

Fiji Islands Weather Summary

July 2004

Rainfall Outlook till October 2004

FIJI METEOROLOGICAL SERVICE

IN BRIEF

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The weather in July was mainly cool and dry with occasional strong and gusty south-east winds. However, monthly total rainfall at a number of centres across the country was above average to well above average due to a considerable amount of rainfall falling within a space of 2-3 days from the 23-25th.

A new one-day high record was set at Viwa (163.7mm) and a new monthly record as well (185.9mm). On the mainland, Ba received 327% of normal rainfall. July long term averages are pretty low (Ba - 39mm) which is the reason for well above average monthly rainfall being recorded within a space of 2-3 days. Above to well above average rainfall was recorded in the Western Division and parts of the Central and Northern Division.

There was less rainfall activity around Taveuni and the Eastern Division with monthly rainfall being below to well below average.

Day-time temperatures were average to above average and night-time temperatures near normal at most centres across the country. Sea surface temperatures in Fiji's waters were slightly above average (0.5-1.0°C) except for a region south of Viti Levu which was near normal.

Total sunshine hours were near the July long-term average. Nadi Airport recorded 110%, Laucala Bay/Suva, 109%, Nacocolevu 113% and Rotuma 85% of normal.

WEATHER PATTERNS

In the first ten days of the month, an area of high pressure in the Tasman Sea, whilst moving steadily towards the east, maintained a ridge over Fiji. Some showers were recorded throughout this period particularly in the southeastern parts of the main islands. Elsewhere, fine conditions prevailed. Nights were cool.

A weak cold front moved over Fiji on the 10th, producing rain over most places. As it cleared the Group on the 11th, an intense area of high pressure following this trough directed fresh to strong southeast winds over the country. This regime persisted till the 22nd during which the whole Fiji Waters was put on strong wind warning.

The major trough of the month approached the country on the 22nd with associated extensive cloud band spreading over the Group. Rain was widespread and heavy on the 23rd. A cold front linked to the trough moved across the country on

the 24th accompanied by another active cloud band resulting in further widespread rain with heavy falls in some places. A strong wind warning was also issued for all Fiji waters in anticipation of fresh to strong and gusty southeast winds behind this front.

Generally fine and cool conditions prevailed for the remaining part of the month, except for some brief showers about the southeastern areas of the main islands.

For most of July, the SPCZ hovered near or over Rotuma. Subsequently, rain was recorded for most days of the month, with significant falls on the 2nd to the 4th as well as the 23rd.

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TABLE 1: RAINFALL FROM MAY TO JULY 2004

<u>Station</u>	<u>Actual Rainfall (mm)</u>	<u>Rainfall in the last three months (Below average, average or above average)</u>	<u>No. of Rain days in May (% of total rain)</u>	<u>No. of Rain days in June (% of total rain)</u>	<u>No. of Rain days in July (% of total rain)</u>
Penang Mill	254.8	Average	05 (4)	14 (58)	6 (38)
Monasavu Dam	893.4	Above Average	14 (8)	27 (72)	16 (20)
Vatukoula Mine	266.0	Above Average	4 (6)	11 (52)	3 (42)
Rarawai Mill, Ba	281.5	Above Average	4 (19)	8 (35)	3 (46)
Yasawa-I-Rara	-	-	-	-	-
Viwa Is.	408.5	Above Average	4 (4)	9 (50)	3 (46)
Lautoka Mill(Research)	179.2	Average	4 (12)	8 (33)	3 (55)
Nadi Airport	135.2	Below Average	5 (5)	9 (52)	4 (43)
Nacocolevu, Sigatoka	324.2	Above Average	4 (8)	10 (61)	3 (31)
Tokotoko, Navua	967.9	Above Average	17 (23)	26 (61)	3 (16)
Laucala Bay, Suva	720.6	Above Average	18 (26)	25 (45)	17 (29)
Nausori Airport	670.0	Above Average	15 (22)	22 (58)	13 (20)
Nabouwalu	526.9	Above Average	17 (21)	27 (57)	12 (22)
Labasa Airport	307.7	Above Average	7 (10)	16 (61)	5 (29)
Savusavu Airport	678.7	Above Average	13 (23)	16 (57)	10 (20)
Udu Point	-	-	17	-	14
Matei Airport	557.9	Above Average	9 (17)	16 (72)	7 (11)
Lakeba Is.	471.1	Above Average	10 (41)	20 (54)	9 (5)
Matuku Is.	-	-	-	-	-
Ono-I-Lau Is.	325.2	Average	9 (17)	12 (69)	9 (14)
Vunisea, Kadavu	394.4	Average	13 (26)	23 (58)	11 (16)
Rotuma	996.3	Above Average	15 (14)	25 (40)	26 (46)

