32.4	8.6	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	14.6	19.6	16.2	1.2	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	5.8	29.4	63.8	39.6	0.0	0.0
17	0.0	0.0	0.0	0.0	2.2	0.0	33.4	28.2	27.4	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	25.2	9.6	14.2	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	16.4	0.0	50.6	10.4	3.6	1.4	16.6	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	21.4	7.2	14.8	1.6	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	8.2	0.0	26.2	43.4	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	4.8	1.6	0.0	50.2	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	6.4	18.4	5.4	0.0	2.4	0.0	1.2	0.0
24	0.0	0.0	0.0	0.0	0.0	67.6	0.0	0.0	6.6	0.0	53.6	0.0
25	0.0	0.0	0.0	0.0	15.8	55.2	0.0	0.0	26.8	0.0	7.2	0.0
26	0.0	0.0	0.0	0.0	2.4	44.8	0.0	0.0	48.4	3.4	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	7.6	19.6	0.0	0.0	3.2	0.0	0.0
28	0.0	0.0	0.0	0.0	117.8	24.2	18.4	0.0	0.0	0.0	5.8	0.0
29	0.0	0.0	0.0	0.0	121.2	28.6	9.2	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	185.8	60.2	8.6	0.0	0.0	14.6	0.0	0.0
31	0.0	0.0	0.0	0.0	70.6	0.0	6.2	5.2	0.0	4.8	0.0	0.0
Total	0.0	0.0	74.6	0.0	579.4	513.0	521.1	375.8	394.9	213.4	144.8	7.2
Annual rainfall in mm					2824.2							

Year- 2007												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	190.0	18.6	4.6	1.4	0.0	0.0
2	0.0	0.0	0.0	0.0	3.6	0.0	70.2	1.2	12.4	6.2	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	50.4	23.6	64.8	2.2	2.6	0.0
4	0.0	0.0	0.0	0.0	36.8	0.0	33.4	44.6	3.6	0.0	36.4	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	52.8	93.2	10.4	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	25.4	0.0	28.2	105.4	17.2	12.4	0.0	0.0
7	0.0	0.0	0.0	0.0	22.8	0.0	86.6	70.6	11.6	0.0	27.8	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	28.6	58.6	2.4	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	8.2	52.2	50.4	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	26.8	70.8	22.8	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	30.6	18.4	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	4.4	12.8	21.2	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	3.4	15.0	1.4	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	8.2	0.0	0.0	32.6	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	27.6	0.0	3.8	26.8	0.0	2.8	0.0	0.0	0.0
16	0.0	0.0	0.0	1.2	0.0	10.0	113.6	0.0	6.8	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	16.4	106.8	0.0	2.6	6.8	0.0	0.0
18	0.0	0.0	0.0	10.2	0.0	21.2	26.4	8.6	30.4	5.6	0.0	0.0
19	0.0	0.0	0.0	4.6	0.0	20.6	0.0	0.0	4.6	1.4	0.0	2.2
20	0.0	0.0	0.0	0.0	0.0	16.8	0.0	4.4	4.2	3.6	0.0	3.4
21	0.0	0.0	0.0	27.8	0.0	9.6	7.2	15.8	2.8	2.8	0.0	0.0
22	0.0	0.0	0.0	3.6	0.0	30.2	1.6	53.6	2.8	1.2	0.0	0.0
23	0.0	0.0	0.0	1.0	0.0	207.8	1.6	0.0	18.6	27.4	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	75.2	0.0	2.4	33.8	4.8	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	22.4	6.8	0.0	76.2	0.0	0.0	0.0
26	0.0	0.0	0.0	1.0	3.2	3.6	3.2	0.0	36.4	2.4	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	8.2	9.2	5.6	1.6	3.6	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	42.4	9.0	11.8	3.8	10.2	0.0	0.0
29	0.0	0.0	0.0	4.8	1.6	61.6	6.4	14.2	1.6	5.4	0.0	0.0
30	0.0	0.0	0.0	12.2	5.8	186.2	4.8	16.6	8.2	16.2	0.0	0.0
31	0.0	0.0	0.0	0.0	11.5	0.0	7.4	6.8	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	102.2	110.7	752.0	1041.0	717.8	387.0	113.6	66.8	5.6
Annual rainfall in mm					3296.7							

Year- 2008												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	16.6	12.2	26.2	9.8	0.0	0.0	3.4
2	0.0	0.0	0.0	3.2	0.0	12.8	10.8	8.0	9.2	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	21.6	0.0	0.0	3.4	0.0	0.0	0.0
4	0.0	0.0	0.0	13.8	0.0	0.0	1.8	6.6	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	7.6	0.0	2.0	0.0	3.8	0.4	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	5.2	6.8	1.8	10.8	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	3.2	4.4	2.8	7.6	27.2	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	20.6	8.6	10.2	20.4	60.2	18.2	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	27.4	1.2	70.8	16.8	9.4	0.0	0.0
11	0.0	0.0	0.0	0.0	34.4	16.6	3.4	60.4	20.4	0.0	0.0	0.0
12	0.0	18.2	0.0	0.0	0.0	47.8	0.0	51.2	8.2	0.2	0.0	0.0
13	0.0	5.6	0.0	0.0	0.0	18.2	0.0	75.8	5.0	21.8	0.0	0.0
14	0.0	0.0	3.6	0.0	0.0	9.4	18.4	30.2	23.2	14.6	0.0	0.0
15	0.0	0.0	11.4	0.0	0.0	33.2	0.0	15.8	11.1	4.4	0.0	0.0
16	0.0	0.0	28.2	0.0	0.0	13.2	20.6	3.2	5.4	0.0	0.0	0.0
17	0.0	0.0	2.4	0.0	0.0	14.4	1.2	3.8	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	6.2	8.6	10.4	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0	4.6	21.4	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	2.4	6.4	0.0	25.2	29.2	0.0	0.0
21	0.0	0.0	32.4	5.8	0.0	4.2	3.6	0.0	0.0	30.2	0.0	0.0
22	0.0	0.0	20.2	0.0	2.2	29.6	0.0	1.4	0.0	5.4	0.0	0.0
23	0.0	0.0	42.6	0.6	0.0	15.4	3.6	6.2	1.2	9.6	0.0	0.0
24	0.0	0.0	9.4	11.6	0.0	1.2	26.2	0.0	0.0	22.4	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	1.4	15.0	0.0	0.0	56.8	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	12.8	30.6	1.2	0.0	11.2	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	10.4	25.2	13.6	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	25.6	91.8	2.8	0.0	0.0	0.0	0.0
29	0.0	0.0	1.4	0.0	11.8	36.4	52.6	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	7.8	0.0	0.0	50.2	43.4	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	2.6	0.0	1.6	0.0	37.4	3.6	0.0	0.0	0.0	0.0
Total	0.0	23.8	162.0	42.6	73.8	454.0	435.2	426.2	242.1	254.8	0.0	3.4
Annual rainfall in mm					2117.9							

Year- 2009												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	1.4	27.4	10.8	2.6	3.8	0.0	0.0
2	0.0	0.0	0.0	0.0	17.2	0.0	30.2	10.2	10.2	4.4	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	27.6	0.0	3.6	6.4	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	55.8	3.4	21.6	21.8	0.0	0.0
5	0.0	0.0	0.0	0.0	2.8	0.0	104.8	4.8	40.0	5.0	4.2	2.4
6	0.0	0.0	0.0	0.0	0.0	57.2	102.4	6.2	29.8	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	47.2	62.6	1.8	16.4	0.0	3.8	0.0
8	0.0	0.0	0.0	0.0	0.0	21.4	29.4	1.2	2.4	5.2	4.8	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	0.0	3.2	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	75.8	10.8	2.4	0.0	66.6	0.0
11	0.0	0.0	0.0	0.0	3.8	0.0	18.6	3.2	2.8	0.0	10.4	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	34.4	2.6	2.8	0.0	21.2	0.0
13	0.0	0.0	13.8	11.2	0.0	20.2	6.4	16.4	4.8	5.4	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	2.2	38.6	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	5.8	0.0	0.0	12.8	98.2	0.0	3.2	17.2	2.4	0.0
16	0.0	0.0	1.6	2.4	0.0	22.6	210.8	0.0	4.0	0.0	21.6	0.0
17	0.0	0.0	0.0	0.0	17.6	8.4	72.6	24.2	3.6	0.0	9.8	2.4
18	0.0	0.0	9.2	0.0	2.4	1.8	100.4	0.0	10.2	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	6.8	8.6	20.4	2.2	1.4	0.0	0.0	0.0
20	0.0	0.0	0.0	34.2	2.6	13.2	11.6	0.0	4.2	0.0	11.6	0.0
21	0.0	0.0	0.0	7.4	0.0	8.8	8.2	11.8	10.4	0.0	1.2	0.0
22	0.0	0.0	0.0	0.0	0.0	6.2	6.4	7.6	0.0	0.0	0.0	0.0
23	0.0	0.0	22.2	60.2	0.0	4.6	10.8	20.4	2.6	0.0	0.0	0.0
24	0.0	0.0	4.4	0.0	0.0	5.8	1.0	19.2	0.0	0.0	0.0	0.0
25	0.0	0.0	17.2	1.6	18.6	5.6	0.0	4.6	0.0	0.0	0.0	0.0
26	0.0	0.0	1.8	0.0	0.0	6.8	0.0	8.2	24.2	0.0	0.0	0.0
27	0.0	0.0	2.4	24.4	0.0	1.2	0.0	0.0	17.4	0.0	0.0	3.8
28	0.0	0.0	7.6	0.0	1.2	0.0	4.5	0.0	0.0	0.0	0.0	53.2
29	0.0	0.0	0.0	1.4	0.0	6.4	30.6	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	20.2	16.4	4.4	4.2	0.0	0.0	1.8
31	0.0	0.0	0.0	0.0	8.6	0.0	1.4	0.0	0.0	0.0	0.0	36.8
Total	0.0	0.0	86.0	142.8	81.6	282.6	1247.3	174.0	224.8	69.2	160.8	100.4
Annual rainfall in mm					2569.5							

Year- 2010												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	4.2	0.0	5.6	14.6	0.8	0.0	19.2	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	10.2	2.8	0.0	51.8	85.4	0.0
3	0.0	0.0	0.0	0.0	11.8	33.6	16.2	3.4	4.2	25.4	0.0	0.0
4	0.0	0.0	0.0	15.2	0.0	0.0	21.8	63.6	0.0	2.6	1.2	0.0
5	0.0	0.0	0.0	0.0	0.0	1.8	42.4	3.8	2.8	0.0	7.2	0.0
6	0.0	0.0	0.0	0.0	0.0	2.2	8.6	7.6	9.0	0.0	75.2	0.0
7	0.0	0.0	0.0	0.0	6.2	0.8	8.2	3.2	22.2	0.8	3.8	0.0
8	0.0	0.0	0.0	0.0	0.0	3.2	4.2	11.8	33.0	1.2	0.6	0.0
9	0.0	0.0	0.0	0.0	10.8	0.0	0.8	2.4	18.8	5.4	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.4	2.4	5.4	0.0
11	1.2	0.0	0.0	0.0	10.4	3.8	0.0	0.0	12.8	7.6	7.4	0.0
12	0.0	0.0	0.0	0.0	25.6	15.6	0.0	0.0	0.0	3.4	4.6	0.0
13	0.0	0.0	0.0	0.0	0.0	83.6	27.8	1.2	0.0	4.8	0.0	0.0
14	0.0	0.0	0.0	5.4	0.0	74.8	0.0	6.8	1.6	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	52.6	2.6	3.6	16.4	9.4	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	17.0	1.8	5.8	4.6	4.2	0.0	0.0
17	0.0	0.0	0.0	0.0	0.6	31.4	21.8	3.2	2.6	14.6	3.2	0.0
18	0.0	0.0	0.0	44.2	0.0	29.8	9.2	5.6	0.0	9.2	83.8	0.0
19	1.0	0.0	0.0	0.0	0.0	9.6	12.4	5.2	0.0	2.0	0.8	0.0
20	0.0	0.0	0.0	3.8	13.2	25.6	20.6	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	10.2	0.0	0.0	10.6	11.8	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	1.8	0.0	0.0	16.4	2.4	17.6	45.6	0.6	0.0
23	0.0	0.0	0.0	0.0	0.0	3.8	4.6	1.8	6.4	25.8	6.8	0.0
24	0.0	0.0	0.0	0.0	0.0	12.6	4.4	0.0	0.0	1.4	14.2	0.0
25	0.0	0.0	0.0	0.0	0.0	13.6	25.6	39.4	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	4.4	0.0	18.8	14.4	12.8	33.4	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	4.4	38.2	26.2	23.6	0.0	3.0	0.0
28	0.0	0.0	0.0	3.8	0.0	0.0	54.4	15.6	0.0	9.4	0.0	0.0
29	0.0	0.0	0.0	1.2	0.0	27.2	31.6	8.4	1.2	9.2	3.4	0.0
30	0.0	0.0	0.0	0.0	0.0	1.6	82.8	13.2	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	27.4	82.6	0.0	5.6	0.0	0.0
Total	2.2	0.0	0.0	90.0	82.8	467.4	524.6	358.8	243.4	241.8	325.8	0.0
Annual rainfall in mm					2336.8							

Year- 2011												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	7.8	3.8	47.4	11.0	40.8	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	17.6	23.8	6.2	98.4	0.0	9.4	0.0
3	0.0	0.0	0.0	0.0	0.0	87.8	0.0	45.2	89.8	2.4	9.6	0.0
4	0.0	0.0	0.0	0.0	0.0	83.2	5.2	38.8	38.6	0.0	6.8	0.0
5	0.0	0.0	0.0	0.0	0.0	89.2	7.6	54.2	3.4	0.0	0.6	0.0
6	0.0	0.0	0.0	0.0	0.0	51.6	11.4	47.8	4.4	0.0	3.8	0.0
7	0.0	0.0	0.0	0.0	0.0	6.4	11.8	10.2	12.2	0.0	4.2	0.0
8	0.0	0.0	0.0	0.0	0.0	41.8	3.2	18.6	1.6	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	22.4	10.6	8.2	8.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	58.8	0.2	4.8	5.2	7.8	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	27.2	4.8	8.0	0.2	11.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	17.0	2.4	1.2	0.0	1.6	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	19.8	7.8	6.8	2.8	12.8	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	17.0	22.8	1.2	2.4	2.8	0.0	0.0
15	0.0	0.0	0.0	14.4	0.0	26.6	43.2	0.0	7.6	0.0	0.0	0.0
16	0.0	0.0	0.0	6.6	6.6	11.8	25.4	20.2	10.2	7.2	0.0	0.0
17	0.0	0.0	0.0	29.8	0.0	30.4	61.2	2.4	0.4	5.6	0.0	0.0
18	0.0	0.0	0.0	0.0	4.2	61.8	32.8	0.0	0.0	9.8	0.0	0.0
19	0.0	0.0	0.0	27.8	0.0	5.2	40.6	0.2	9.8	1.2	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	15.6	24.0	1.6	0.0	0.0	0.0
21	0.0	0.0	0.0	21.6	0.0	0.0	12.2	23.2	1.4	0.0	0.0	0.0
22	0.0	0.0	0.0	31.2	0.0	0.0	6.4	5.4	0.2	0.4	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	11.6	15.2	2.6	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	15.4	5.8	1.2	44.8	7.2	0.0	48.2	0.0	0.0
25	0.0	0.0	0.0	3.2	3.4	5.8	14.2	3.2	0.0	8.4	0.0	0.0
26	0.0	0.0	0.0	18.8	0.0	41.2	26.4	2.6	0.0	2.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	27.8	20.6	7.6	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	12.4	33.4	8.8	9.0	0.0	8.2	0.0	0.0
29	0.0	0.0	2.8	0.0	2.2	4.2	13.6	6.2	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	1.2	0.4	21.8	0.0	10.8	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	15.8	23.6	0.0	0.0	0.0	0.0
Total	0.0	0.0	2.8	168.8	42.4	805.8	556.2	421.4	339.0	140.2	34.4	0.0
Annual rainfall in mm					2511.0							

