Volume 3: Issue: 4
April 2003

Weather Summary for Fiji Islands – April 2003

Rainfall Outlook till July 2003

FIJI METEOROLOGICAL SERVICE

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In Brief

With April being a 'transition' month, weather conditions fluctuated between 'wet' and 'dry' as expected. Rainfall was also variable across the country with wet conditions in one area and dry conditions in another. Rainfall ranged from above average to below average in the Western Division, average to below average in the Eastern Division and above average to average in the Central and Northern Divisions.

Both day and night-time air temperatures were average to above average across the Group, however a new low night-time temperature recorded was set at Penang Mill on the 17th during a period of strong and cool southwesterly winds.

There were numerous media reports of flooding in the interior of the Central Division during the last week of the month. The Wainimala and Waidina Rivers, tributaries of the Rewa burst their banks and a number of bridges along them were closed. Numerous landslides were reported in the Central Division with a number of these slides occurring in the Veisari area.

Total sunshine hours were around average at Nadi Airport, Laucala Bay, Nacocolevu and Rotuma.

Weather Patterns

During the first week of April, a ridge of high pressure extended over Fiji from the southeast. Meanwhile a trough of low to the west of the country slowly made its way to the east. Showers were mostly confined in the east with afternoon showers about the main islands. At the end of the week rainfall activity increased about these areas.

Rain was experienced over most places as a trough moved closer to the country from the west on the 9th. Some heavy falls were recorded in the Northern and Western Division. Rain eased over most places on the 10th, however, rain continued about the northern and eastern areas for the next three days.

The trough eventually moved to the east of Fiji on the 13th. However, another active trough with a tropical depression, developed to the northeast of Fiji. Associated moist air continued to produce showers in the southeastern areas and heavy afternoon showers about the main islands.

TC *Fili* formed near Tonga on the 14th and subsequently moved southeast resulting in cool, dry conditions over most of Fiji for the next days.

A weak trough developed to the northeast causing showers over the Yasawas and eastern parts of the group. Isolated heavy falls were recorded over southeastern parts of Viti Levu. The trough slowly moved south maintaining the shower activity over most places till 22nd. As the trough moved south on the 23rd, showers cleared except for the eastern parts of the main islands.

On the 25th, the trough to the south retrogressed over Fiji resulting in increased rainfall activity over most parts of the country. This trough remained slow moving over the group for the rest of the month. The eastern parts of Viti Levu experienced continuous heavy downpours resulting in flooding of rivers, landslides and major roadblocks in Kings and Queens highway leaving many vehicles stranded for a couple of hours.

Rotuma experienced showers for most of the month, due to a series of troughs located close to the island. The highest rainfall recorded was on the 11th.

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TABLE 1: Rainfall from February to April 2003

Station	Actual Rainfall (mm)	Has rainfall in the last three months been below average, average or above average?	No. of Rain days in Feb (% of total rain)	No. of Rain days in Mar (% of total rain)	No. of Rain days in Apr (% of total rain)
Penang Mill	1068.6	Average	10 (06)	21 (50)	17 (44)
Monasavu	1819.1*	Above Average	21	27	17
Vatukoula Mine	1039.5*	Above Average	13	24	20
Rarawai Mill, Ba	1133.1	Above Average	10 (18)	15 (63)	15(19)
Yasawa-I-Rara		NA	NA	NA	NA
Viwa Island		NA	85.2mm	197.3mm	NA
Lautoka	721.1	Average	10 (13)	17 (70)	14 (17)
Nadi Airport	575.2	Below Average	12 (10)	18 (72)	15 (18)
Nacocolevu	636.5	Average	10 (13)	19 (57)	10 (30)
Navua	977.1	Below Average	18 (17)	23 (32)	22 (51)
Laucala Bay, Suva	869.9	Below Average	24 (14)	24 (53)	25 (33)
Nausori Airport	1002.6	Average	22 (19)	21 (44)	22 (37)
Nabouwalu	930.1	Average	12 (13)	21 (42)	25 (45)
Labasa Airport	827.0	Average	09 (09)	20 (49)	17 (42)
Savusavu Airport	516.1	Below Average	09 (19)	14 (20)	16 (61)
Udu Point		NA	101.8mm	483.0mm	NA
Matei Airport	486.3	Below Average	15 (24)	18 (32)	17 (44)
Lakeba	527.5	Below Average	09 (43)	21 (32)	14 (25)
Matuku		NA	103.2mm	186.4mm	NA
Ono-I-Lau	381.8	Below Average	09 (17)	15 (69)	05 (14)
Vunisea, Kadavu	577.3	Below Average	13 (16)	25 (50)	17 (34)
Rotuma	753.8	Below Average	21 (41)	22 (25)	26 (34)

* Data is not available for Vatukoula on the 7th and 26th of March. Similarly no data was also recorded at Monasavu on the 19th and 21st April.