RAINFALL IN THE LAST THREE MONTHS

Rainfall in July

Cool and dry conditions were dominant for most of the month however monthly total rainfall at a number of centres in the Western, Central and Northern Division was above average to well above average due to considerable amount of rainfall falling within a space of 2-3 days from the 23-25th. A new one-day high record was set at Viwa Island.

There was less rainfall activity on Taveuni and the Eastern Division with monthly rainfall being below to well below average.

Rainfall in the 3-months from May to July

The Rainfall Outlook for the period May to July in the April Fiji Islands Weather Summary was for rainfall to be near average. The confidence level of the forecast was moderate.

Of the nineteen sites that reported in time for this summary, four sites reported average, fourteen above average and one below average.

Figure A

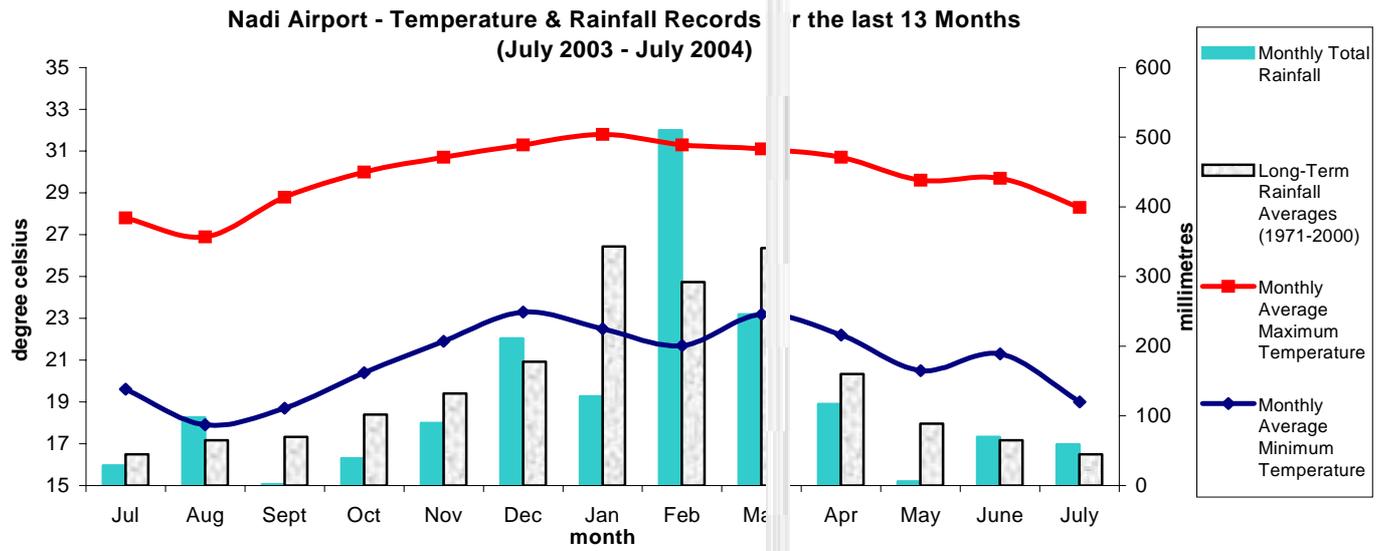


Figure B

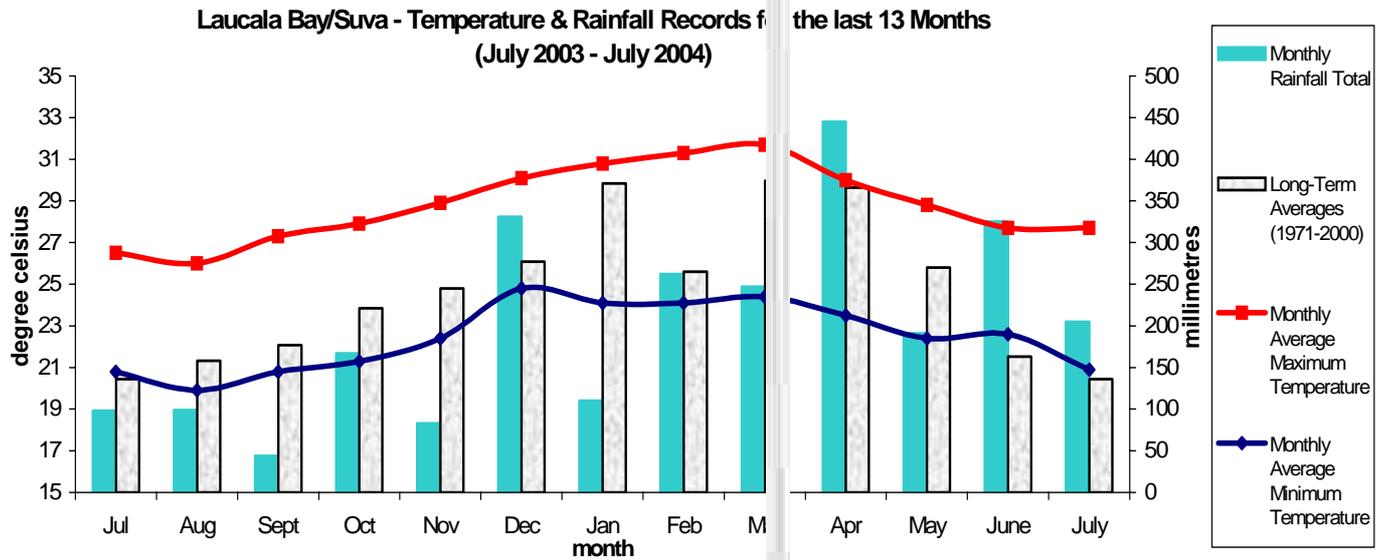
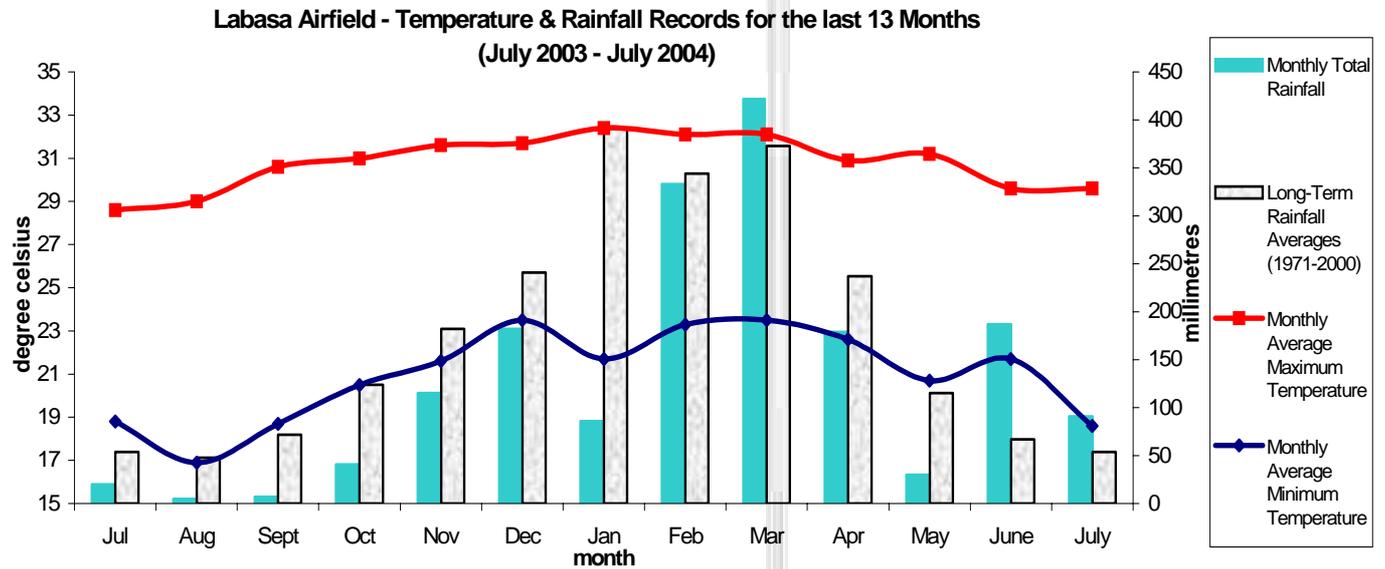