Rainfall data (in mm) from Siddapur rain gauge station over the years

Year- 2002												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.2	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	38.2	0.0	18.2	0.0	8.4	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	15.4	4.6	6.2	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.4	4.6	20.2	0.0	0.0
5	0.0	0.0	0.0	10.4	12.2	10.6	5.2	20.2	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.6	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	4.6	0.0	0.0	0.0	40.4	3.2	0.0	0.0	0.0
8	0.0	6.2	0.0	0.0	0.0	0.0	0.0	20.2	15.4	0.0	0.0	0.0
9	0.0	15.2	0.0	20.6	0.0	0.0	0.0	25.4	20.6	0.0	0.0	0.0
10	0.0	0.0	0.0	10.4	0.0	0.0	0.0	26.4	25.4	22.6	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.4	10.6	5.2	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	50.4	25.2	0.0	10.8	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	8.6	20.4	0.0	28.2	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	12.4	4.2	17.2	0.0	70.2	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	15.6	6.4	5.4	0.0	155.2	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	32.4	8.2	2.6	0.0	12.4	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	5.2	5.4	16.4	8.2	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	25.6	4.6	56.6	10.2	2.6	0.0	0.0
19	0.0	0.0	0.0	0.0	8.4	10.6	5.2	9.4	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	15.4	4.6	5.4	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	9.2	0.0	1.6	0.0	8.2	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	12.6	0.0	9.4	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	8.6	5.4	2.4	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	15.4	3.2	4.6	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	2.6	25.6	25.2	0.0	7.2	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	8.4	30.4	4.4	0.0	0.0	0.0	0.0
27	0.0	0.0	10.4	8.4	2.4	3.6	0.0	0.0	0.0	58.6	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	8.4	30.4	0.0	27.2	3.2	0.0	0.0
30	0.0	0.0	0.0	0.0	6.2	0.0	5.6	0.0	6.2	7.2	0.0	0.0
31	0.0	0.0	20.4	0.0	0.0	0.0	50.2	0.0	0.0	3.2	0.0	0.0
Total	0.0	21.4	30.8	95.2	54.8	259.0	232.6	479.0	131.6	407.8	0.0	0.0
Annual rainfall in mm					1712.2							

Year- 2003												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

1	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	5.4	0.0	0.0	0.0
2	0.0	0.0	5.2	0.0	0.0	5.2	6.2	10.2	1.2	7.2	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	3.4	12.4	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	6.4	6.2	0.0	5.6	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	11.4	2.4	0.0	15.4	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	25.2	8.4	0.0	6.2	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	4.2	1.4	5.2	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	2.4	3.4	0.0	2.4	0.0	0.0
9	0.0	0.0	0.0	0.0	9.4	0.0	1.6	6.4	3.4	3.2	2.4	0.0
10	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	2.6	0.0	1.2	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	4.2	0.0	9.4	0.0	0.0	0.0	5.6	0.0	0.0
13	0.0	0.0	0.0	2.4	0.0	0.0	9.4	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	10.6	49.4	13.4	24.4	6.2	0.0	0.0
15	0.0	2.4	2.4	0.0	0.0	20.4	21.4	2.4	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	4.2	48.4	4.2	0.0	0.0	0.0	0.0
17	0.0	0.0	5.6	0.0	0.0	13.4	31.2	2.4	2.4	9.4	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	5.2	1.4	16.2	0.0	5.2	0.0	0.0
19	0.0	0.0	2.4	9.4	0.0	14.2	0.0	8.4	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	11.6	0.0	27.2	9.4	19.6	0.0	9.4	0.0	0.0
21	0.0	0.0	12.4	0.0	0.0	40.0	0.0	8.6	0.0	8.2	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	23.0	0.0	10.2	0.0	39.2	0.0	0.0
23	0.0	0.0	0.0	3.2	0.0	26.4	5.4	22.4	0.0	7.2	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	25.2	11.6	29.2	0.0	1.2	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	5.4	6.4	0.0	0.0	0.0	0.0
26	0.0	14.6	0.0	0.0	0.0	5.6	8.6	1.4	0.0	0.0	0.0	0.0
27	0.0	19.4	0.0	0.0	0.0	7.2	4.2	6.2	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	28.2	0.0	0.0	5.6	5.6	0.0	0.0	0.0	0.0
29	0.0	0.0	6.4	0.0	0.0	1.4	13.2	2.4	0.0	0.0	0.0	0.0
30	0.0	0.0	2.6	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	16.4	0.0	0.0	0.0	0.0	2.4	0.0	4.2	0.0	0.0
Total	0.0	36.4	53.4	62.2	9.4	238.6	292.6	205.2	48.0	148.2	3.6	0.0
Annual rainfall in mm						1097.6						

Year- 2004												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	15.2	30.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	3.2	18.6	0.0	2.4	0.0	4.6	0.0	0.0
3	0.0	0.0	0.0	2.8	0.0	17.7	9.4	19.4	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	8.2	0.0	8.6	0.0	0.0	8.6	0.0	0.0
5	0.0	0.0	0.0	0.0	7.6	19.2	0.0	63.4	0.0	2.4	0.0	0.0
6	0.0	0.0	0.0	4.2	2.4	4.6	21.4	38.4	0.0	4.2	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	14.6	5.4	31.4	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	4.6	33.4	18.2	0.0	23.4	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	5.2	6.6	0.0	0.0	9.6	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	12.8	6.6	5.2	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	3.4	25.4	0.0	0.0	3.2	7.4	0.0	0.0
12	0.0	0.0	0.0	0.0	2.4	38.2	0.0	0.0	1.6	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	4.2	14.4	4.2	6.2	0.0	0.0
14	0.0	0.0	0.0	3.4	0.0	0.0	1.2	9.8	0.0	18.6	0.0	0.0
15	0.0	0.0	0.0	2.4	0.0	0.0	11.2	10.4	0.0	12.6	0.0	0.0
16	0.0	0.0	0.0	0.0	18.2	16.6	12.4	6.2	0.0	27.4	0.0	0.0
17	0.0	0.0	0.0	0.0	7.4	18.4	7.2	5.6	0.0	4.6	0.0	0.0
18	0.0	0.0	0.0	0.0	39.4	28.4	0.0	0.0	4.6	32.4	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	30.4	1.4	25.6	27.8	10.2	0.0	0.0
20	0.0	0.0	0.0	0.0	2.4	34.4	2.4	9.4	1.4	38.4	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	25.2	3.2	15.6	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	1.4	20.4	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	43.4	4.2	6.4	3.4	3.4	0.0	0.0	0.0	0.0
24	0.0	0.0	6.2	0.0	5.6	5.4	8.6	5.2	0.0	0.0	0.0	0.0
25	0.0	0.0	1.6	0.0	6.4	1.4	18.8	5.4	6.4	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	9.4	2.4	21.4	0.0	1.4	0.0	0.0	0.0
27	0.0	0.0	7.4	0.0	4.2	3.4	1.4	6.2	2.4	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	9.4	3.6	2.4	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0	15.6	1.6	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	2.4	31.2	0.0	4.2	0.0	0.0	3.2	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	0.0	0.0
Total	0.0	0.0	15.2	96.4	234.0	363.9	165.0	309.2	53.0	190.2	0.0	0.0
Annual rainfall in mm					1426.9							

Year- 2005												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	53.4	50.4	78.6	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	25.8	46.6	15.4	0.0	5.2	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	8.6	15.6	22.6	2.4	10.4	0.0
4	0.0	0.0	0.0	31.3	0.0	0.0	2.4	16.4	14.4	0.0	2.4	0.0
5	0.0	0.0	0.0	0.0	7.2	3.5	18.6	10.6	26.6	29.4	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	26.2	5.8	5.4	4.2	0.0	0.0	0.0
7	0.0	0.0	0.0	2.4	0.0	4.6	6.4	10.6	2.4	9.6	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	13.6	30.4	0.0	0.0
9	0.0	0.0	5.2	0.0	0.0	0.0	6.4	5.4	22.6	1.6	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	5.4	18.6	6.8	2.4	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	2.6	11.6	6.4	11.4	0.0	0.0	0.0
12	0.0	0.0	0.0	6.3	0.0	9.2	10.2	4.8	22.8	32.2	0.0	0.0
13	0.0	0.0	0.0	0.0	34.6	14.5	5.4	11.6	22.6	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	11.4	11.6	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.2	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	7.2	10.6	7.6	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	18.2	10.6	11.2	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	15.8	14.4	5.6	0.0	24.6	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	14.4	16.4	0.0	16.2	10.2	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	69.6	4.2	0.0	17.4	3.4	0.0	0.0
22	0.0	0.0	0.0	5.8	0.0	35.6	6.4	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	7.2	10.4	3.6	0.0	0.0	2.6	9.2	0.0
24	0.0	0.0	0.0	20.3	15.6	3.6	38.6	0.0	0.0	63.2	13.6	0.0
25	0.0	0.0	0.0	0.0	3.4	4.2	43.4	0.0	9.4	0.0	0.0	0.0
26	0.0	0.0	0.0	29.2	0.0	1.2	35.6	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	59.3	27.4	6.2	40.4	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	14.4	0.0	7.4	20.4	28.4	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	5.7	0.0	2.4	30.4	12.4	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	6.4	24.6	0.0	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	64.4	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	5.2	174.7	95.4	322.0	545.6	334.0	229.2	209.6	40.8	0.0
Annual rainfall in mm					1956.5							

Year- 2006												
Month Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	62.4	14.4	3.6	0.0	0.0	16.2	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.0	0.0	0.0	4.2	0.0
3	0.0	0.0	0.0	12.4	12.4	9.2	53.4	0.0	3.4	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	62.4	8.2	0.0	6.4	12.2	0.0
5	0.0	0.0	2.4	7.2	0.0	0.0	26.6	25.2	0.0	2.6	2.4	0.0
6	0.0	0.0	19.4	0.0	0.0	2.4	5.6	7.8	0.0	3.2	13.2	0.0
7	0.0	0.0	6.4	0.0	0.0	0.0	3.2	0.0	21.2	0.0	0.0	0.0
8	0.0	0.0	7.6	0.0	0.0	0.0	9.4	0.0	1.4	0.0	0.0	0.0
9	0.0	0.0	0.0	17.2	17.2	0.0	5.6	0.0	0.0	6.4	0.0	0.0
10	0.0	0.0	6.2	35.4	35.4	0.0	0.0	10.4	20.4	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	17.4	12.6	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	38.4	30.4	0.0	8.2	39.4	3.2	10.2	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	3.2	9.2	5.4	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	9.2	23.2	9.6	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	8.2	10.4	10.4	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	5.6	9.4	12.4	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	11.4	9.6	16.2	15.6	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	17.4	8.4	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	9.2	0.0	9.2	0.0	0.0	0.0	9.4	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	2.4	8.4	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	11.2	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	24.2	0.0	0.0	5.4	0.0	8.2	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.4	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	14.6	0.0	0.0	26.2	3.2	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	65.2	10.2	0.0	0.0	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	72.4	36.2	20.2	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	110.4	37.4	4.2	5.2	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	35.2	0.0	5.2	3.6	0.0	14.6	0.0	0.0
Total	0.0	0.0	42.0	110.6	387.8	219.8	319.4	192.8	175.6	55.0	65.8	0.0
Annual rainfall in mm					1568.8							

Year- 2007												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	102.4	13.2	2.4	6.2	0.0	0.0
2	0.0	0.0	0.0	0.0	16.4	0.0	45.4	2.4	10.6	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	38.2	12.6	36.2	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	36.6	0.0	25.4	17.4	14.6	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	5.2	28.6	39.2	14.2	7.6	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	10.2	52.4	3.6	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	8.4	0.0	72.4	51.6	4.2	0.0	23.2	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	8.6	44.2	0.0	0.0	14.6	0.0
9	0.0	0.0	0.0	0.0	15.4	0.0	36.4	29.6	35.4	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	114.4	42.4	3.2	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	11.2	24.2	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	5.2	9.2	9.4	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	4.2	0.0	0.0	5.2	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	14.2	0.0	6.4	24.4	0.0	25.6	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	4.2	55.4	0.0	2.5	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	5.2	5.6	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	13.4	1.2	0.0	14.6	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	4.2	29.4	0.0	3.1
20	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	2.2	0.0	0.0	7.2
21	0.0	0.0	0.0	47.6	0.0	3.4	0.0	12.4	11.4	35.4	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	10.2	0.0	18.6	25.6	0.0	0.0	0.0
23	0.0	0.0	0.0	30.2	0.0	135.2	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	11.4	0.0	0.0	12.4	2.6	0.0	0.0
25	0.0	0.0	0.0	0.0	5.2	6.4	0.0	0.0	25.6	0.0	0.0	0.0
26	0.0	0.0	0.0	5.6	9.2	12.2	0.0	0.0	15.2	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	0.0	12.6	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	41.2	24.4	3.4	0.0	1.4	0.0	0.0
29	0.0	0.0	0.0	0.0	2.4	64.2	2.2	25.6	0.0	15.6	0.0	0.0
30	0.0	0.0	0.0	0.0	3.2	0.0	0.0	6.2	0.0	9.4	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	101.8	96.8	342.2	642.8	404.8	263.7	120.2	37.8	10.3
Annual rainfall in mm					2020.4							

Year- 2008												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	8.4	10.2	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	23.4	0.0	3.4	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	15.6	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	5.4	0.0	0.0	9.2	4.2	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	2.4	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	10.2	0.0	0.0	1.2	0.0	0.0	17.4	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	7.4	0.0	0.0	0.0	24.2	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	7.4	0.0	6.4	5.2	0.0	0.0
9	0.0	0.0	0.0	0.0	23.4	7.4	4.2	13.4	24.2	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	3.6	2.4	46.4	11.4	9.2	0.0	0.0
11	0.0	0.0	0.0	0.0	28.6	6.4	0.0	32.4	0.0	10.4	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	19.4	0.0	45.2	6.4	9.4	0.0	0.0
13	0.0	12.6	0.0	0.0	0.0	11.4	0.0	60.4	10.4	14.6	0.0	0.0
14	0.0	0.0	25.6	0.0	0.0	0.0	0.0	17.4	4.2	0.0	0.0	0.0
15	0.0	0.0	37.2	0.0	0.0	27.6	0.0	3.6	0.0	2.4	0.0	0.0
16	0.0	0.0	50.4	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	1.4	2.4	0.0	4.2	0.0	0.0	0.0	6.6	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	6.4	0.0	0.0	10.4	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	8.4	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	22.4	0.0	0.0
21	0.0	0.0	29.2	6.4	0.0	17.2	6.4	0.0	0.0	25.4	0.0	0.0
22	0.0	0.0	24.6	0.0	0.0	2.4	0.0	0.0	0.0	4.2	0.0	0.0
23	0.0	0.0	25.6	25.4	0.0	4.2	0.0	0.0	0.0	16.4	0.0	0.0
24	0.0	0.0	2.4	7.2	0.0	3.4	0.0	0.0	0.0	30.4	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	15.4	4.2	0.0	2.4	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	7.2	21.4	8.4	0.0	10.4	0.0	0.0
27	0.0	0.0	0.0	0.0	9.6	2.4	16.2	10.6	0.0	0.0	6.2	0.0
28	0.0	0.0	0.0	0.0	0.0	15.2	76.6	16.4	0.0	0.0	2.4	0.0
29	0.0	0.0	0.0	19.4	0.0	22.4	35.4	4.2	0.0	0.0	0.0	0.0
30	0.0	0.0	2.4	2.4	11.4	42.2	26.4	36.4	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	4.0	0.0	29.2	41.4	0.0	0.0	0.0	0.0
Total	0.0	12.6	198.8	81.2	77.0	254.2	262.2	358.2	76.0	219.4	8.6	0.0
Annual rainfall in mm					1548.2							