Rainfall in the last three months

Rainfall in April

Rainfall in April varied considerably across the country more so than in March. Rainfall ranged from above average to below average in the Western Division, average to below average in the Eastern Division and above average to average in the Central and Northern Divisions. Rainfall in the Central Division was 79-133% of average.

Rainfall in the three-months from February to April

The Rainfall forecast for period from February to April in the January Fiji Islands Weather Summary was for rainfall to be below average to average across the country. The skill level of the forecast for the above period was moderate.

For areas where data is available the forecast was generally successful except for Ba, Vatukoula and Monsavu in the Western Division which received more rainfall than the predicted below average.

Figure A

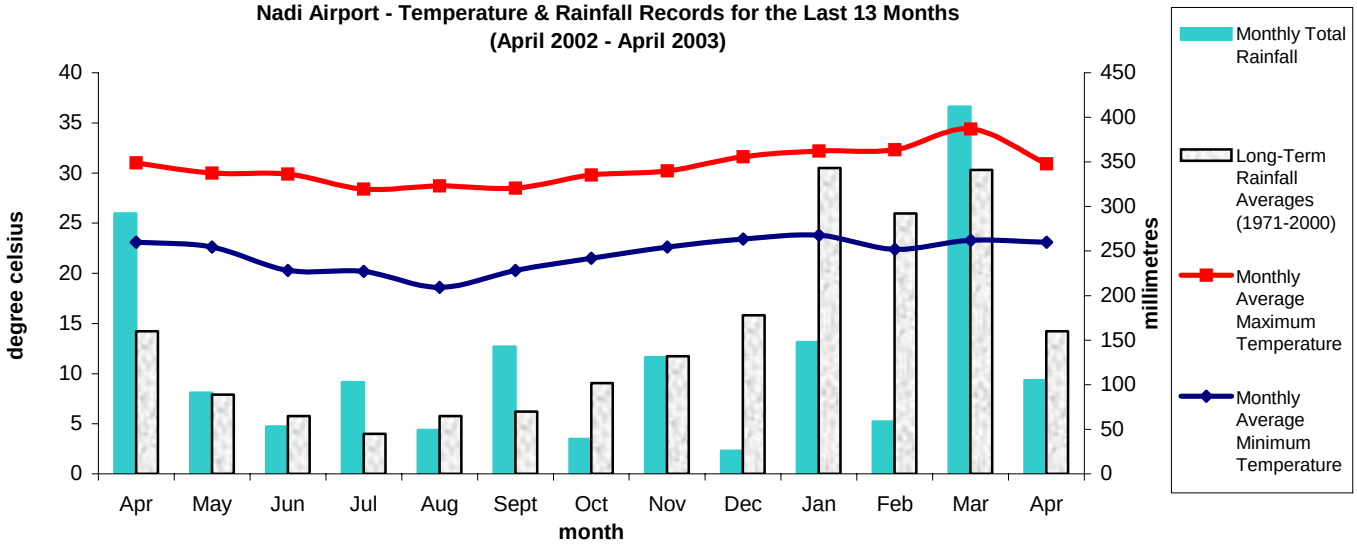


Figure B

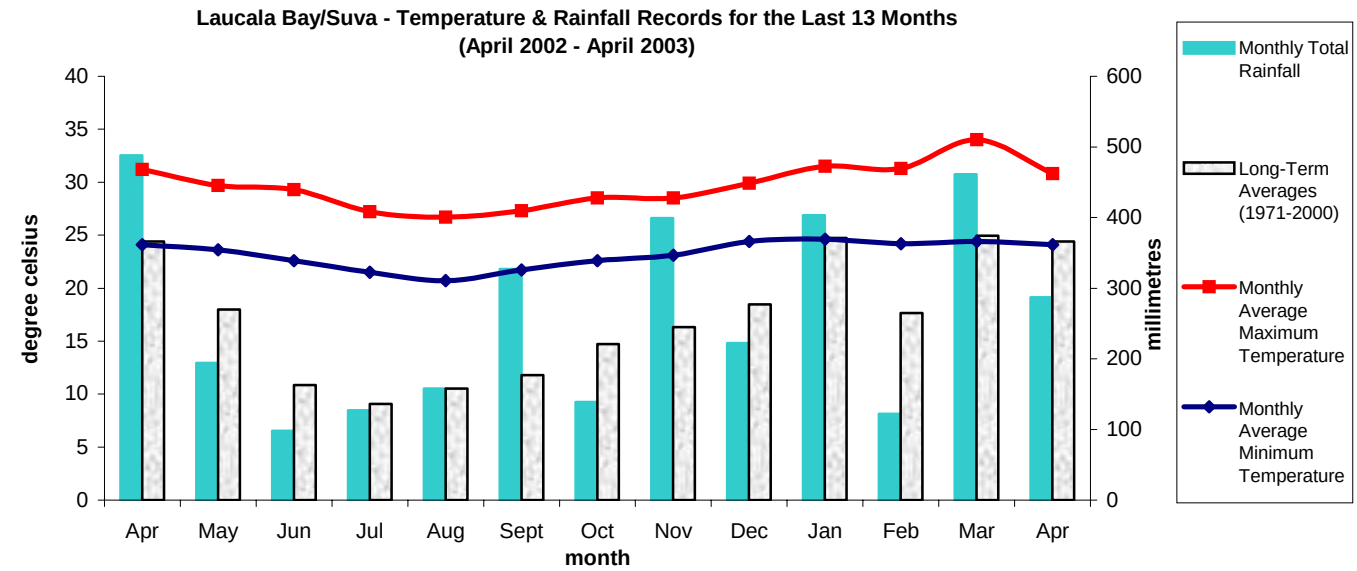
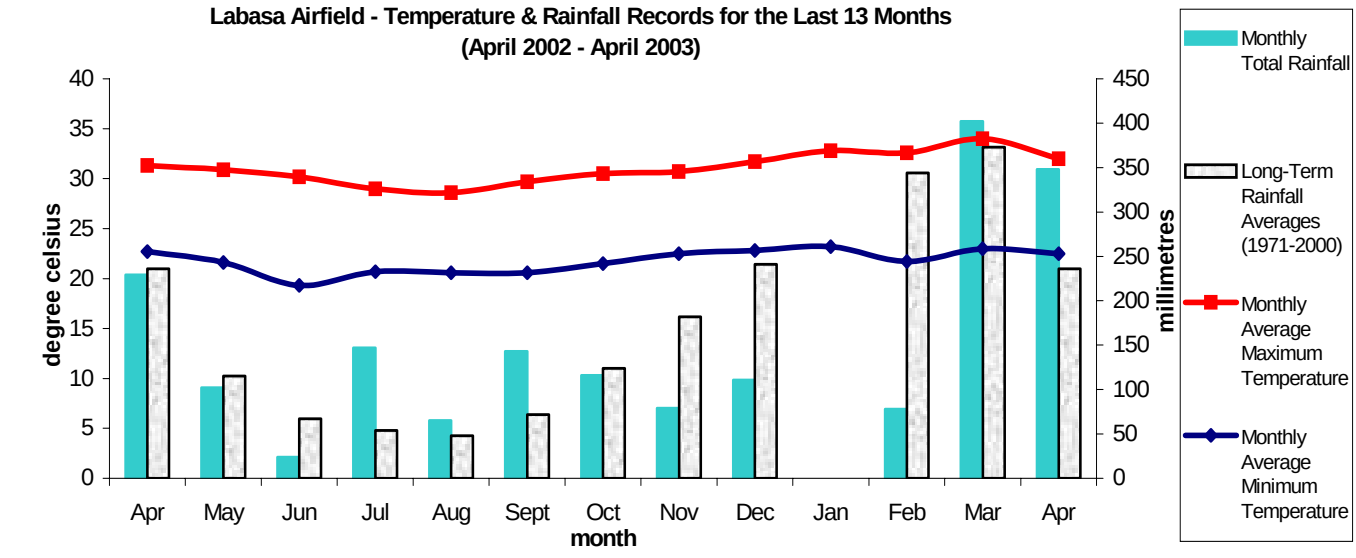


Figure C



Climate in April

Mean Day-time and Night-time Air Temperatures and 0900 hrs Relative Humidity

Day-time temperatures in April were average to above average across the country. The greatest positive departures from normal were observed at Nabouwalu, Ono-I-Lau and Nacocolevu which recorded monthly averages 1.8, 1.7 and 1.6°C respectively above normal.

Night-time temperatures were also average to above average across the country. The greatest positive departures from normal were observed at Savusavu Airfield and Vatukoula which recorded 1.6°C and 1.5°C above average respectively. Penang Mill recorded the greatest negative departure from normal of -0.2°C.

The coolest nights were generally on the 12th, 15-17th. There was no distinct pattern with the warmest days although the 4-9th and 21-23rd stood out as being generally the warmest days in April.

Relative Humidity (RH) at 0900hrs was around average across the country in April with Rotuma and Lautoka recording the highest negative departure of –2% and Matei recording the highest positive of +4% above normal.