Figure C



Climate in July

MEAN DAY-TIME AND NIGHT-TIME AIR TEMPERATURES AND RELATIVE HUMIDITY AT 0900HRS.

Day-time temperatures were average to above average across the country. The greatest positive departures were recorded at the Nabouwalu and Vunisea which recorded 1.1°C above normal. There was only one negative departure recorded at Nadi Airport which was 0.3°C below normal.

Night-time temperatures were near normal across the country. The greatest positive departures were recorded at, Vatakoula and Vunisea which recorded 1.7°C and 1.5°C respectively above normal. The greatest negative departure were recorded at Ono-I-Lau which recorded 1.1°C below normal, Viwa and Penang Mill recorded 0.7°C below normal

Relative Humidity (RH) at 0900hrs were mostly below average across the country. The greatest positive departures from normal were recorded at Nadi Airport and Nausori which recorded 3.8% and 3.0% respectively above normal. The greatest negative departures were recorded at Ono-I-Lau, Matuku and Lautoka which recorded 7.7%, 7.0% and 6.2% below normal.

SOIL MOISTURE AND RUNOFFS

In the Western Division conditions were generally limiting to dry for most of the month except towards the end when conditions became ample to moderate. Monasavu recorded ample to moderate conditions for most of the month than excessive to ample at the end.

In the Central Division conditions were excessive to ample throughout the month.

In the Northern Division, conditions were excessive to moderate at Nabouwalu, Savusavu Airport and Udu Point. At Labasa Airport conditions were limiting to dry for most of the month except for the end of the month when conditions were excessive to ample.

In the Eastern Division, Lakeba, Vunisea and Ono-I Lau recorded moderate to limiting dry conditions throughout the month.

Rotuma recorded excess to ample conditions throughout the month.

Significant runoffs were recorded at Rotuma (340.7mm), Laucala Bay, Suva (123.4mm) and Viwa (102.2mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were near the July 1971-00 average. Nadi Airport recorded 110%, Laucala Bay/Suva, 109%, Nacolevu 113% and Rotuma 85% of normal.

Monthly average wind speed was below average at Nabouwalu, Vunisea and Rotuma. Nausori Airport and Nadi Airport recorded above average winds.

Global Solar Radiation (average per day) recorded at Nadi Airport was 14.2MJ/ M².

RECORDS SET IN JULY 2004

<u>Element</u>	<u>Station</u>	<u>Observed (record)</u>	<u>On</u>	<u>Rank</u>	<u>Previous (record)</u>	<u>Year</u>	<u>Records Began</u>
Rainfall	Viwa	163.7mm	24th	New One Day-High	124.2mm	1996	1978
Rainfall	Viwa	185.9mm	-	Second Mly High	164.1mm	1996	1978