Year- 2009												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	3.2	0.0	12.4	11.2	12.4	6.4	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	13.2	7.4	6.6	11.2	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	18.6	2.6	8.4	3.6	0.0	0.0
4	0.0	0.0	0.0	0.0	18.6	0.0	14.2	14.2	11.6	18.2	10.4	0.0
5	0.0	0.0	0.0	0.0	0.0	19.2	58.4	0.0	26.6	2.4	0.0	6.4
6	0.0	0.0	0.0	0.0	0.0	22.4	38.4	11.2	38.4	0.0	9.8	0.0
7	0.0	0.0	0.0	0.0	0.0	40.4	68.6	0.0	4.2	0.0	6.5	0.0
8	0.0	0.0	0.0	0.0	0.0	9.2	14.4	0.0	0.0	0.0	5.8	0.0
9	0.0	0.0	0.0	0.0	0.0	4.2	23.2	7.4	0.0	0.0	73.8	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	20.4	4.6	5.4	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	0.0	0.0	8.3	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	40.2	0.0	2.4	0.0	1.0	0.0
13	0.0	0.0	0.0	4.2	0.0	0.0	5.2	0.0	0.0	12.2	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	36.4	0.0	5.4	2.4	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	4.2	96.6	0.0	0.0	7.2	2.2	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	112.4	0.0	0.0	0.0	40.7	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	42.6	5.2	4.2	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	122.2	0.0	68.4	32.4	12.4	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	23.4	0.0	12.2	4.6	2.4	0.0	9.6	0.0
20	0.0	0.0	4.6	76.4	4.2	0.0	8.4	4.2	11.4	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	14.4	5.6	10.2	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	1.2	4.2	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	17.4	14.2	0.0	0.0	4.2	6.4	0.0	0.0	0.0	0.0
24	0.0	0.0	3.4	0.0	0.0	0.0	2.2	12.2	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	4.2	0.0	0.0	0.0	4.6	8.4	0.0	0.0	0.0
26	0.0	0.0	0.0	8.6	0.0	0.0	0.0	2.4	5.2	0.0	0.0	0.0
27	0.0	0.0	13.4	0.0	0.0	0.0	2.4	7.2	7.6	0.0	0.0	0.0
28	0.0	0.0	7.6	0.0	15.4	0.0	5.2	0.0	0.0	0.0	0.0	44.2
29	0.0	0.0	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	23.4	5.6	0.0	2.4	0.0	0.0	17.4
31	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.0	10.4
Total	0.0	0.0	46.4	107.6	187.0	138.6	765.4	148.0	175.4	63.6	168.1	78.4
Annual rainfall in mm					1878.5							

Year- 2010												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	4.2	0.0	0.0	12.4	2.4	28.6	13.4	0.0
2	0.0	0.0	0.0	0.0	2.4	0.0	7.2	3.4	0.0	68.6	51.2	0.0
3	0.0	0.0	0.0	0.0	4.4	9.4	19.4	8.2	4.4	6.2	10.4	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	20.2	44.6	0.0	10.2	0.0	0.0
5	0.0	0.0	0.0	0.0	35.4	13.4	16.2	2.2	0.0	12.5	6.2	0.0
6	0.0	0.0	0.0	0.0	0.0	1.6	2.4	0.0	11.4	16.4	44.2	0.0
7	0.0	0.0	0.0	0.0	7.4	0.0	6.2	0.0	5.4	6.2	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	2.4	1.2	12.2	1.2	1.2	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	7.6	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	16.2	0.0	15.4	2.4	34.2	0.0
11	0.0	0.0	0.0	0.0	19.2	0.0	6.4	0.0	5.2	4.2	7.2	0.0
12	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	3.2	10.6	0.0
13	0.0	0.0	0.0	0.0	0.0	52.6	0.0	4.6	0.0	1.2	0.0	0.0
14	2.4	0.0	0.0	0.0	0.0	32.4	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	4.2	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	5.4	18.4	0.0	11.6	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	7.2	10.4	10.2	0.0	0.0	2.4	0.0
18	0.0	0.0	0.0	17.4	0.0	5.2	4.4	12.2	0.0	0.0	24.6	0.0
19	2.2	0.0	0.0	0.0	0.0	4.2	10.6	2.4	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	10.2	0.0	8.4	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	8.4	0.0	0.0	3.2	8.2	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	5.4	6.4	3.2	8.2	3.2	0.0
23	0.0	0.0	0.0	0.0	0.0	9.2	3.2	0.0	17.6	4.2	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	12.4	5.4	0.0	0.0	3.2	4.2	0.0
25	0.0	0.0	0.0	0.0	3.4	0.0	18.4	40.2	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	9.6	0.0	0.0	14.2	5.8	1.4	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	19.2	24.7	16.2	29.6	0.0	3.2	0.0
28	0.0	0.0	0.0	2.4	0.0	0.0	52.4	2.4	3.2	26.2	0.0	0.0
29	0.0	0.0	0.0	1.2	0.0	3.4	10.6	10.2	2.4	0.0	5.4	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	30.4	6.2	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	28.2	55.4	0.0	14.2	0.0	0.0
Total	4.6	0.0	0.0	43.2	89.0	195.8	344.9	254.6	133.0	216.9	221.6	0.0
Annual rainfall in mm					1503.6							

Year- 2011												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	1.2	17.6	9.0	0.0
2	0.0	0.0	0.0	0.0	6.4	2.4	26.4	6.4	2.0	24.4	12.0	0.0
3	0.0	0.0	0.0	0.0	0.0	37.2	0.0	13.6	0.0	5.4	6.4	0.0
4	0.0	0.0	0.0	0.0	0.0	24.2	0.0	23.2	0.0	0.0	2.6	0.0
5	0.0	0.0	0.0	0.0	0.0	25.4	4.6	11.4	4.5	0.0	9.6	0.0
6	0.0	0.0	0.0	0.0	0.0	12.2	4.8	14.2	11.3	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	2.6	4.6	5.8	14.4	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	3.2	0.0	8.2	17.2	0.0	12.0	0.0
9	0.0	0.0	0.0	0.0	0.0	14.4	0.0	3.2	2.4	0.0	10.0	0.0
10	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	4.2	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	4.6	5.2	2.4	0.0	2.4	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	5.7	2.6	80.2	0.0	7.6	0.0	0.0
13	0.0	0.0	0.0	0.0	1.4	17.2	5.6	9.6	2.4	41.4	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	15.2	9.2	0.0	4.6	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	12.0	2.4	20.2	0.0	8.2	0.0	0.0	0.0
16	0.0	0.0	0.0	19.6	12.6	12.2	14.2	0.0	0.0	4.2	0.0	0.0
17	0.0	0.0	0.0	3.2	0.0	16.4	34.2	0.0	0.0	2.4	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	4.2	19.4	0.0	0.0	9.2	0.0	0.0
19	0.0	0.0	0.0	32.4	0.0	0.0	27.4	0.0	26.2	0.0	0.0	0.0
20	0.0	0.0	0.0	10.2	0.0	3.2	6.4	12.4	15.2	0.0	0.0	0.0
21	0.0	0.0	0.0	22.4	0.0	44.6	5.6	21.2	9.3	0.0	0.0	0.0
22	0.0	0.0	0.0	9.6	0.0	22.4	5.6	0.0	2.3	0.0	0.0	0.0
23	0.0	0.0	0.0	16.4	0.0	24.6	14.2	1.2	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	27.6	1.2	1.2	9.6	0.0	0.0	44.4	0.0	0.0
25	0.0	5.2	0.0	2.4	0.0	0.0	13.6	4.6	0.0	9.2	0.0	0.0
26	0.0	0.0	0.0	0.0	14.8	0.0	7.2	2.4	3.2	10.4	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	0.0	7.4	0.0	5.2	0.0	0.0	0.0
28	0.0	0.0	23.0	0.0	0.0	0.0	5.4	0.0	0.0	2.4	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	0.0	9.2	7.6	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6	2.4	2.4	0.0	0.0
31	0.0	0.0	0.0	0.0	7.6	0.0	5.4	12.6	4.0	8.4	0.0	0.0
Total	0.0	5.2	23.0	143.8	56.0	298.9	268.0	257.0	140.2	191.8	61.6	0.0
Annual rainfall in mm					1445.5							

Rainfall data (in mm) from Sulya rain gauge station over the years

Year- 2002												
Month	Jan	Feb	Ma	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	46.8	0.0	33.8	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	19.2	25.2	4.0	12.0	0.0	8.2	0.0
3	0.0	0.0	0.0	0.0	0.0	66.2	22.4	11.8	14.4	0.0	34.6	0.0
4	0.0	0.0	0.0	0.0	0.0	11.2	11.0	17.6	9.8	22.4	1.4	0.0
5	0.0	0.0	0.0	0.0	2.4	0.0	13.2	21.8	2.0	0.0	0.0	0.0
6	0.0	2.6	0.0	0.0	0.0	2.0	16.1	56.8	24.2	1.2	0.0	0.0
7	0.0	4.6	0.0	6.0	0.0	0.0	2.1	0.0	34.8	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	1.4	11.8	39.8	14.6	20.3	0.0
9	0.0	0.0	0.0	0.0	0.5	8.8	4.2	24.8	49.2	36.2	0.0	0.0
10	0.0	11.0	0.0	0.0	0.0	5.4	10.4	29.8	5.6	22.4	0.0	0.0
11	0.0	0.0	0.0	15.2	8.4	6.2	19.4	37.4	0.0	11.4	0.0	0.0
12	0.0	0.0	0.0	5.2	0.0	1.2	110.2	28.6	0.0	83.8	0.0	0.0
13	0.0	0.0	0.0	1.8	0.0	0.0	4.6	13.4	6.4	152.6	0.0	0.0
14	0.0	0.0	0.0	6.0	5.6	32.4	16.2	6.6	0.0	76.8	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	64.6	14.8	6.6	0.0	2.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	54.2	24.6	57.2	36.2	18.2	0.0	0.0
17	0.0	0.0	0.0	0.0	32.4	2.6	6.4	72.2	0.0	1.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.5	5.4	11.6	22.6	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	13.0	52.2	6.2	19.6	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	6.8	9.4	10.8	9.2	0.0	17.8	0.0	0.0
21	0.0	0.0	0.0	0.0	11.2	32.4	1.0	37.2	0.0	4.6	0.0	0.0
22	0.0	0.0	0.0	6.6	0.0	25.8	11.8	15.4	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	3.4	45.2	13.2	11.2	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	25.8	7.8	21.2	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	28.2	1.0	1.4	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	4.2	2.4	45.0	2.4	0.0	22.8	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	4.2	13.2	0.0	0.0	22.4	0.0	0.0
28	0.0	0.0	0.0	0.0	14.4	23.2	52.2	0.0	10.2	5.6	0.0	0.0
29	0.0	0.0	0.0	0.0	0.5	5.8	34.2	0.0	0.0	3.0	0.0	0.0
30	0.0	0.0	0.0	0.0	1.2	1.4	47.4	0.0	1.6	3.2	0.0	0.0
31	0.0	0.0	0.0	0.0	4.2	0.0	20.2	0.0	0.0	12.4	0.0	0.0
Total	0.0	18.2	0.0	40.8	108.7	535.4	578.3	587.4	246.2	568.2	64.5	0.0
Annual rainfall in mm						2747.7						

Year- 2003												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

[illegible]

Year- 2004												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	5.0	7.2	5.4	16.0	16.0	0.0	0.0	8.0	0.0
2	0.0	0.0	0.0	1.2	0.0	32.2	7.2	24.2	0.0	5.4	17.2	0.0
3	3.3	0.0	0.0	1.4	3.2	41.2	25.2	55.2	0.0	10.0	0.0	0.0
4	0.0	0.0	0.0	5.2	5.0	0.0	93.2	127.0	0.0	12.2	0.0	0.0
5	0.0	0.0	0.0	0.0	26.0	0.0	10.0	56.2	0.0	32.0	6.2	0.0
6	0.0	0.0	0.0	0.0	0.0	31.0	5.2	21.0	1.2	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	12.4	4.0	0.0	33.2	0.0	0.0	33.4	0.0
8	0.0	0.0	0.0	0.0	16.2	45.4	0.0	11.0	2.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	28.2	32.0	36.2	1.2	0.0	0.0	15.2	0.0
10	0.0	0.0	0.0	1.0	3.0	48.0	9.0	2.0	10.2	0.0	0.0	0.0
11	0.0	0.0	0.0	10.4	34.4	66.4	21.0	12.0	8.0	0.0	28.2	0.0
12	0.0	0.0	0.0	0.0	0.0	20.0	8.2	8.2	18.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	24.0	9.0	44.2	14.4	1.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	40.2	31.0	18.0	29.2	7.2	0.0	0.0
15	0.0	0.0	0.0	0.0	3.0	55.0	40.2	29.0	0.0	3.4	0.0	0.0
16	0.0	0.0	0.0	0.0	22.0	38.0	39.2	45.0	2.0	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	11.0	29.2	18.0	40.0	2.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	11.2	11.2	15.4	0.0	5.4	0.0	0.0
19	0.0	0.0	0.0	0.0	30.2	11.2	0.0	63.2	0.0	9.0	0.0	0.0
20	0.0	0.0	0.0	10.2	15.0	3.0	2.0	28.4	2.0	10.2	0.0	0.0
21	0.0	0.0	0.0	0.0	4.2	5.4	14.0	3.2	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	1.0	33.2	4.2	9.0	12.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	32.2	0.0	27.0	30.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	4.0	8.4	4.0	36.0	23.2	18.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	6.2	3.0	92.4	12.2	13.4	0.0	0.0	0.0
26	0.0	0.0	49.1	0.0	73.2	17.0	82.2	8.2	45.0	9.2	0.0	0.0
27	0.0	0.0	0.0	0.0	48.0	3.2	35.0	29.4	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	23.0	28.2	29.0	14.0	12.4	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	120.2	18.0	0.0	12.2	11.4	0.0	0.0
30	0.0	0.0	0.0	4.2	22.2	5.4	38.0	0.0	2.0	35.2	0.0	0.0
31	0.0	0.0	17.4	0.0	0.0	0.0	39.0	0.0	0.0	0.0	0.0	0.0
Total	3.3	0.0	66.5	43.6	467.4	728.0	801.4	782.6	192.0	151.6	108.	0.0
Annual rainfall in mm					3344.6							