Soil Moisture and Runoffs

Soil moisture conditions generally ranged from excessive to ample in the Central Division except for during the third week when conditions were moderate. Soil moisture returned to excessive during the last week of the month.

In the Western Division, conditions were limiting to dry in Nadi and Lautoka except for the second week, excessive to ample for the first half and then moderate in Ba, Vatukoula and Monasavu, moderate to excess in Rakiraki and ample to moderate conditions in Sigatoka.

In the Northern Division the soil moisture were generally excessive to ample at Nabouwalu and excessive to dry at Savusavu Airport and Matei. At Labasa Airport conditions were moderate initially and then excess to ample during the 2nd & 3rd week before returning to moderate conditions.

Limiting to dry conditions prevailed at Ono-I-lau, moderate to excessive at Rotuma and at Vunisea the soil conditions were moderate for the first 3 weeks and then to limiing in the last week of the month.

There were significant runoffs at Navua (343.8mm), Nabouwalu (271.6mm) and Penang (256.0mm) in April.

Sunshine, Radiation & Winds

Total sunshine hours were around average at Nadi Airport, Laucala Bay, Nacocolevu and Rotuma.

The solar Radiation recorded at Nadi Airport and Laucala Bay was 93% and 81% of average respectively.

Average wind speeds in April were above average at Nadi Airport and Rotuma while below average wind speeds were recorded at Nausori Airport, Nabouwalu and Vunisea.

Records set in April 2003

Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Rainfall	Tokotoko, Navua	228.8	30th	New 1-day High	175	1997	1992
Min Temp	Penang	17.4	17th	New Low	17.8	1971	1930

November to April 2002/03 Tropical Cyclone Season

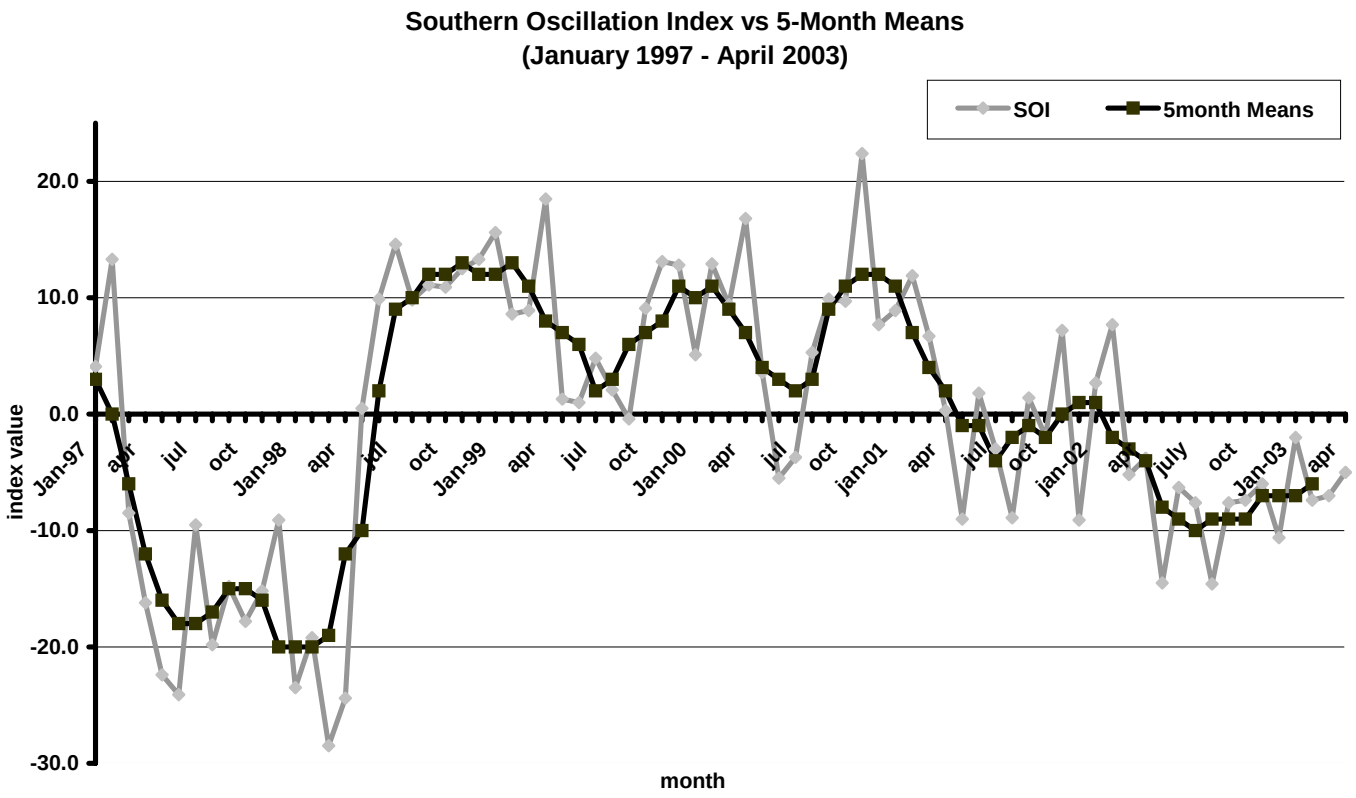
The South Pacific Tropical Cyclone Season which was officially from the 1st of November 2002 to the 30th April 2003 has now ended.