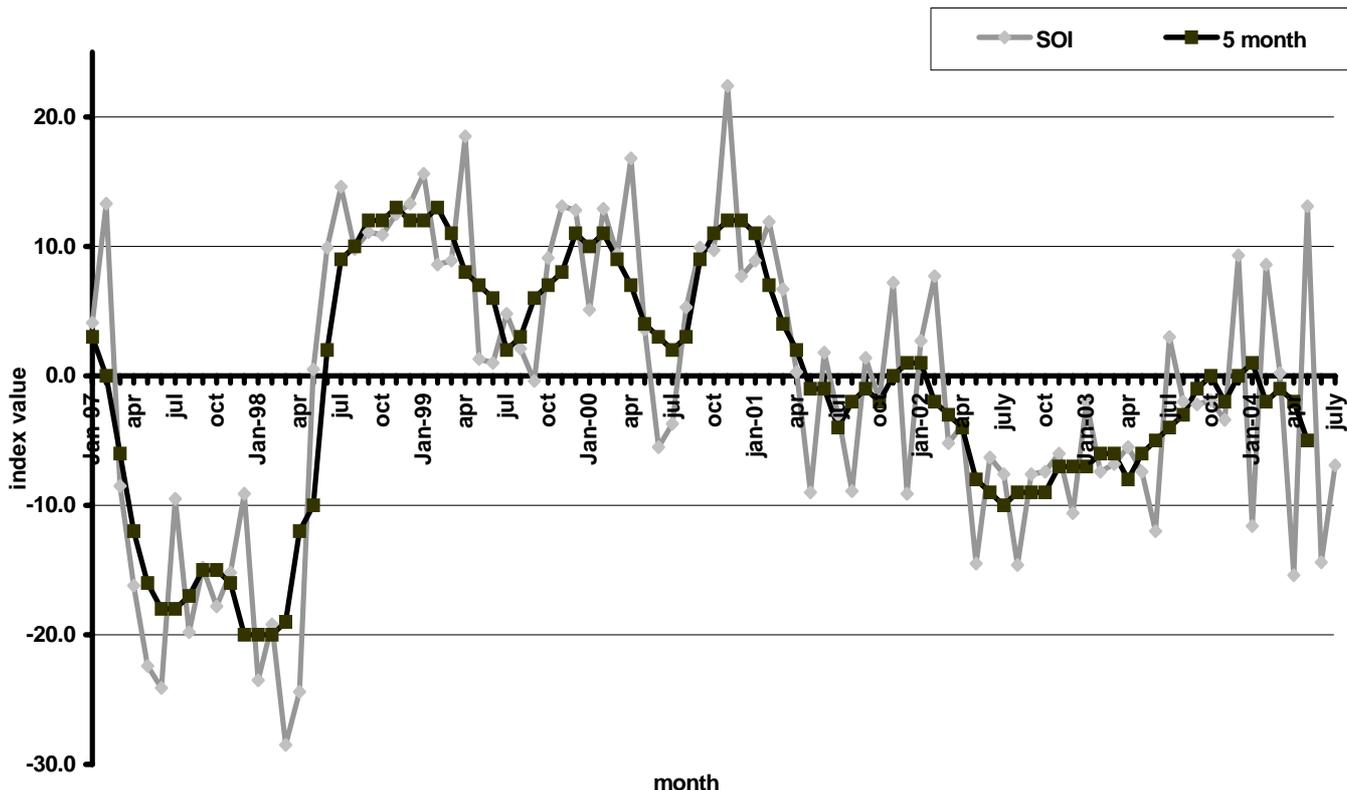
PRELIMINARY CLIMATOLOGICAL SUMMARY FOR JULY 2004

	RAINFALL				AIR TEMPERATURES						SUNSHINE				
	TOTAL	RAIN	MAX.		AVERAGE DAILY			EXTREME			TOTAL				
	* DAYS FALL				MAX.	#	MIN.	#	MAX.	MIN.	HRS	*			
	MM	%	+	MM ON	C	C	C	C	C	ON	C	ON			
NADI AIRPORT	59	132	4	40	23	28.3	-0.3	19.0	0.6	31.2	31	16.1	2	240	110
SUVA/LAUCALA BAY	205	151	17	52	24	27.7	0.9	20.9	0.2	30.6	22	16.9	14	147	109
NACOCOLEVU	100	140	3	49	24	28.0	0.7	17.7	-0.1	31.5	21	13.4	7	188	113
ROTUMA	460	185	26	88	23	29.9	0.8	24.3	0.2	31.8	21	21.5	5	168	85
VIWA	186	332	3	164	23	28.4	0.6	21.9	-0.5	31.0	5	19.7	3		
UDU POINT	139	157	14	101	23	28.2	0.2	22.1	-0.2	30.0	9	19.5	24		
LABASA AIRFIELD	91	168	5	65	23	29.6	0.4	18.6	0.4	32.0	22	13.5	6		
NABOUWALU	118	128	12	52	23	27.4	1.1	21.9	0.1	29.7	20	17.5	24		
SAVUSAVU AIRFIELD	140	145	10	62	23	27.4	0.4	21.3	0.3	30.5	20	19.2	8		
MATEI AIRFIELD	63	61	7	42	23	27.9	0.8	21.3	-0.4	29.9	23	18.6	24		
*YASAWA-I-RARA	Faulty AWS														
VATUKOULA	111	223	3	81	23	29.5	0.3	19.2	1.7	32.3	29	16.0	7		
MONASAVU	182	94	16	65	23	21.8	0.9	15.8	0.5	25.2	20	10.5	7		
NAUSORI AIRPORT	134	113	13	43	23	26.9	0.6	19.5	-0.1	29.4	10	15.0	14		
NAVUA/TOKOTOKO	160	94	13	53	23	26.6	0.6	19.3	-0.4	30.0	18	15.0	7		
LAKEBA	21	27	9	6	23	27.2	0.8	21.6	0.6	29.3	22	15.5	7		
MATUKU	Faulty Rain gauge					26.6	0.6	21.4	0.6	28.8	19	15.5	8		
VUNISEA	64	46	11	31	23	26.6	1.1	21.1	1.5	29.4	10	17.6	2		
ONO-I-LAU	44	50	9	14	23	25.5	0.5	19.1	-1.1	28.7	21	16.6	8		
BA/RARAWAI MILL	128	327	3	67	24	29.7	0.1	17.5	0.5	32.0	9	13.8	7		
LAUTOKA AES	98	199	3	55	23	28.7	0.4	20.0	0.1	30.6	11	16.9	14		
PENANG MILL	95	172	6	68	23	27.9	0.5	19.7	-0.7	30.5	10	16.2	6		

Note: This summary is prepared for rapid dissemination as soon as possible following the end of the month. The quantitative data are obtained daily on the phone or radiotelephone from a network of climate stations reporting 9 am observations; these data must be treated as provisional. FMS does not guarantee accuracy and reliability of the forecast information presented in this summary but the Department should be sought for expert advice, any clarification or additional information. Any person wishing to re-print any information provided in this summary must seek permission from the Director of Meteorology.