Year- 2005												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	12.6	56.6	57.4	24.2	0.0	10.2	0.0
2	0.0	0.0	0.0	0.0	1.6	1.0	50.8	33.4	12.2	0.0	1.2	0.0
3	0.0	0.0	0.0	0.0	0.0	69.4	54.6	16.4	75.4	0.0	5.8	0.0
4	0.0	0.0	0.0	2.2	0.0	0.0	32.2	30.0	21.8	0.0	8.2	13.4
5	0.0	0.0	0.0	0.0	0.0	0.0	50.2	11.8	20.6	0.0	0.0	2.0
6	0.0	0.0	0.0	21.2	0.0	0.0	10.6	25.6	2.2	0.0	4.6	0.0
7	0.0	0.0	0.0	5.3	0.0	18.8	21.2	11.4	1.4	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	1.2	3.2	0.0	2.4	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	18.2	1.8	16.8	13.8	3.2	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	4.8	13.2	22.2	25.4	8.2	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	26.0	73.4	22.2	56.2	10.8	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	1.4	18.2	21.4	19.8	22.4	13.8	0.0
13	0.0	0.0	0.0	0.0	18.0	0.0	12.4	9.8	24.2	32.4	6.2	0.0
14	0.0	0.0	0.0	11.2	0.0	2.6	25.0	23.6	4.0	32.4	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	31.8	3.8	36.8	25.8	8.2	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	6.2	45.4	10.2	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	13.6	30.8	47.8	8.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	22.6	37.0	37.0	2.4	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	64.2	24.4	2.2	0.0	3.2	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	101.6	64.0	44.2	22.2	24.2	0.0	0.0
21	0.0	0.0	0.0	48.2	3.2	163.8	26.0	0.0	30.6	8.0	0.0	0.0
22	0.0	0.0	0.0	1.2	0.0	147.2	46.2	83.2	5.4	69.6	0.0	0.0
23	0.0	0.0	0.0	44.2	0.0	43.8	22.2	0.0	2.2	10.4	0.0	0.0
24	0.0	0.0	0.0	2.0	0.0	16.8	99.2	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	16.4	101.4	4.2	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	3.4	20.2	8.8	22.2	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	6.0	0.0	9.6	19.4	0.0	0.0	11.6	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	10.2	32.8	40.4	0.0	1.2	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	15.6	35.4	9.2	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	32.6	21.4	36.2	28.2	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	4.6	0.0	61.2	4.4	0.0	4.2	0.0	0.0
Total	0.0	0.0	0.0	144.9	80.2	843.4	1091.8	685.0	410.4	250.0	50.0	15.4
Annual rainfall in mm					3571.1							

Year- 2006												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	51.8	33.4	8.0	4.0	2.2	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	11.2	35.4	9.4	5.2	44.4	2.2	0.0
3	0.0	0.0	0.0	0.0	4.8	13.6	77.4	12.2	0.0	9.0	13.4	0.0
4	0.0	0.0	0.0	0.0	0.0	4.2	36.4	31.2	0.0	23.2	0.0	0.0
5	0.0	0.0	0.0	0.0	13.4	5.2	13.0	10.0	0.0	22.2	58.2	0.0
6	0.0	0.0	0.0	0.0	4.6	2.4	6.4	25.4	2.2	0.2	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	21.2	7.4	0.0	10.0	28.4	0.0
8	0.0	0.0	4.6	0.0	0.0	14.2	31.2	0.0	4.2	29.2	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	28.4	1.2	20.0	20.0	0.0	0.0
10	0.0	0.0	0.0	0.0	3.4	0.0	6.0	32.4	25.0	5.4	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	1.2	23.4	62.2	0.4	0.2	0.0	0.0
12	0.0	0.0	0.0	0.0	36.2	2.2	60.2	98.4	7.4	24.4	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	51.6	38.2	72.4	3.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	57.4	32.0	47.4	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	72.2	71.4	12.4	1.2	2.2	0.0
16	0.0	0.0	0.0	0.0	0.0	46.2	28.2	38.4	31.2	23.2	0.0	0.0
17	0.0	0.0	0.0	0.0	26.8	65.4	11.6	19.2	26.4	51.2	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	1.2	33.4	26.4	3.4	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	26.6	14.4	36.4	9.0	1.4	25.2	10.4	0.0
20	0.0	0.0	0.0	0.0	0.0	30.2	53.2	8.2	10.2	20.0	0.0	0.0
21	0.0	0.0	0.0	10.2	0.0	20.0	25.6	2.4	8.6	7.2	35.2	0.0
22	0.0	0.0	0.0	5.4	0.0	48.4	12.4	10.2	13.8	15.2	0.0	0.0
23	0.0	0.0	0.0	0.0	1.4	34.2	26.4	1.0	0.0	0.0	1.4	0.0
24	0.0	0.0	0.0	0.0	1.6	31.2	1.6	0.0	3.0	0.0	14.2	0.0
25	0.0	0.0	0.0	0.0	8.4	92.2	0.0	0.0	3.1	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	34.6	82.4	20.2	0.0	48.2	15.2	0.0	0.0
27	0.0	0.0	0.0	0.0	39.2	20.2	13.4	4.4	0.0	12.4	0.0	0.0
28	0.0	0.0	0.0	0.0	170.4	53.2	52.4	3.2	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	114.4	83.2	44.4	19.4	1.2	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	145.6	89.4	2.4	18.4	18.6	75.2	0.0	0.0
31	0.0	0.0	0.0	0.0	55.8	0.0	3.4	21.0	0.0	22.4	0.0	0.0
Total	0.0	0.0	4.6	15.6	687.2	817.8	918.6	620.6	369.7	461.8	165.6	0.0
Annual rainfall in mm					4061.5							

Year- 2007												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	1.4	0.0	161.2	28.8	41.6	0.4	0.0	0.0
2	0.0	0.0	0.0	0.0	0.4	0.2	33.4	4.2	23.4	25.2	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	9.2	35.2	42.8	85.8	6.8	4.4	0.0
4	0.0	0.0	0.0	0.0	7.2	0.0	86.2	36.8	15.8	0.0	4.2	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	32.2	77.2	49.4	0.0	4.0	0.0
6	0.0	0.0	0.0	0.0	2.2	54.2	20.0	89.4	65.6	0.0	2.8	0.0
7	0.0	0.0	0.0	0.0	77.2	28.4	131.4	124.6	11.2	0.2	9.6	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	35.8	46.8	5.6	9.8	6.2	0.0
9	0.0	0.0	0.0	0.0	1.2	47.0	60.2	61.2	5.2	0.0	0.0	0.0
10	0.0	0.0	0.0	1.4	0.0	0.0	20.0	53.2	30.6	0.0	1.2	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	36.4	6.8	0.2	2.4	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.4	47.6	34.4	0.0	5.8	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	39.2	49.2	13.2	2.8	15.8	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	23.4	38.4	0.4	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	36.2	13.2	0.4	43.4	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	21.2	83.4	0.6	3.2	1.2	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	18.4	98.6	3.4	46.4	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	3.2	128.6	4.2	24.8	5.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	60.2	10.4	0.0	4.8	8.2	0.0	0.2
20	0.0	0.0	0.0	0.0	0.0	56.2	14.6	2.8	5.8	6.8	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	24.2	24.6	18.4	9.8	12.2	0.0	0.0
22	0.0	0.0	0.0	5.4	0.0	30.4	1.8	36.6	8.8	24.6	0.0	0.0
23	0.0	0.0	0.0	8.4	0.0	234.4	4.2	9.4	5.2	19.2	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	104.2	3.2	32.2	19.0	58.8	0.0	0.0
25	0.0	0.0	0.0	0.0	5.2	20.4	14.8	47.4	38.8	22.2	0.0	0.0
26	0.0	0.0	0.0	0.0	3.4	29.2	9.8	7.6	45.2	0.2	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	28.2	8.6	10.4	0.0	2.4	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	61.4	10.8	7.2	1.4	13.6	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	29.0	11.4	24.8	11.0	2.4	0.0	0.0
30	0.0	0.0	0.0	2.2	0.0	85.4	33.6	4.6	23.4	0.0	0.0	0.0
31	0.0	0.0	0.0	16.2	2.2	0.0	28.6	77.6	0.0	0.0	3.6	0.0
Total	0.0	0.0	0.0	33.6	100.4	1044.2	1287.4	907.4	628.2	243.2	36.0	0.2
Annual rainfall in mm					4280.6							

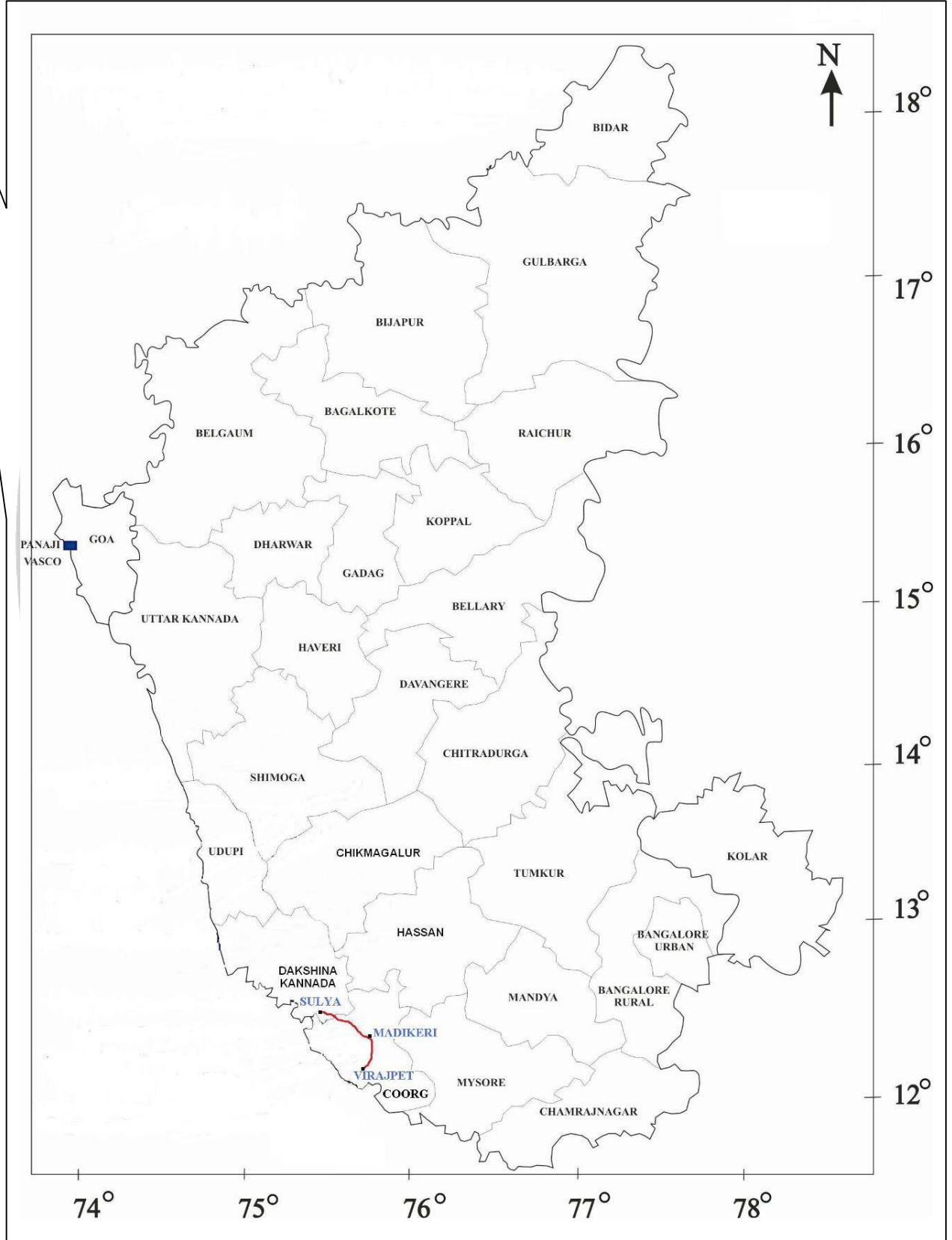
Year- 2008												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	50.2	37.4	24.0	14.6	0.0	0.0	9.2
2	0.0	0.0	0.0	0.0	0.0	35.4	33.8	32.6	5.4	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	5.2	12.2	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	2.6	19.8	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	1.2	9.6	18.0	0.0	2.2	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	14.2	13.2	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	27.8	28.8	8.6	1.4	2.2	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	33.4	15.6	17.8	1.6	3.8	0.0	0.0
9	0.0	0.0	0.0	0.0	16.2	34.6	28.2	20.2	78.4	1.6	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	6.8	17.4	71.2	57.4	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	16.8	2.4	90.4	15.6	1.8	6.2	0.0
12	0.0	0.0	0.0	0.0	0.0	51.8	18.4	59.2	2.6	12.8	0.0	0.0
13	0.0	12.8	3.8	0.0	0.0	33.8	4.4	74.2	23.8	21.2	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	20.0	17.2	48.4	15.8	59.2	0.0	0.0
15	0.0	19.8	3.4	0.0	0.0	75.4	11.4	25.8	9.0	2.2	0.0	0.0
16	0.0	0.0	5.6	0.0	0.0	12.8	16.4	7.0	8.6	0.0	0.0	0.0
17	0.0	0.0	9.2	6.2	0.0	6.2	0.0	21.8	3.6	5.6	0.0	0.0
18	0.0	0.0	11.2	11.2	0.0	25.2	2.2	10.4	0.0	16.2	4.2	0.0
19	0.0	0.0	0.0	0.0	0.0	23.2	9.0	1.2	0.0	8.0	0.0	0.0
20	0.0	0.0	6.4	0.0	0.0	6.8	0.0	17.8	34.0	45.2	0.0	0.0
21	0.0	0.0	34.2	0.0	0.0	24.2	6.4	29.4	0.0	11.2	0.0	0.0
22	0.0	0.0	48.2	0.0	0.0	21.8	2.6	11.4	0.0	2.2	0.0	0.0
23	0.0	0.0	76.2	0.0	0.0	17.8	23.2	1.4	0.0	2.6	0.0	0.0
24	0.0	0.0	6.4	3.8	14.6	23.2	5.8	0.0	0.0	12.0	0.0	0.0
25	0.0	0.0	17.2	33.6	0.0	32.2	33.2	0.0	0.0	22.6	0.0	0.0
26	0.0	0.0	0.0	0.0	23.4	72.4	45.4	1.4	13.6	18.8	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	28.6	67.2	0.2	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	58.2	69.2	1.8	0.0	0.0	0.0	0.0
29	0.0	0.0	0.0	0.0	0.0	47.4	64.8	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	28.2	109.2	91.4	6.2	0.0	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	31.4	2.8	0.0	0.0	0.0	0.0
Total	0.0	32.6	221.8	54.8	82.4	896.4	714.8	648.4	285.4	251.4	10.4	9.2
Annual rainfall in mm					3207.6							