The chances of Fiji being affected by a Tropical Cyclone are now low but there have been at least thirteen instances since 1970 (three affecting Fiji) when cyclones have occurred in the South-west Pacific in the months of May and June. Of these thirteen events a number of them reached 'hurricane' intensity.

Fiji has only been directly affected by one cyclone this season (*Ami*) with three others (*Zoe, Cilla* and *Eseta*) brushing past the Group. *Zoe* had marginal effects on Yasawa-I-Rara while *Eseta* produced significant rain and strong winds.

During a cyclone regular updates will be provided on the Fiji Meteorological Service http://www.met.gov.fj website and through the media.

Figure D



ENSO status and Rainfall Outlook to July 2003

Southern Oscillation Index: The Southern Oscillation Index (SOI) for March was -5.5 (March was - 6.8) with the five-month running mean of –6 centred on January (January was -7) (Figure D).

The most recent observations for the Pacific Ocean confirm the establishment of neutral conditions. Negative sea-surface temperature anomalies have developed in the eastern tropical Pacific, and the subsurface ocean temperatures show negative anomalies persisting across the central to eastern equatorial Pacific. Trade Winds remain fairly close to average across the tropical Pacific. The SOI for the 30 days ending 30th April was –5.5, with values rising slowly towards the neutral territory. Most computer predictions indicate that the current neutral conditions in the Pacific will continue through to the middle of the year. While a regeneration of El Niño cannot be ruled out entirely, this is much less likely than neutral conditions.

(The ENSO Update and SOI are provided by of the National Climate Centre, Australian Bureau of Meteorology and can be found at http://www.bom.gov.au)

FMS Rainfall Prediction Model: *This model is based on schemes, which have run successfully at the Australian Bureau of Meteorology's National Climate Centre. These a statistical scheme based on the relationship between SOI and subsequent three-month rainfall totals. In each case the probability of low, medium or high rainfall in the oncoming three-month period is provided. The scheme uses the SOI averaged over the most recent three-month period. <u>The reliability of the model is high during the wet season (Nov-Mar) but decreases during the dry season (May-Sept) and during the transitions months, April and October.</u>*

The model forecasts rainfall to be below average to average across most of the Fiji Group. For Rotuma, the forecast is for rainfall in the next three months to be average to above (Figure E).

Australian Rainman: *This is a Rainfall Prediction Model was created from joint efforts between Australia Meteorological and Agricultural Agencies. The model incorporates the use of SOI to test its effects on the probability of rainfall in upcoming months. It shows the relationship between ENSO (El Niño - Southern Oscillation) events and rainfall. Due to public demand this model is currently used to present the probability of receiving rainfall in the coming individual months over a three-month period. Please note that the reliability of forecast for one month is lower than for a combined three month period.*

The model predicts 'variable' rainfall across the country in the next three months (Table. 2).

<u>Outlook for May to July 2003:</u>

Based on the model predictions and current climatic conditions, Fiji's rainfall is likely to be variable, with most sites still predicted to receive below average to average rainfall.

NOTE: The confidence level in the outlook is 'low'.