Figure D

Southern Oscillation Index vs 5-Month Running Mean
(January 1997 - July 2004)



ENSO status and Rainfall Outlook to October 2004

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for July was -6.9 (June was -14.4) with the five-month running mean of -5 centred on May (March was -2) (Figure D).

As of August 4th, the current El Niño-Southern Oscillation status remains neutral. However, the central Pacific Ocean has continued to warm during the past few weeks and the SOI has now been negative for two months. The recent warming in the central Pacific is consistent with most computer models forecasts, and is related to a weakening of the Trade Winds which occurred during June and July. Indices of the Pacific Ocean climate have been unusually volatile in recent months, adding some uncertainty to the likely trend in El Niño related conditions.

Thus the development of an El Niño event later this year cannot be entirely ruled out, there being one clear instance in recent decades of an El Niño event developing in the second half of the year (1986/87). Further available forecast guidance indicates continued warmer than average temperatures in the central equatorial Pacific.

(The ENSO Update is kindly provided by the Australian Bureau of Meteorology and can be found on their website <http://www.bom.gov.au>).

RAINFALL PREDICTIONS

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. 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.*

The model predicts rainfall in the coastal regions of the Western and Central Divisions (excluding Nausori) and western and northern parts of Vanua Levu to be average to below average. For the remainder of the country the model predicts equal chances of receiving average, below or above average rainfall (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 a 27-50% chance (depending on location) of receiving average (mean) rainfall across Fiji in next three months (Table. 2).