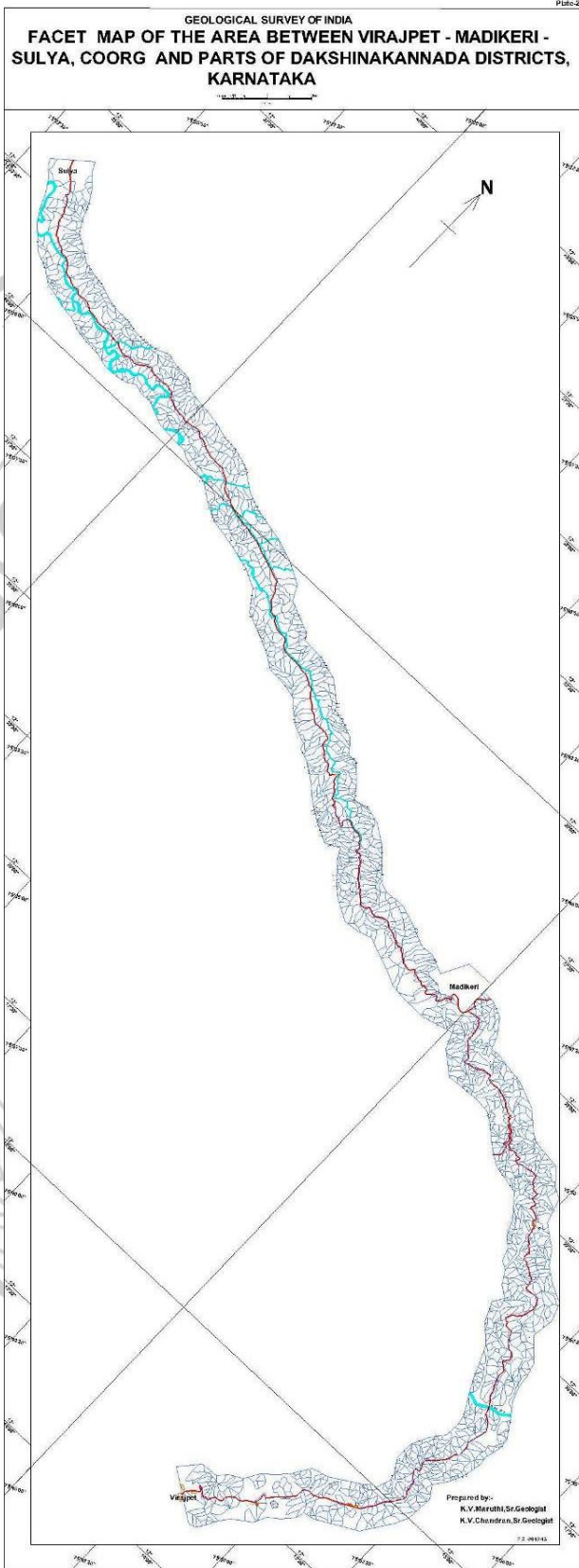
Year- 2009												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	0.0	5.2	15.6	39.6	20.2	4.6	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	25.6	24.6	23.4	23.4	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	21.2	8.2	14.2	5.2	0.0	0.0
4	0.0	0.0	0.0	0.0	12.2	0.0	70.2	8.6	78.4	29.2	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	16.6	104.4	2.6	46.8	0.6	0.0	1.8
6	0.0	0.0	0.0	0.0	0.0	58.8	59.2	23.6	65.8	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	39.8	54.6	13.4	18.2	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	22.6	44.4	22.8	25.2	0.0	24.6	0.0
9	0.0	0.0	0.0	0.0	0.0	6.4	27.6	1.6	0.0	0.0	4.2	0.0
10	0.0	0.0	0.0	0.0	0.0	16.6	52.8	8.8	0.0	0.0	56.2	0.0
11	0.0	0.0	5.4	0.0	0.0	0.0	35.4	15.6	0.0	0.0	14.6	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	46.8	28.2	0.0	0.0	0.8	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	8.2	7.8	0.0	1.2	0.0	0.0
14	0.0	0.0	24.2	0.0	0.0	0.0	58.2	8.8	4.8	15.4	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	4.4	68.2	0.0	18.2	0.0	6.2	0.0
16	0.0	0.0	0.0	0.0	0.0	2.2	70.6	0.8	0.4	5.8	2.4	0.0
17	0.0	0.0	0.0	0.0	14.4	25.6	116.4	51.6	0.0	0.0	0.4	0.0
18	0.0	0.0	29.4	0.0	5.2	0.0	60.2	5.8	17.8	0.0	5.2	0.0
19	0.0	0.0	0.0	0.0	1.2	7.4	62.2	72.4	27.6	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	59.4	0.4	8.2	4.8	34.6	0.0	9.2	0.0
21	0.0	0.0	0.0	0.0	0.0	5.8	9.2	1.8	16.2	0.0	1.0	0.0
22	0.0	0.0	0.0	2.6	30.2	3.8	11.2	2.8	8.6	0.0	0.0	0.0
23	0.0	0.0	0.0	45.6	0.0	0.8	20.0	9.2	0.0	0.0	0.0	0.0
24	0.0	0.0	4.8	0.0	0.0	17.2	3.4	37.2	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	1.2	16.4	2.6	15.8	4.6	0.0	8.8	0.0
26	0.0	0.0	0.0	0.0	2.4	14.2	1.4	27.8	1.6	0.0	2.2	0.0
27	0.0	0.0	0.8	28.6	0.0	4.4	0.0	9.6	0.0	0.0	0.0	49.6
28	0.0	0.0	0.0	0.0	37.4	27.6	31.6	5.8	3.4	0.0	0.0	108.2
29	0.0	0.0	0.0	0.0	0.0	6.8	29.4	7.2	8.8	1.4	0.0	1.8
30	0.0	0.0	0.0	0.0	1.4	11.2	58.4	6.2	5.8	2.4	0.0	23.2
31	0.0	0.0	0.0	0.0	0.0	0.0	31.2	9.4	0.0	0.0	0.0	1.2
Total	0.0	0.0	64.6	76.8	165.0	314.2	1208.4	482.4	444.6	89.2	135.8	185.8
Annual rainfall in mm					3166.8							

Year- 2010												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	26.2	0.0	0.0	0.0	5.4	0.0	8.6	22.2	0.4	20.4	42.6	0.0
2	0.0	0.0	0.0	0.0	7.2	0.0	65.6	8.2	0.0	20.2	9.6	0.0
3	0.0	0.0	0.0	0.0	50.8	4.0	28.2	13.2	25.8	39.4	4.2	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	24.8	61.4	1.6	8.8	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	32.4	14.2	29.2	0.0	0.4	15.2	0.0
6	0.0	0.0	0.0	0.0	0.0	5.0	30.2	8.6	3.4	0.0	57.6	0.0
7	0.0	0.0	0.0	0.0	2.0	0.0	35.4	9.4	22.4	0.0	52.8	0.0
8	0.0	0.0	0.0	0.0	8.2	0.0	39.8	5.8	59.8	21.4	3.8	0.0
9	0.0	0.0	0.0	2.2	3.8	37.6	17.2	5.2	31.6	1.2	0.4	0.0
10	0.0	0.0	0.0	0.0	30.0	2.0	3.2	4.2	0.4	17.6	9.8	0.0
11	11.2	0.0	0.0	0.0	4.2	0.0	1.2	13.8	40.4	0.0	1.6	0.0
12	0.0	0.0	0.0	0.0	24.2	1.4	27.8	27.6	1.8	1.4	42.2	5.2
13	2.4	0.0	0.0	3.2	0.0	62.2	36.4	15.8	11.2	0.0	0.0	0.0
14	1.4	0.0	0.0	0.0	0.0	26.8	0.0	38.8	11.8	0.0	0.4	0.0
15	0.0	0.0	0.0	9.8	0.0	56.6	25.4	10.2	5.2	1.4	10.8	0.0
16	0.0	0.0	0.0	4.4	0.4	17.2	46.4	26.6	15.6	0.0	1.2	0.0
17	0.0	0.0	18.6	0.0	0.0	29.4	51.2	42.6	11.2	12.2	15.6	0.0
18	0.0	0.0	0.0	19.2	0.0	31.8	19.8	21.2	1.4	6.8	21.8	0.0
19	0.0	0.0	0.0	2.8	0.8	5.4	32.6	14.2	0.0	0.6	0.0	0.8
20	0.0	0.0	0.0	0.0	24.8	7.2	64.2	4.2	0.0	6.2	1.2	0.0
21	0.0	0.0	0.0	0.0	4.6	0.0	51.4	5.8	0.0	1.2	0.0	0.0
22	0.0	0.0	0.0	3.2	0.0	0.0	61.2	56.4	0.0	29.2	22.8	0.0
23	0.0	0.0	0.0	0.0	1.4	13.6	6.8	5.6	4.4	20.2	1.4	0.0
24	0.0	0.0	0.0	0.0	0.0	38.6	10.4	26.2	1.8	33.4	15.6	0.0
25	0.0	0.0	0.0	0.0	5.6	30.6	28.6	109.2	11.8	1.6	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	102.4	23.2	36.4	2.6	0.0	0.0	0.0
27	0.0	0.0	0.2	6.8	0.0	35.8	33.4	38.8	24.2	48.4	0.0	0.0
28	0.0	0.0	0.0	2.0	0.0	6.4	48.2	9.8	26.8	0.2	0.0	0.0
29	0.0	0.0	0.0	3.0	0.0	13.8	98.6	17.2	13.6	19.4	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	6.2	105.4	33.8	2.4	0.0	0.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	69.4	110.4	0.6	28.8	0.0	0.0
Total	41.2	0.0	18.8	56.6	173.4	566.4	1108.8	832.0	332.2	340.4	330.6	6.0
Annual rainfall in mm					3806.4							

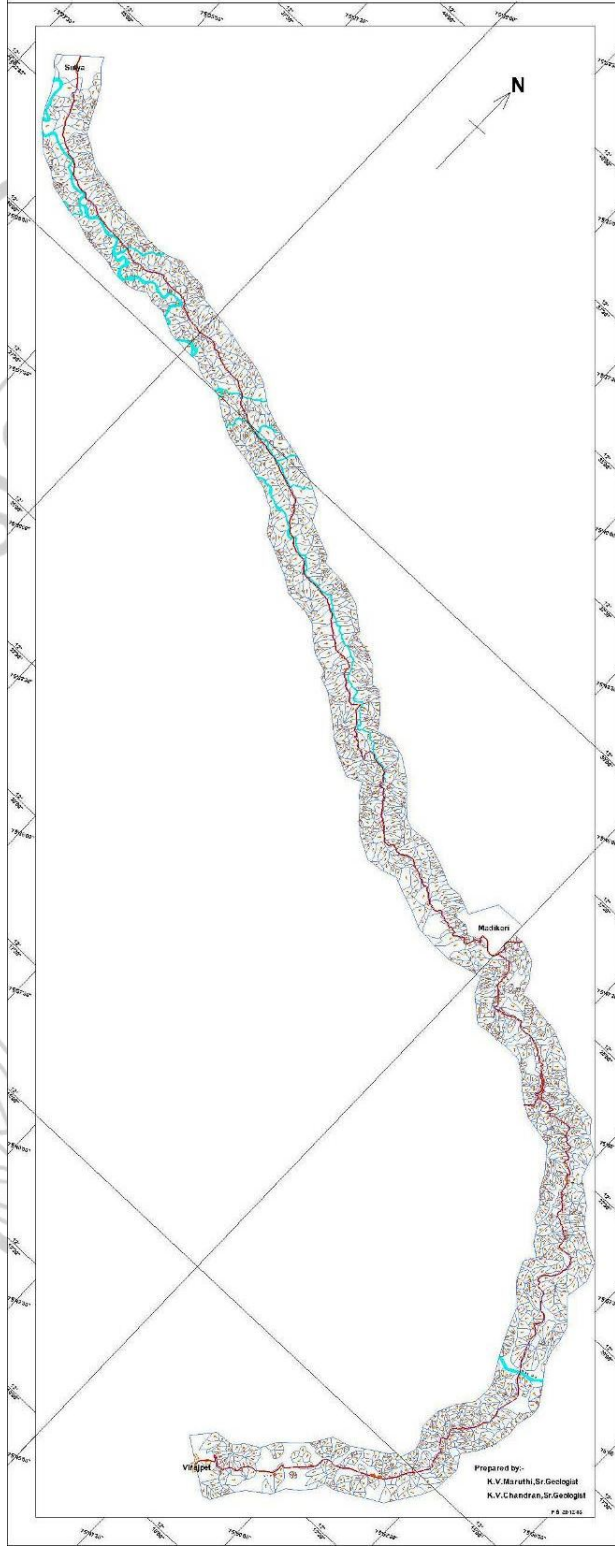
Year- 2011												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	0.0	11.4	0.0	21.4	17.4	26.2	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	6.8	0.0	60.6	45.4	41.8	0.0	11.2	0.0
3	0.0	0.0	0.0	0.0	0.0	22.4	6.2	81.4	71.6	0.0	59.2	0.0
4	0.0	0.0	0.0	0.0	0.0	21.8	10.8	55.8	49.8	0.0	10.4	0.0
5	0.0	0.0	0.0	0.0	0.0	32.4	9.6	74.2	7.2	0.0	0.6	0.0
6	0.0	0.0	0.0	0.0	0.0	62.4	33.6	139.2	0.6	0.0	23.8	0.0
7	0.0	0.0	0.0	0.0	0.0	49.8	29.4	41.2	7.6	0.0	27.2	0.0
8	0.0	0.0	0.0	0.0	0.0	44.2	27.8	52.8	21.4	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	26.4	36.6	13.2	22.4	0.0	0.0	0.0
10	0.0	0.0	0.0	6.8	0.0	15.2	4.8	21.2	14.8	38.6	0.0	0.0
11	0.0	0.0	0.0	2.4	0.0	16.2	40.2	8.6	1.6	31.2	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	26.2	10.2	65.6	10.8	70.2	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	54.8	38.4	74.2	17.2	1.2	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	49.6	39.6	13.2	21.4	0.6	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	44.6	70.4	1.4	44.2	12.4	0.0	0.0
16	0.0	0.0	0.0	0.0	22.8	27.4	50.2	0.8	45.2	0.0	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	24.8	42.8	1.2	2.8	3.8	0.0	0.0
18	0.0	0.0	0.0	1.6	93.8	83.4	62.4	1.6	1.2	11.2	0.0	0.0
19	0.0	0.0	0.0	4.8	0.0	10.8	42.2	15.2	5.4	18.2	0.0	0.0
20	0.0	0.0	0.0	13.8	0.0	3.6	38.4	25.2	2.8	0.0	0.0	0.0
21	0.0	0.0	0.0	31.4	0.0	3.8	14.2	11.0	3.4	0.6	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	2.6	30.6	6.2	1.2	0.0	0.0	0.0
23	0.0	0.0	0.0	59.6	0.4	5.2	19.8	12.8	0.0	27.2	0.0	0.0
24	0.0	0.0	0.0	11.6	0.0	32.2	47.8	23.6	0.0	19.6	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	47.4	76.4	29.2	0.0	15.2	0.0	0.0
26	0.0	0.0	0.0	2.6	10.4	77.6	45.8	33.2	0.0	14.4	4.2	0.0
27	0.0	0.0	0.0	22.2	0.0	78.4	20.6	12.8	0.0	0.0	1.8	0.0
28	0.0	0.0	0.0	0.0	2.2	108.6	13.8	14.6	0.0	5.2	0.0	0.0
29	0.0	0.0	2.4	0.0	0.0	8.4	3.6	11.8	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.2	9.2	4.2	37.6	0.0	13.4	20.6	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	20.2	53.8	0.0	20.8	0.0	0.0
Total	0.0	0.0	2.4	156.8	148.0	989.4	972.6	995.4	420.6	303.8	159.0	0.0
Annual rainfall in mm					4148.0							