Preliminary Climatological Summary for April 2003

PRELIMINARY CLIMATOLOGICAL DATA FOR MONTH 4 , 2003 : SUMMARY FOR DAYS 1 TO 30

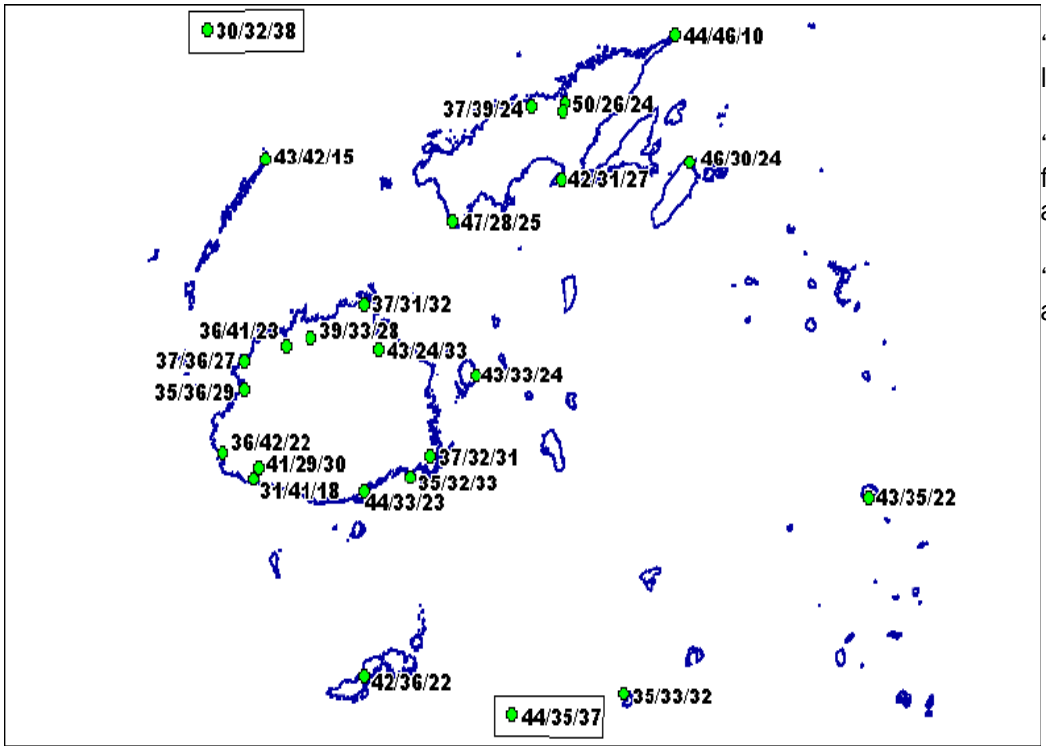
	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL		RAIN DAYS	MAX. FALL		AVERAGE DAILY MAX.	#	MIN.	#	EXTREME MAX.		EXTREME MIN.		TOTAL	
	MM	* %	+	MM	ON	C	C	C	C	C	ON	C	ON	HRS	* %
NADI AIRPORT	105	65	15	57	9	30.9	0.2	23.1	1.3	33.3	4	20.1	17	217	110
SUVA/LAUCALA BAY	287	79	25	78	30	30.8	0.9	24.1	0.8	33.1	9	20.6	17	165	107
NACOCOLEVU	189	122	10	96	13	31.8	1.6	22.9	1.4	34.0	22	18.0	17	175	104
ROTUMA	257	87	26	38	11	32.0	1.5	25.8	1.0	33.1	27	24.0	12	206	113
*VIWA	Faulty AWS														
*UDU POINT	Faulty AWS														
LABASA AIRFIELD	348	147	17	69	9	32.0	0.9	22.5	1.2	33.6	21	20.0	15		
NABOUWALU	418	139	25	132	27	30.8	1.8	25.0	1.0	33.5	8	22.8	17		
SAVUSAVU AIRFIELD	313	120	16	60	28	30.6	0.8	24.8	1.6	32.9	8	22.8	17		
MATEI AIRFIELD	215	71	17	47	6	30.4	0.8	24.8	1.0	31.8	15	23.3	17		
*YASAWA-I-RARA	Faulty AWS														
VATUKOULA	320	145	20	120	9	31.6	0.2	22.5	1.5	33.5	1	19.6	17		
MONASAVU	169	32	17	32	2	25.6	1.5	19.2	0.6	27.1	14	10.3	16		
NAUSORI AIRPORT	374	105	22	87	30	30.4	1.1	23.2	0.7	32.1	23	18.8	17		
NAVUA/TOKOTOKO	495	133	22	229	30	30.1	1.1	23.2	0.7	32.0	8	18.5	17		
LAKEBA	133	64	14	44	26	30.5	1.2	25.2	1.4	33.5	6	22.0	17		
*MATUKU	Faulty AWS														
VUNISEA	195	83	17	65	30	29.6	0.8	23.7	1.0	31.6	9	21.1	15		
ONO-I-LAU	52	34	5	27	23	29.9	1.7	24.4	0.8	31.7	17	22.4	27		
BA/RARAWAI MILL	218	105	15	94	9	32.3	0.8	22.2	1.0	34.4	1	18.8	17		
LAUTOKA AES	123	66	14	61	9	31.3	0.8	23.8	0.9	33.2	5	21.5	21		
PENANG MILL	471	175	17	135	9	30.4	0.8	23.0	-0.2	32.0	13	17.4	17		