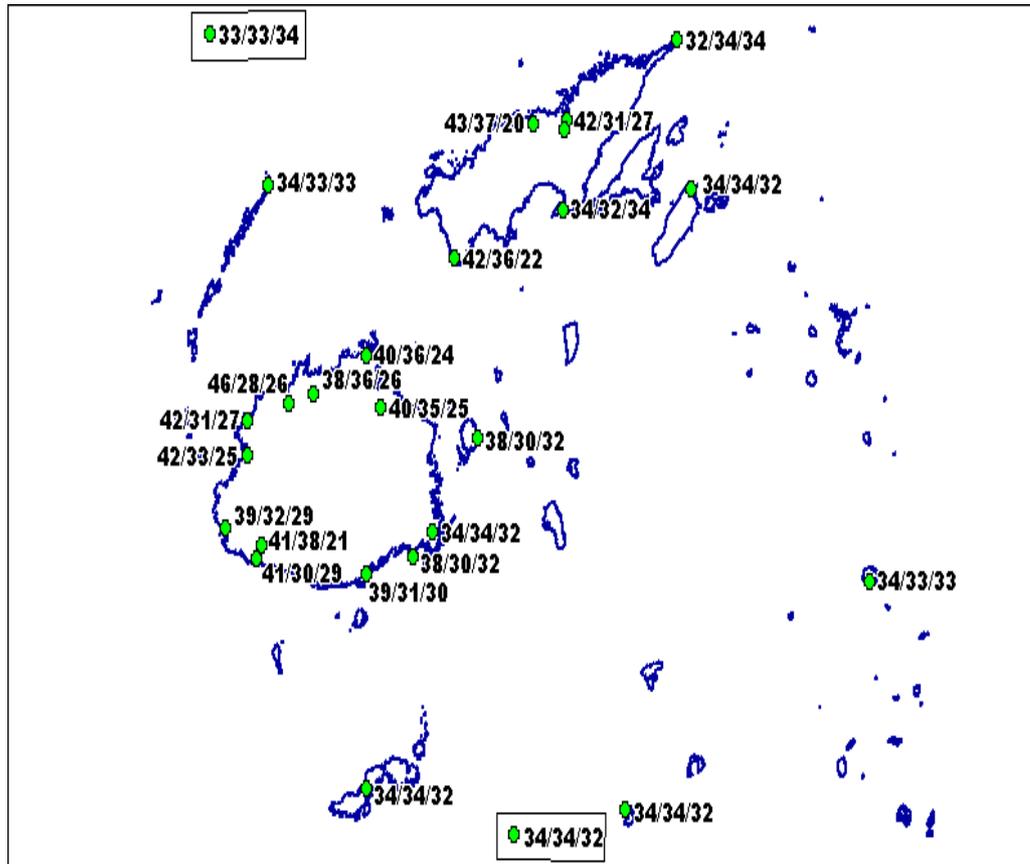
RAINFALL OUTLOOK FOR AUGUST TO OCTOBER 2004

Most parts of the country based on model predictions and current ocean and atmospheric conditions can expect rainfall in the next three months to be near average. There may be parts of the Western and Northern Divisions which receive below average rainfall.

NOTE: The confidence level of this prediction is low to moderate.