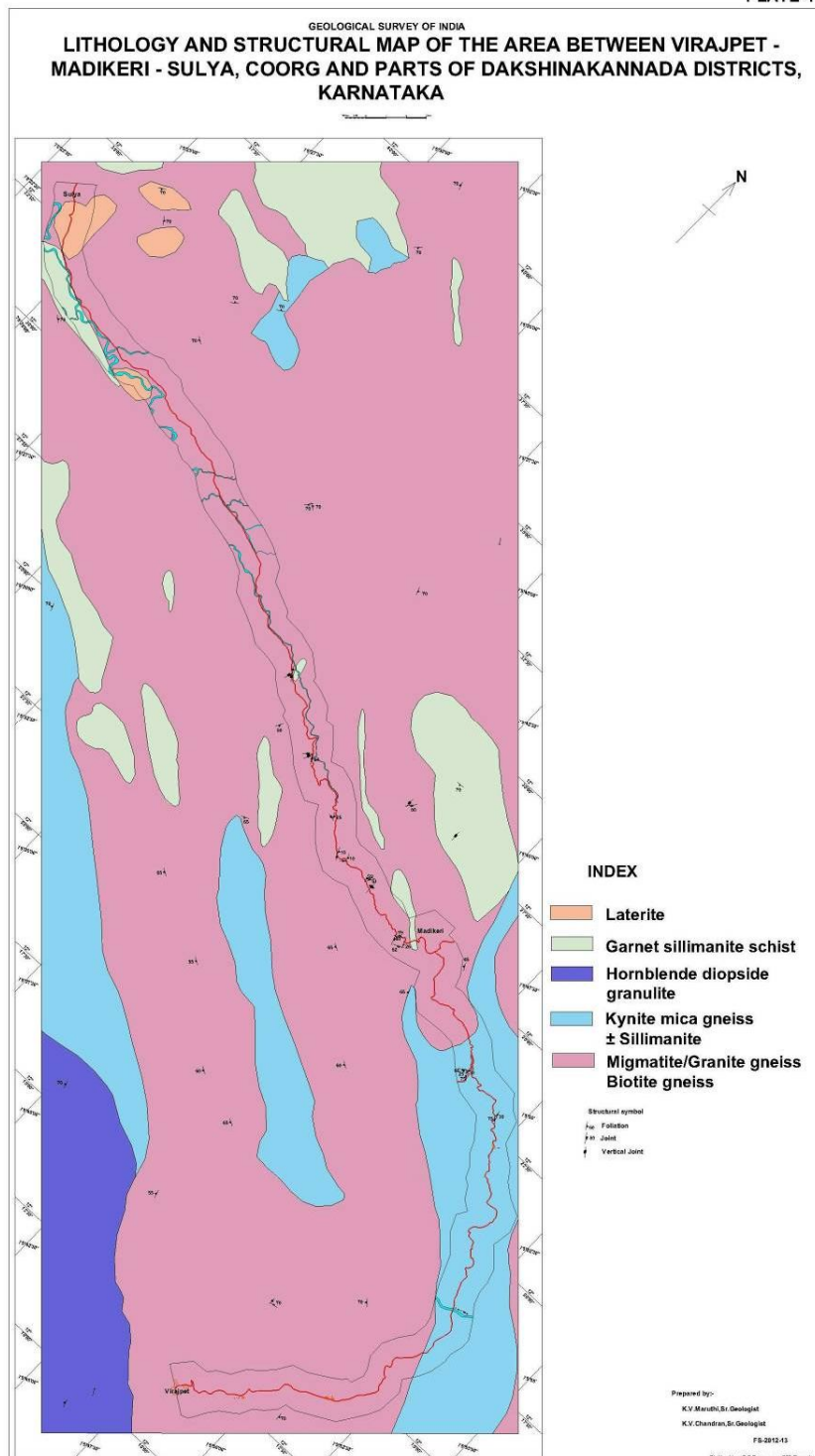
PLATE-1
LOCATION MAP OF LANDSLIDE HAZARD ZONATION
AREA BETWEEN VIRAJPET-MADIKERI-SULYA



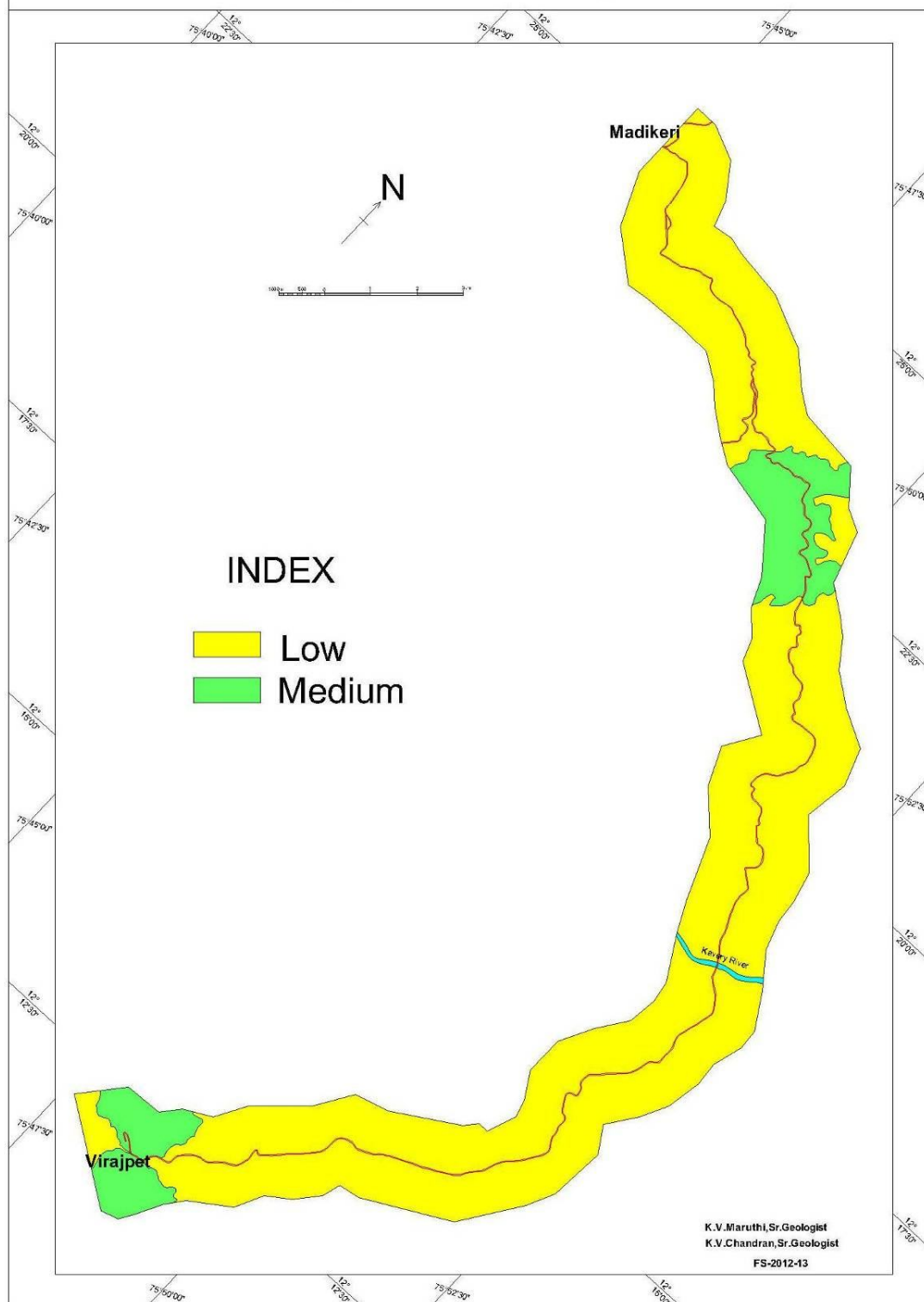


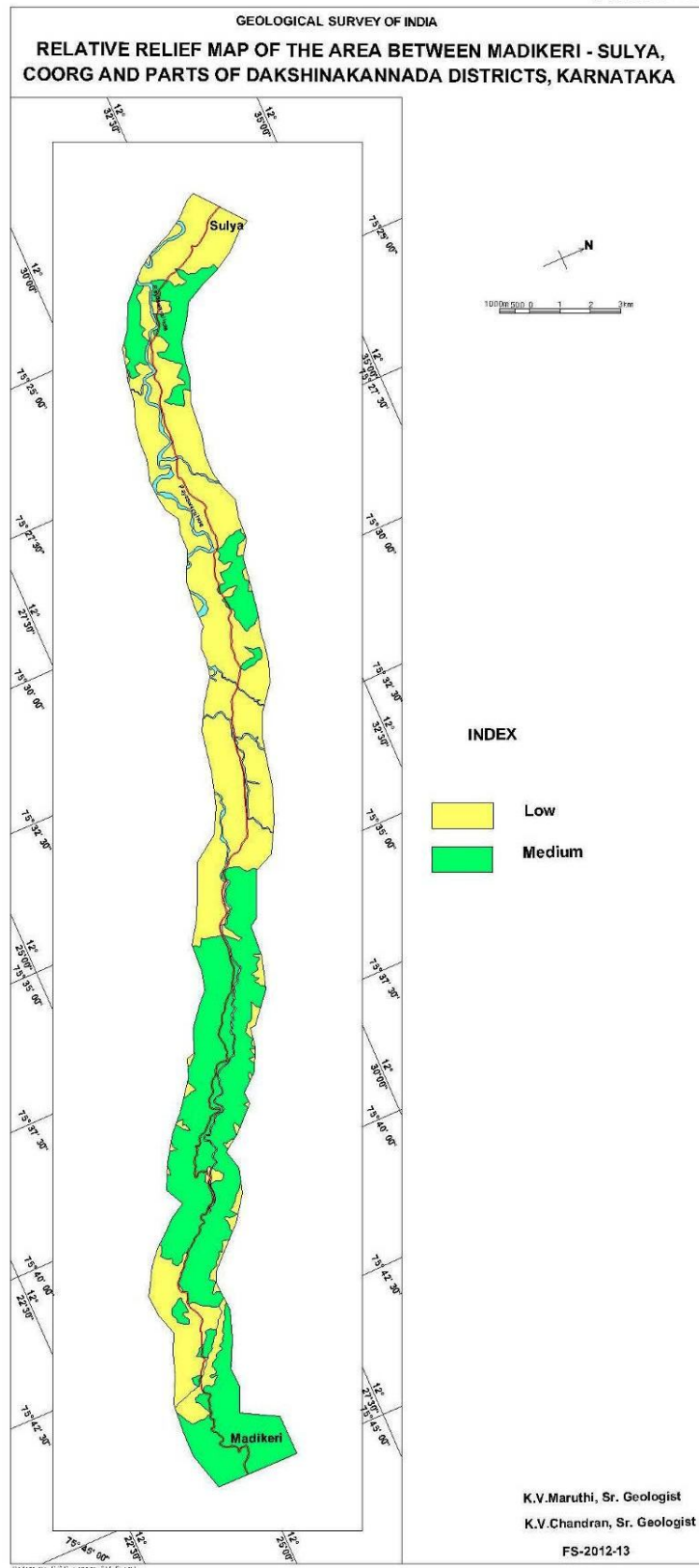
GEOLOGICAL SURVEY OF INDIA
SLOPE MORPHOMETRY MAP OF THE AREA BETWEEN
VIRAJPET - MADIKERI - SULTA, COORG AND PARTS OF
DAKSHINAKANNADA DISTRICTS, KARNATAKA





GEOLOGICAL SURVEY OF INDIA
**RELATIVE RELIEF MAP OF THE AREA BETWEEN
 VIRAJPET -MADIKERI, COORG DISTRICT, KARNATAKA**

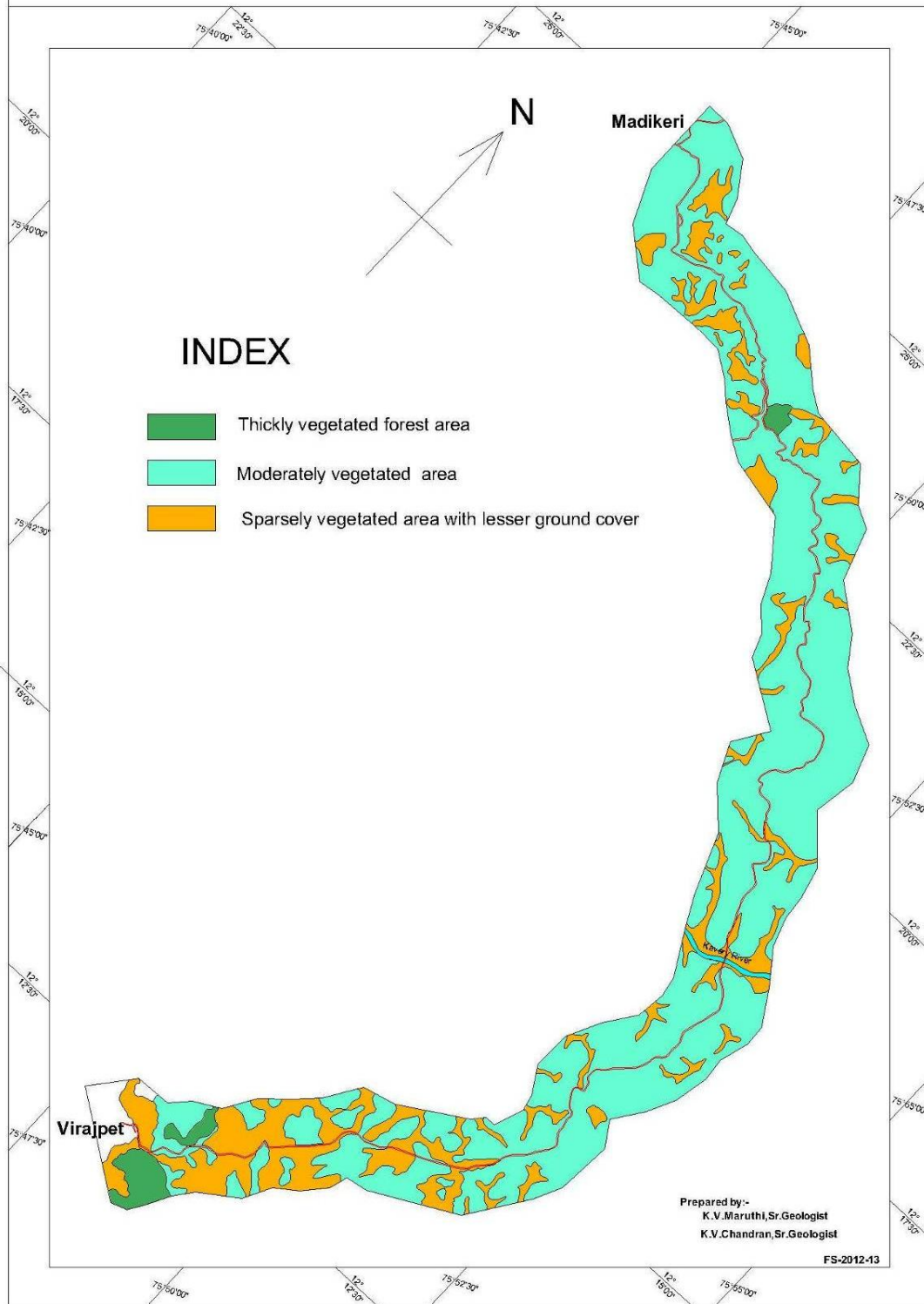




GEOLOGICAL SURVEY OF INDIA

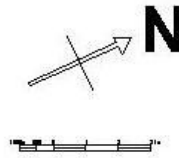
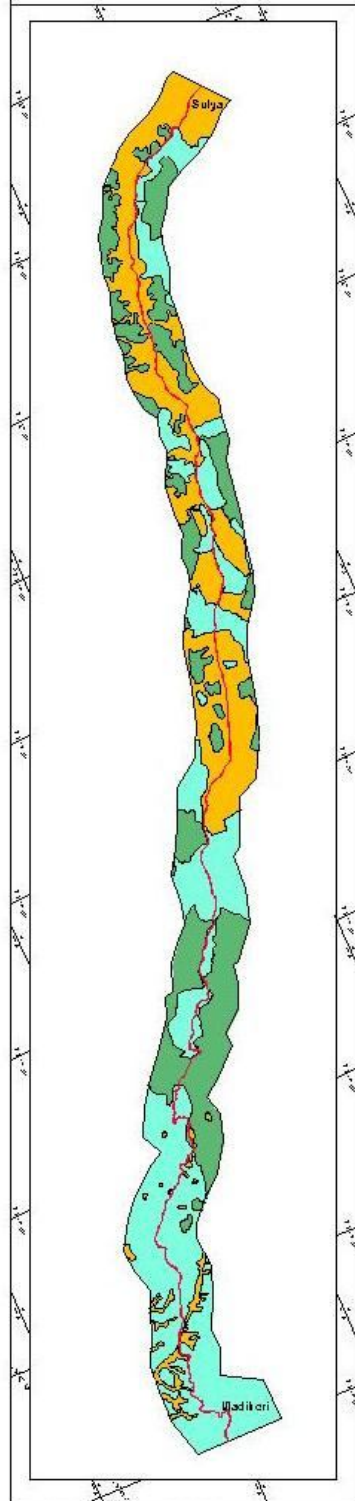
LAND COVER MAP OF THE AREA BETWEEN VIRAJPET - MADIKERI, COORG DISTRICT, KARNATAKA