	PE	WATER BALANCE(MM)						TEMPERATURE(C)			HUMIDITY		WIND	SUN	RAD
		MAX.	LAST	DEF	NO	RO	NO	DLY	DRY	WET	RH%	VP		%OF	MJ/
	.1MM	DS	ON	DS	DYS		DYS	MEAN	(AVERAGE AT 9AM)				KT	POS	SQ.M
NADI AIRPORT	51	75	5	75	38	10	0	0	27.0	27.7	24.9	79	29.3	4.1	57	15.9
SUVA/LAUCALA BAY	48	38	21	0	0	0	132	6	27.4	27.8	25.5	82	30.8		44	11.8
NACOCOLEVU	49	44	8	26	0	0	54	1	27.3	27.4	25.4	85	30.8		48	21
ROTUMA	50	46	1	22	0	0	71	4	28.9	29.4	26.3	78	31.7	3.8	56	22
*VIWA	Faulty AWS															
*UDU POINT	Faulty AWS															
LABASA AIRFIELD	49	49	1	5	0	0	154	6	27.2	28.1	25.4	80	30.2			
NABOUWALU	48	29	25	0	0	0	272	10	27.9	28.1	25.7	82	31.2	5.6		
SAVUSAVU AIRFIELD	48	75	1	2	3	1	101	4	27.7	28.2	25.7	82	31.1			
MATEI AIRFIELD	48	67	26	3	0	0	35	2	27.6	28.0	25.8	84	31.5			
*YASAWA-I-RARA	Faulty AWS															
VATUKOULA	51	53	26	15	0	0	161	3	27.0	28.4	25.0	75	28.9			
MONASAVU	38	54	30	54	0	0	105	8	22.4	22.4	21.0	88	23.7			
NAUSORI AIRPORT	47	21	17	0	0	0	222	7	26.8	27.2	25.1	84	30.4	4.6		
NAVUA/TOKOTOKO	46	37	26	0	0	0	344	8	26.6	27.2	25.0	83	30.0			
LAKEBA	48	75	9	26	25	7	0	0	27.9	28.4	25.6	79	30.7			
*MATUKU	Faulty AWS															
VUNISEA	48	55	20	0	0	0	37	1	26.6	27.5	24.8	80	29.1	5.5		
ONO-I-LAU	48	75	6	73	67	15	0	0	27.1	27.2	24.5	80	28.8			
BA/RARAWAI MILL	52	53	26	32	0	0	89	4	27.3	27.9	25.0	78	29.5			
LAUTOKA AES	51	75	23	75	14	5	0	0	27.5	28.7	25.0	73	28.6			
PENANG MILL	51	65	1	0	0	0	256	5	26.7	26.1	24.5	88	29.6			

DS IS SOIL MOISTURE DEFICIT,LIMIT 75 MM; RO IS WATER SURPLUS (INDEX OF RUNOFF)
DEF (AE-PE) IS EVAPOTRANSPIRATION DEFICIT (INDEX OF IRRIGATION WATER NEEDED.
PE IS LONG TERM MEAN PENMAN POTENTIAL EVAPOTRANSPIRATION (CALCULATED OR ESTIMATED).
MEAN TEMPERATURE IS (MAX+MIN)/2; WIND IS MEAN SPEED AT 06,12,18,24 HOURS.
$:SOLAR RADIATION CALCULATED FROM SUNSHINE DURATION. # :DEPARTURE FROM NORMAL.
+ :NUMBER OF DAYS WITH 0.1 MM OR MORE RAIN. * :PERCENT OF NORMAL.