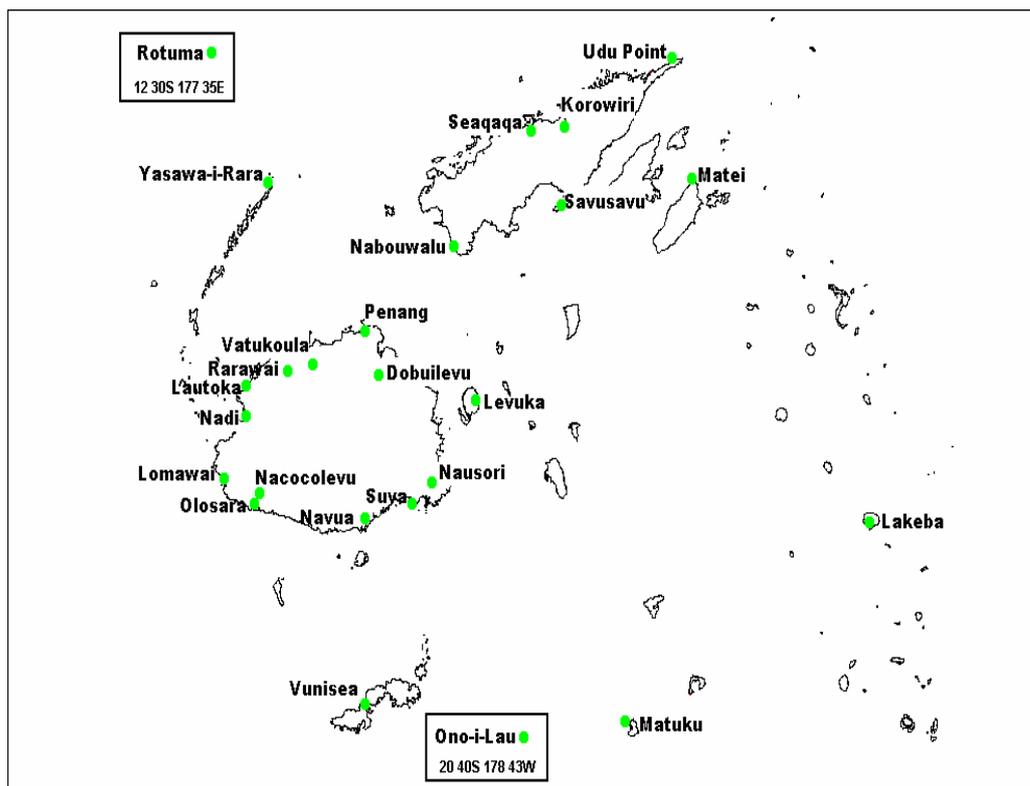
Three Month Rainfall Outlook Probabilities for August to October 2004

FIGURE E: Three Month Forecast for Selected Stations in Fiji using the Fiji Meteorological Services Rainfall Prediction Model. The forecast probabilities are presented as



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



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	272	389
Vatukoula	167	269
Rarawai	171	289
Penang	177	274
Lautoka	168	257
Nadi	172	276
Lomawai	161	261
Nacocolevu	206	304
Olosara	216	320
Yasawa	157	259
Central Division		
Navua	555	796
Suva	385	600
Nausori	384	542
Eastern Division		
Levuka	306	476
Lakeba	227	335
Matuku	192	357
Ono-I-Lau	232	345
Vunisea	286	418
Northern Division		
Labasa Mill	173	246
Seaqaqa	166	292
Nabouwalu	249	453
Savusavu	300	417
Udu Point	270	422
Matei	360	495
Rotuma	665	864

TABLE 3: Monthly Rainfall Outlook Probabilities for August to October 2004

Station Name	August 2004		September 2004		October 2004		August to October 2004 combined	
	Average*	Probability#	Average*	Probability#	Average*	Probability#	Average*	Probability#
Western Division								
Dobuilevu	80	57	119	36	153	42	352	46
Vatukoula	68	33	78	41	99	31	245	33
Rarawai	65	34	74	47	107	33	246	29
Penang	73	35	96	37	114	33	283	35
Lautoka	70	29	72	43	102	35	244	33
Nadi	65	43	70	55	102	30	237	44
Lomawai	79	32	71	49	71	47	221	49
Olosara	98	28	103	49	90.5	37	292	43
Nacocolevu	83	34	92	40	98	40	273	40
Yasawa-I-Rara	63	34	66	35	105	25	234	41
Central Division								
Navua - Tamanoa	202	45	229	40	280	35	711	50
Suva	158	33	177	43	221	28	556	42
Nausori	147	52	165	40	205	33	517	44
Eastern Division								
Lakeba	102	27	101	42	123	48	326	48
Ono-I-Lau	118	20	108	37	86	42	312	38
Northern Division								
Korowiri	52	39	75	48	127	29	254	27
Seaqaqa	56	49	82	44	142	32	280	48
Nabouwalu	105	39	113	47	170	31	388	40
Savusavu	116	29	133	40	171	36	420	32
Udu Point	85	42	113	39	165	45	363	42
Rotuma	210	40	238	39	340	32	788	33

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.

The probabilities in the three-month combined column are not an average of the three individual months. The model in this case has been re-run for three combined months. There is a higher degree of skill association with predicting rainfall for three combined months compared to three individual months.

* 'Long-term Average' for the 30 year period from 1971-2000.

Probability of expecting at least normal rainfall.