1000m 500 0 1 2 3km



GEOLOGICAL SURVEY OF INDIA

**LAND COVER MAP OF THE AREA BETWEEN MADIKERI - SULTA,
COORG AND PARTS OF DAKSHINAKANNADA DISTRICTS,
KARNATAKA**



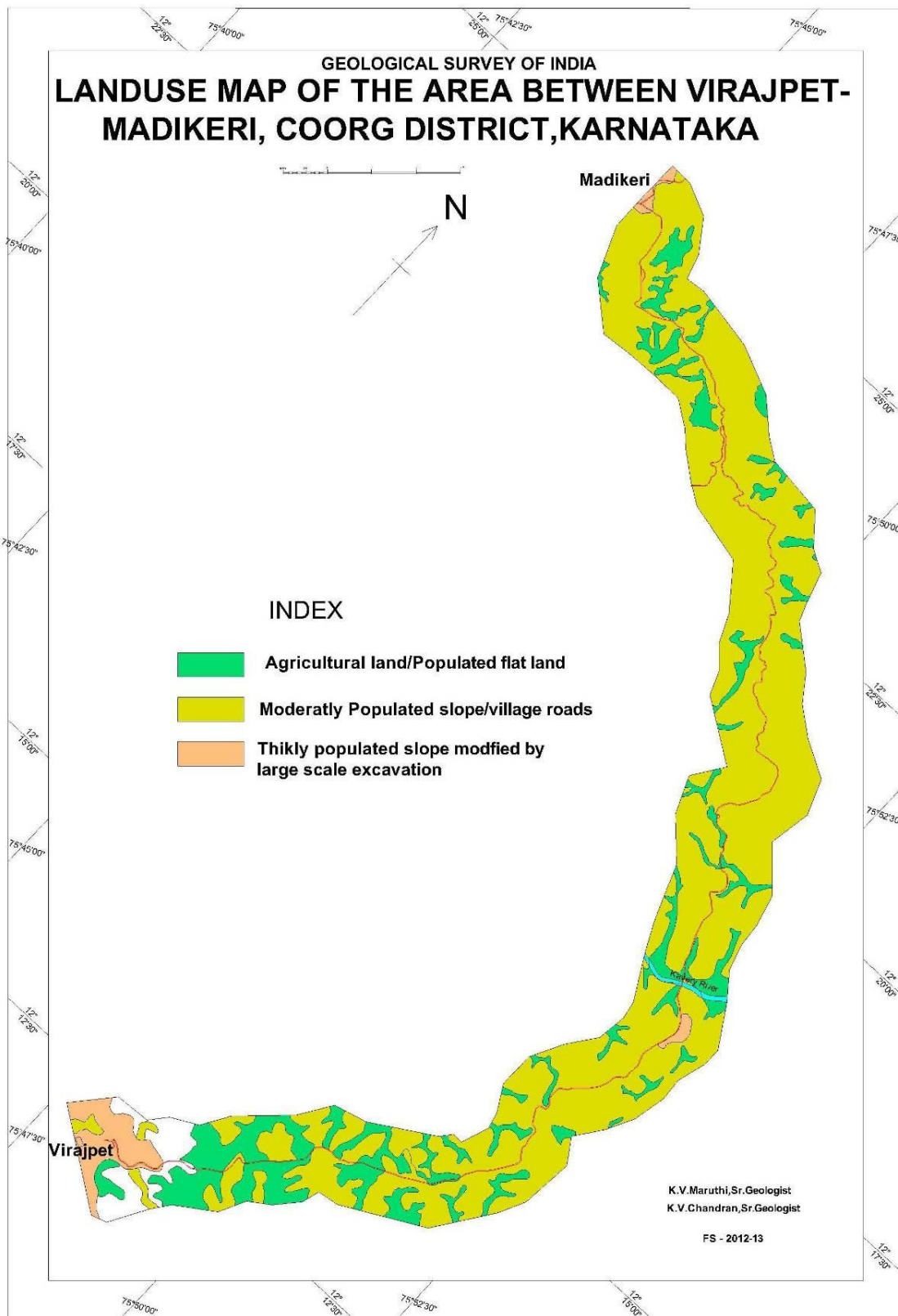
INDEX

- Thickly vegetated forest area
- Moderately vegetated area
- Sparsely vegetated area with lesser ground cover