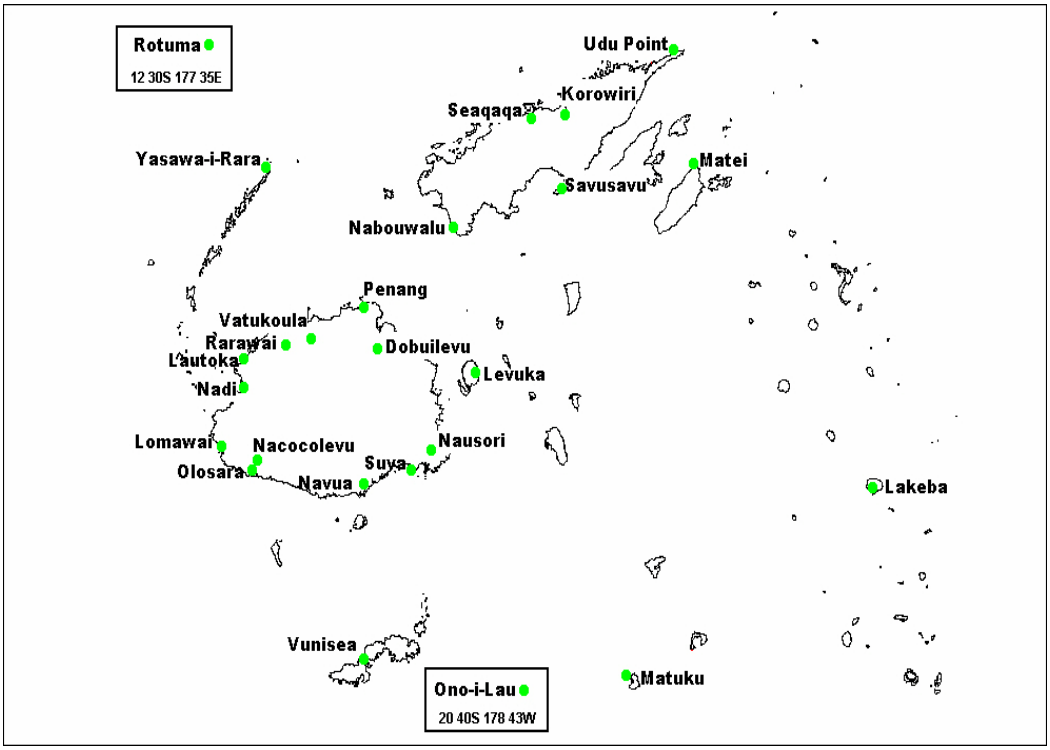
Three Month Rainfall Outlook Probabilities for May to July 2003

FIGURE E*:* Three Month Forecast for Selected Stations in Fiji using the Fiji Meteorological Services Rainfall Prediction Model



Please note that the probabilities are listed beside of the corresponding station marker or dot.

FIGURE F*:* Reference Map of selected Climate/Rainfall sites in Fiji



The forecast probabilities are presented as

DRY/NORMAL/WET

'DRY' range refers to rainfall less than 33rd percentile.

'NORMAL' (average) range refers to rainfall between 33rd and 67th percentiles.

'WET' range refers to rainfall above 67th percentile.

Reference Table for 33rd and 67th Percentile

Station	33% (mm)	67% (mm)
Western Division		
Dobuilevu	246	380
Vatukoula	145	248
Rarawai	153	254
Penang	179	298
Lautoka	105	236
Nadi	148	225
Lomawai	168	285
Nacocolevu	203	296
Olosara	217	333
Yasawa	171	274
Central Division		
Navua	611	763
Suva	424	612
Nausori	386	558
Eastern Division		
Levuka	304	481
Lakeba	244	352
Matuku	261	391
Ono-I-Lau	217	342
Vunisea	316	456
Northern Division		
Labasa Mill	174	250
Seaqaqa	159	264
Nabouwalu	305	445
Savusavu	315	473
Udu Point	256	466
Matei	315	524
Rotuma	688	576

TABLE 3: Monthly Rainfall Outlook Probabilities for May to July 2003

	May		June		July	
Station Name	**Average***	**Probability#**	**Average***	**Probability#**	**Average***	**Probability#**
Western Division						
Dobuilevu	130	**51**	98	**50**	56	**47**
Vatukoula	78	**48**	73	**39**	50	**40**
Rarawai	95	**25**	89	**30**	39	**65**
Penang	161	**26**	99	**30**	55	**50**
Lautoka	84	**53**	72	**32**	49	**51**
Nadi	89	**52**	65	**50**	45	**46**
Lomawai	90	**50**	72	**34**	62	**53**
Olosara	99	**64**	90	**33**	77	**43**
Nacocolevu	85	**68**	75	**33**	71	**61**
Yasawa-I-Rara	85	**50**	82	**75**	43	**39**
Central Division						
Navua - Tamanoa	287	**60**	196	**51**	186	**44**
Suva	270	**34**	163	**33**	136	**37**
Nausori	248	**38**	150	**50**	118	**43**
Eastern Division						
Lakeba	136	**62**	78	**50**	80	**37**
Ono-I-Lau	103	**38**	89	**31**	92	**19**
Northern Division						
Korowiri	116	**41**	73	**23**	52	**24**
Seaqaqa	125	**43**	63	**50**	52	**32**
Nabouwalu	171	**58**	98	**40**	92	**26**
Savusavu	196	**75**	117	**50**	96	**48**
Udu Point	167	**50**	116	**50**	89	**36**
Rotuma	296	**71**	234	**60**	233	**39**

Please note that the above figures should be used with caution, as there is some degree of uncertainty associated with them, and particularly the reliability of the model is low during the transition months and the dry season.

** 'Long-term Average' for the 30 year period from 1971-2000.*
 # Probability of expecting at least normal rainfall.