K.V. Maruthi, Sr. Geologist
K.V. Chandran, Sr. Geologist

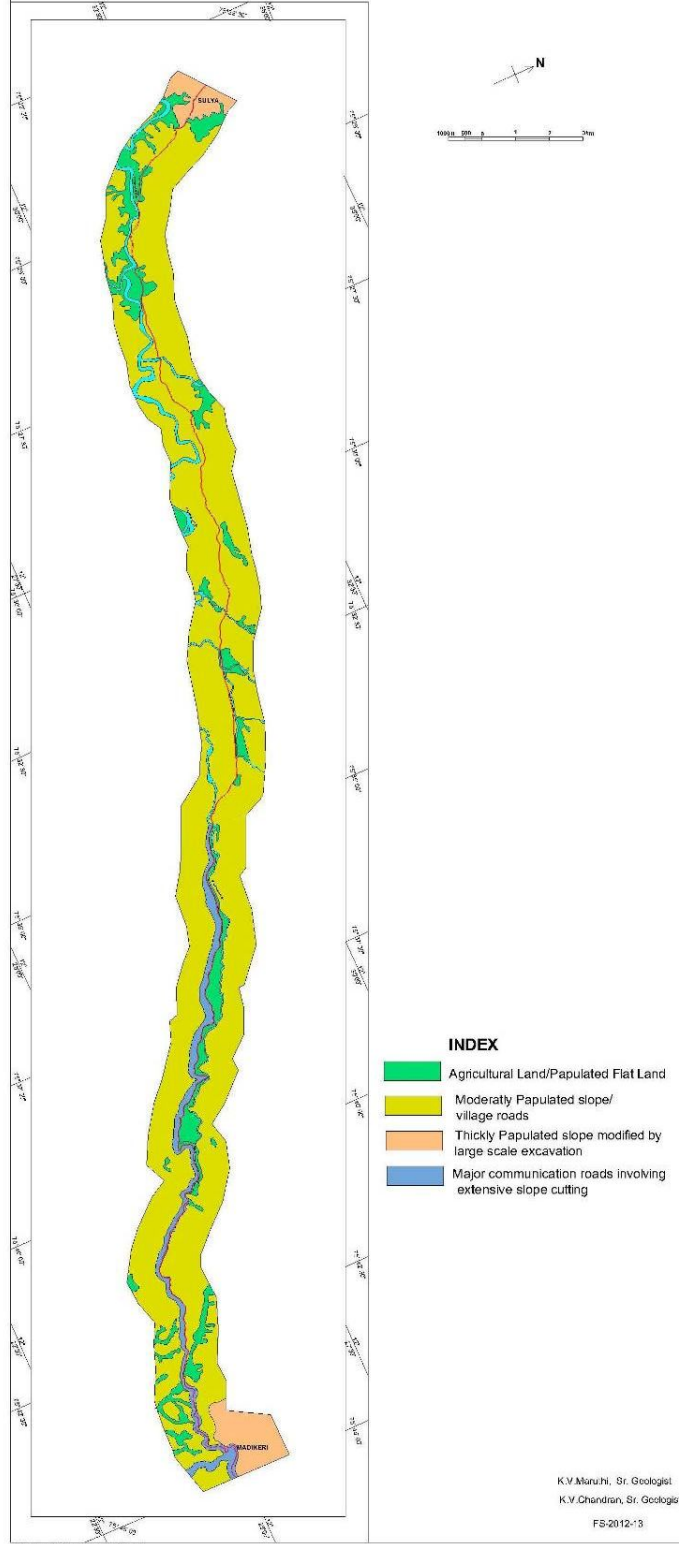
FS-2012-13

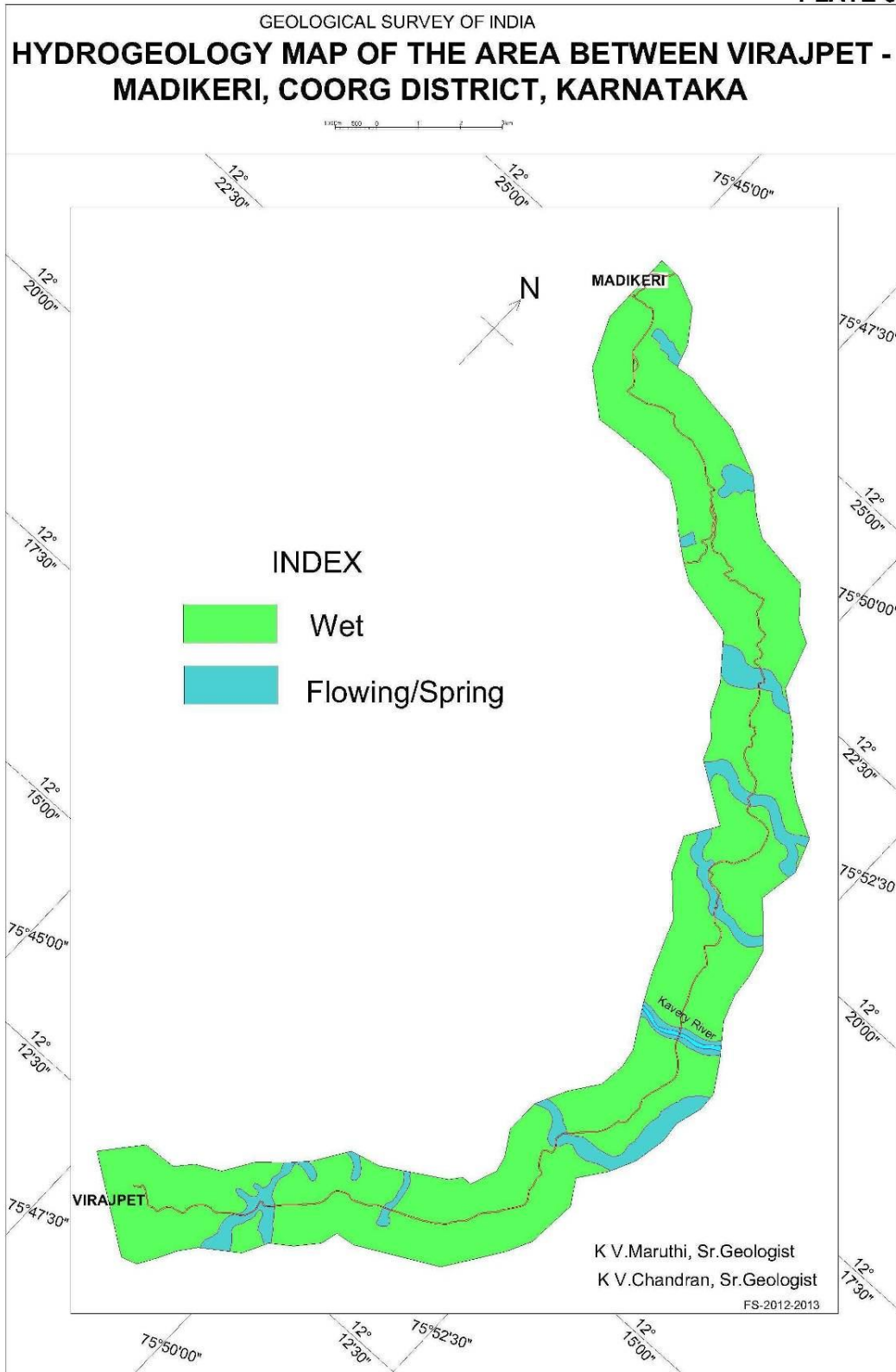
Sg. and Dy. G.G. Suresh, S.T.F. Survey

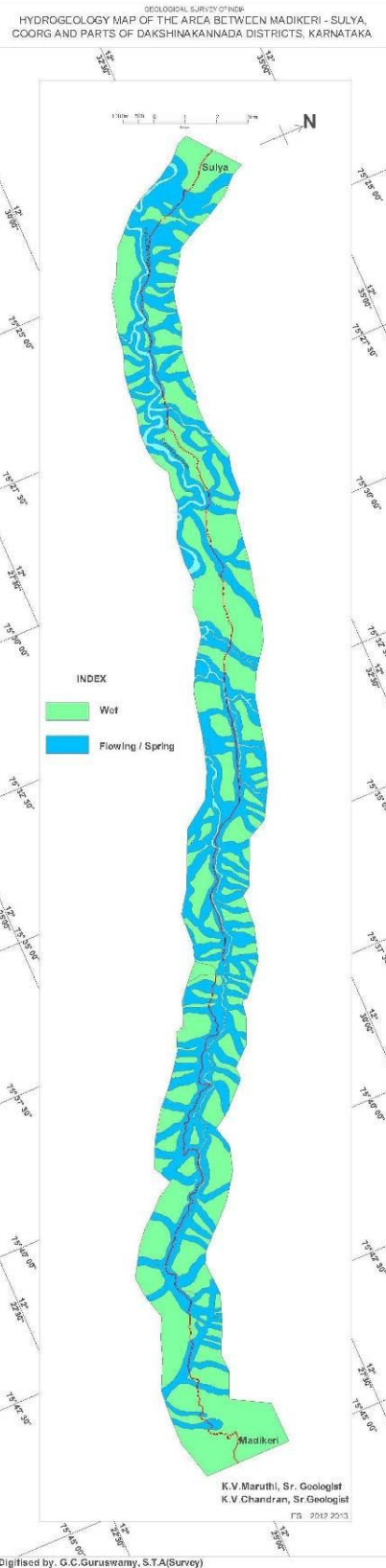


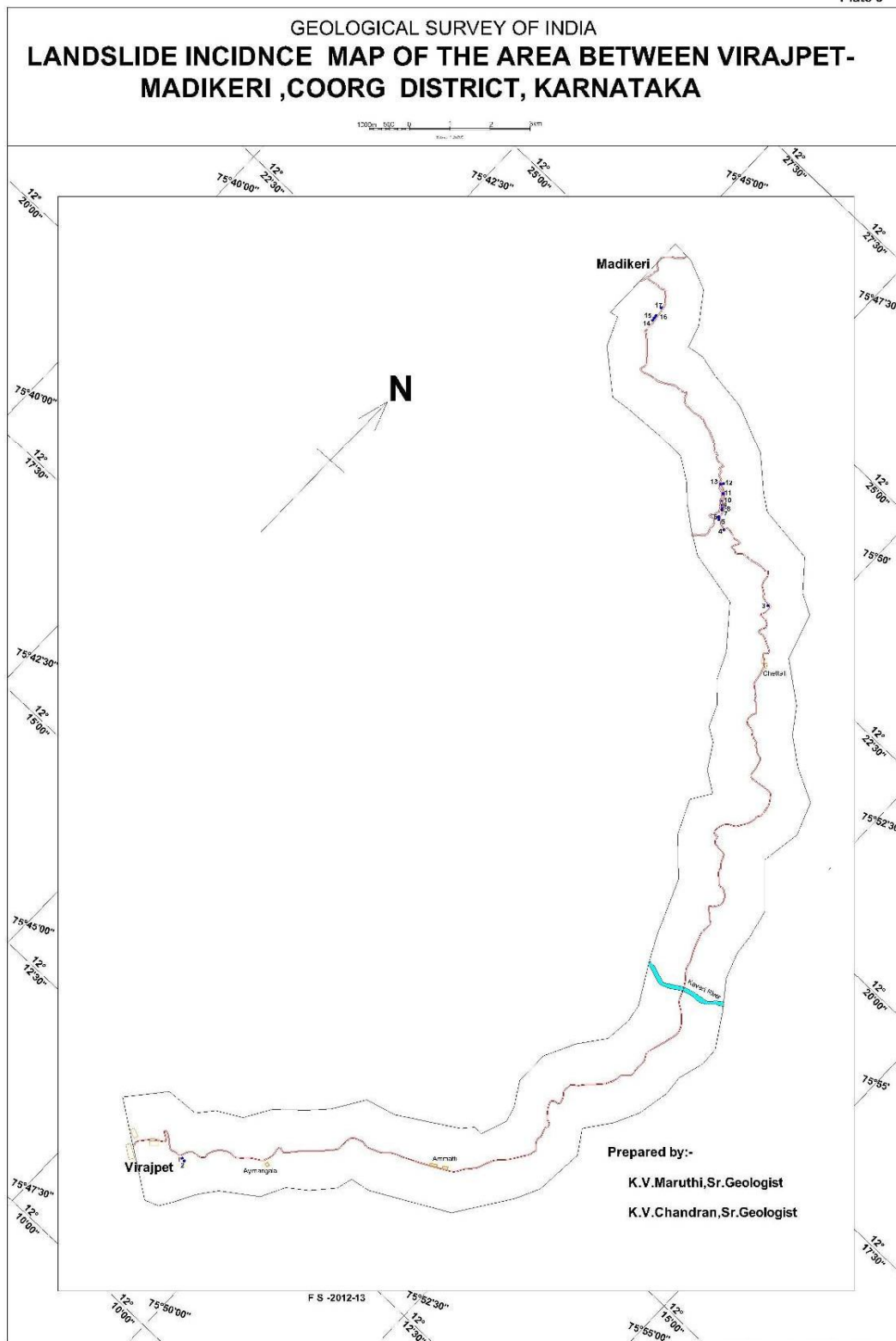
GEOLOGICAL SURVEY OF INDIA

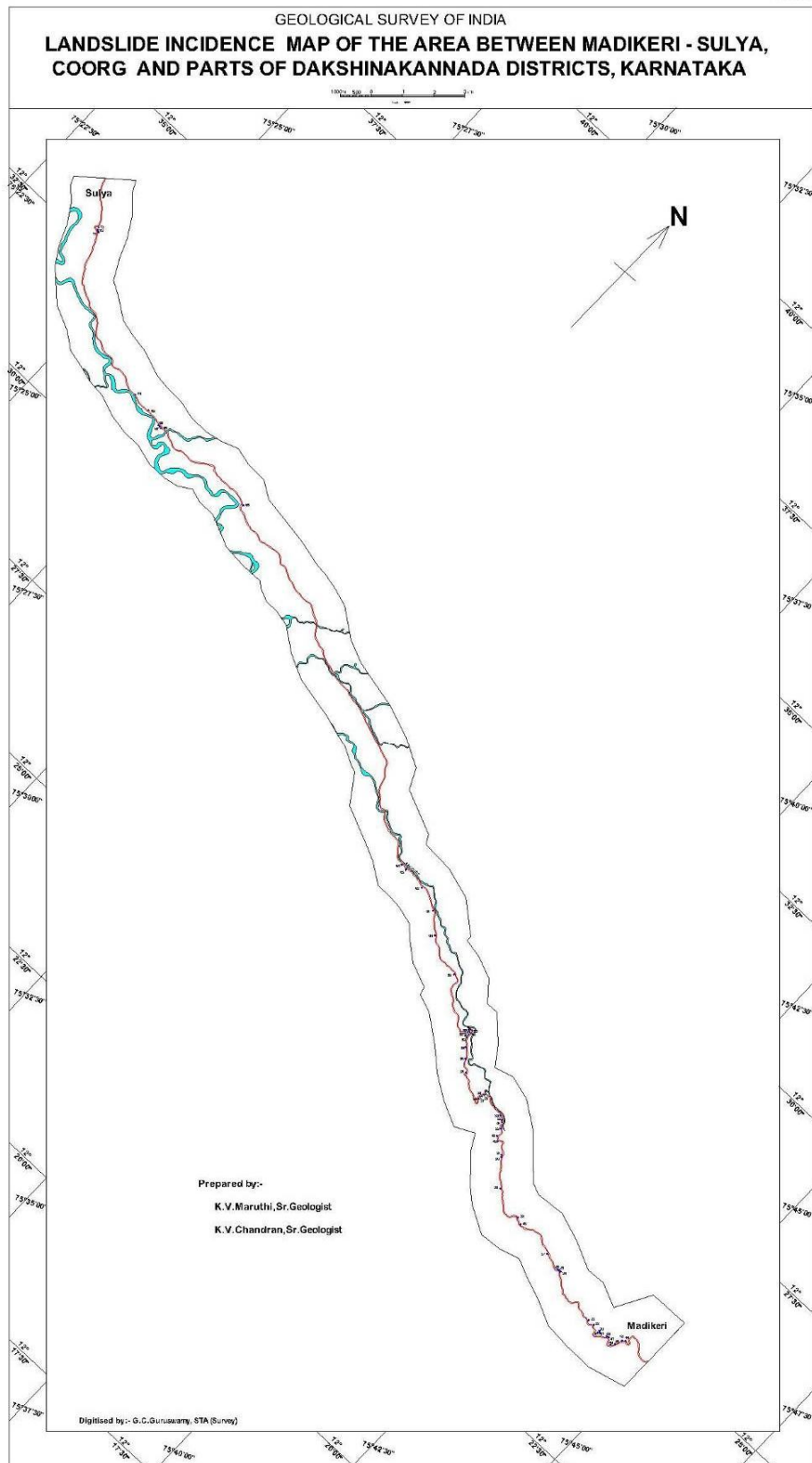
**LAND USE MAP OF THE AREA BETWEEN MADIKERI - SULTA,
COORG AND PARTS OF DAKSHINAKANNADA DISTRICTS,
KARNATAKA**

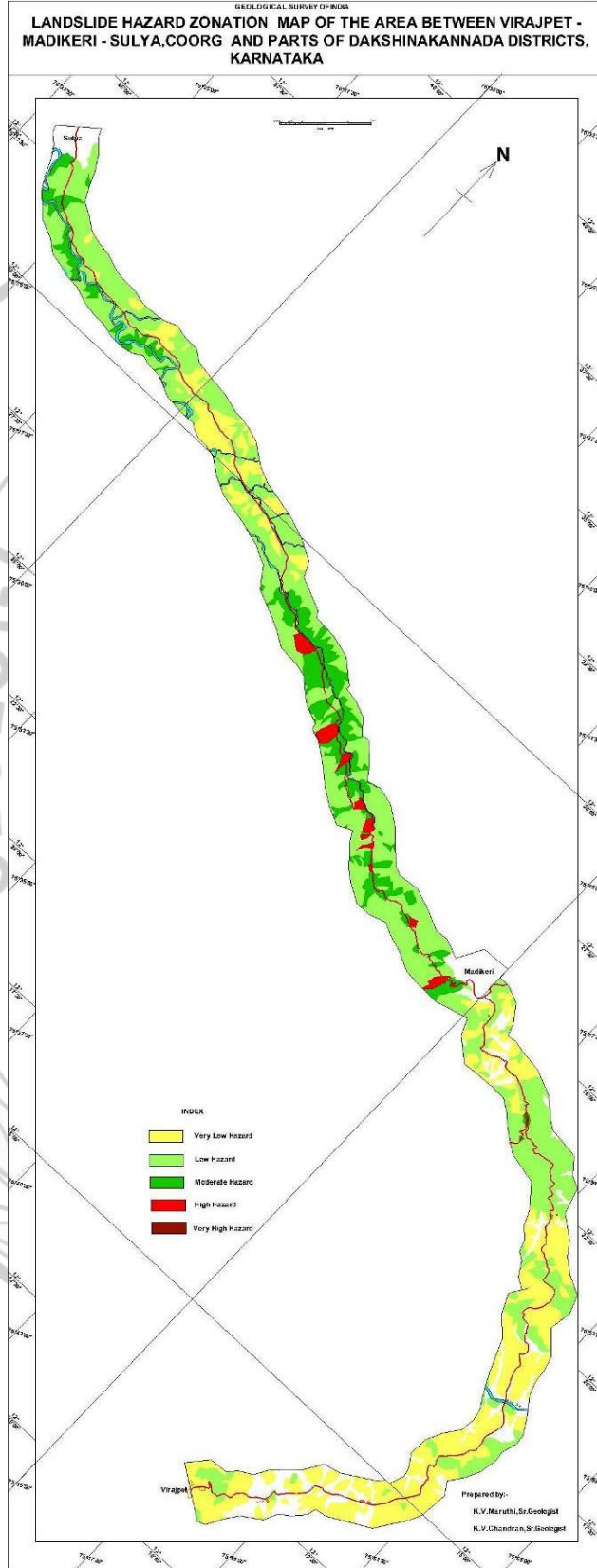














GEOLOGICAL SURVEY OF INDIA
Data sheet on report movement in connection with its scrutiny

Project / Division: EG Division SU:K&G GSI Bangalore		FSP No: LHZ/ SR/KG/2012/121	Mission: IV
Title of the report: LANDSLIDE HAZARD ZONATION OF VIRAJPET-MADIKERE-SULYA ROAD SECTION COORG DISTRICT, KARNATAKA			
Names of author(s) 1. K.V. MARUTHI 2. K.V. CHANDRAN 3.	Date of submission to the Supervisory Officer 10-07-2013		Signature of the senior most author M. G. K.V.
	Date of receipt of the report: 10-07-2013		
Name of the Supervisory Officer: SHAFEEQ AHMED	Date of completion of scrutiny: 18-07-2013		Date of handing over the report to the author(s) after scrutiny: 18/07/2013
	Signature: M. G. K.V.		
	Date of receipt after scrutiny: 18/07/2013		
Name of the author to whom the report has been handed over by the Supervisory Officer: K.V. MARUTHI	Date of resubmission: 24/7/2013		Signature: M. G. K.V.
	Signature: M. G. K.V.		
Supervisory Officer SHAFEEQ AHMED	Date of receipt after modification: 24/7/2013		Date of handing over the report to the Regional Mission Head: 25/07/13
	Signature: M. G. K.V.		
Name of the Regional Mission Head - II P.A. RAMESH BABU	Date of receipt of the report: 29-7-13		Date of handing over the report to the Project Director after peer review: 24.9.13
	Date of handing over the report to the Project Director after peer review: 24.9.13		
	Signature: haha		

Supervisory Officer SHAFEEQ AHMED	Date of receipt of the report from the Regional Mission Head after peer review: 24-09-2013
	Date of handing over to the author(s) 24-09-2013
	Signature: M. G. K.V.
Name of the author(s) K.V. MARUTHI	Date of receipt of the report from the Supervisory Officer: 24-09-2013
	Date of resubmission to the Supervisory Officer after modification: 26-09-2013
	Signature: M. G. K.V.
Name of the Supervisory Officer SHAFEEQ AHMED	Date of receipt of the report after modification: 26-09-2013
	Date of handing over the report to the Regional Mission Head: 26-09-2013
	Signature: M. G. K.V.
Name of the Regional Mission Head: P.A. RAMESH BABU	Date of receipt of the report from the Project Director after modification: 27-09-2013
	Date of handing over the report to the HOD of the Region for approval: 27-09-2013
	Signature: P. A. R.
Name of the HOD of the Region: S. BALAKRISHNAN	Date of receipt of the report for approval: 28-09-2013
	Date of approval: 30-09-2013
	Date of sending back report to Project Director: 29-09-2013
Name of the Project Director:	Signature: S. Balakrishnan
	Date of receipt of the report after approval of the HOD:
	Date of circulation of the report



GEOLOGICAL SURVEY OF INDIA
Certificate of Quality of the report

Project/ Division: EG Division SU:K&G GSI Bangalore

FSP No.: LHZ/ SR/KG/2012/121

Mission: IV

Title of the report: LANDSLIDE HAZARD ZONATION OF VIRAJPET-MADIKERE-
SULYA ROAD SECTION COORG DISTRICT, KARNATAKA

Part - A

This is to certify that the following Officer(s) have carried out the above mentioned FSP and are responsible for collection of field data, carrying out required laboratory analysis, compilation and synthesis of field data, collation of the data and writing of the report as per the approved guidelines. The duration of field stay of each Officer is as against his/ her name.

Name and designation of the Officer	Total field stay during the FSP (No. of days)	Signature with date
1. K.V. Mandali, Sr. Geologist	30	M. G. K.V. 10/7/13
2. K.V. Chandran, Sr. Geologist	30	
3.		

Part-B -NA-

This is to certify that drilling has been carried out and completed as per the table given below:

Drilling Unit No	Date of commencement of drilling	Date of completion of drilling	Name and signature of the Director Drilling
1.			
2.			

Part-C -NA-

This is to certify that geophysical component of the item has been carried out as per the table given below

Name(s) Designation of the geophysicist	Date of commencement of work	Date of completion of work	Signature of the Geophysicist with date
1.			
2.			
Name of the Director (Geophysics)			
Signature with date			

Part-D -NA-

This is to certify that the chemical analysis of the geological samples has been carried out as per the table given below

Name of the Director in charge of the Laboratory	Date of receipt of samples from the Field Officer/ party	Date of providing complete analytical results to the Field Officer/ party	Signature with date

Part -E

This is to certify that the Supervisory Officer(s) mentioned below have supervised the above item and have provided guidance to the Field Officer(s). The number of inspection visits and total duration of field visits is as per the table below. It is also certified that the work carried out under the project is of high standards, the norms of field work, lab work etc. have been followed. It is also certified that thorough scrutiny of the report for maintaining the scientific contents and its quality has been overseen

Name(s) and designation of the Supervisory Officers	No. of inspection visits	Total No. of days spent on inspection visit	Signature with date
Dr.B.R.Venkatesh, Director	02	04	Retired
Shafecq Ahamed, Director	02	03	

Part-F

This is to certify that the report has been thoroughly scrutinized at the Regional Mission Head level. The scientific contents and the quality of the report are certified. The report has been peer reviewed and the needful corrections have been attended to.

Name and designation of the Regional Mission Head - IV	Signature with date
P.A. RAMESH BABU, D7-D-6	P.A. R.

Part-G

This is to certify that the report has been scrutinized at various levels and has also been peer reviewed. On being satisfied regarding the scientific content and quality of the report, the undersigned has accorded approval for its circulation.

Name and designation of the Regional HOD	Signature with date
S. BALA KRISHNAN	