Volume 3: Issue: 7
August 2003

Fiji Islands Weather Summary August 2003 Rainfall Outlook till November 2003

FIJI METEOROLOGICAL SERVICE

Inside this issue:

In Brief

August was cooler and drier then normal. Apart from parts of the Western Division and Rotuma rainfall for most of the country was below average and in some cases well below average.

Matei has now recorded seven, Ono-I-Lau five and Savusavu Airport four consecutive months of below average rainfall. Well below average rainfall in the last three months has also been recorded at Labasa Airport and Penang Mill (Rakiraki).

Below average rainfall has been received in the last three months at Monasavu with last months rainfall being the second lowest on record. This certainly wouldn't have provided any relief to the situation reported in the media recently of very low water levels, even lower than last year at the Fiji Electricity Authority Monasavu Dam. Monasavu has to the end of August received 87% of normal rainfall this year.

Both night and daytime average air temperatures were generally below average across the country. Relative Humidity showed a similar trend.

Total sunshine hours ranged from below average to average for the month of August.

Rainfall in the next three months is predicted to be generally below average to average over most of the Fiji Group, however the amount of rainfall received in the coming months should increase compared to present as the country approaches the *Wet season.*

Weather Patterns

The cool and dry trend continued throughout August. Rainfall appeared significantly reduced. Cold fronts were a little more prevalent. Pressure Surges caused Wind Warnings for certain areas of the Fiji Waters on several occasions during the month.

In the first three days of the first week, a weak cold front moved across Fiji from the southwest, bringing a few light showers over the country. However, behind the front was a ridge, which helped gradually displace the front and associated showers north of the Group. This ridge maintained cool and dry weather over the country from the 6th till the 9th.

On the 9th, a trough of low pressure began to move onto the Group from the north and caused rain over most places till the 11th. The trough eventually cleared the country on the 12th, being displaced east by an intense ridge from the southwest. This ridge brought cool and dry conditions from origins far to the south of Fiji till the 17th. Subsequently, on the 15th, Labasa recorded the lowest temperature of 10.7 degrees Celsius for the month.

From the 18th, another trough moved across Fiji from the west. In response to this, a convergence zone to the north also drifted onto the Group and together produced widespread rain till the 21st. Later on the 21st and 22nd, a second weak cold front brushed past the country. Following this front was yet another ridge which lingered over Fiji till the 27th and subsequently produced the third episode of cool and dry conditions over the country for the month.

A third weak cold front moved across Fiji on the 28th but did not cause any significant precipitation. Fine conditions prevailed over the Group till the end of the month.

Rotuma recorded some significant rainfall in August, due mainly to the convergence of cool southeasterlies and moist northeasterlies over the island and the occasional convergence zone. However, there were more dry days in August than either June or July.

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TABLE 1: Rainfall from June to August 2003

Station	Actual Rainfall (mm)	Has rainfall in the last three months been below average, average or above average?	No. of Rain days in June (% of total rain)	No. of Rain days in July (% of total rain)	No. of Rain days in August (% of total rain)
Penang Mill	84.9	Well Below Average	08 (22)	07 (29)	05 (49)
Monasavu Dam	550.3	Below Average	25 (39)	23 (36)	12 (25)
Vatukoula Mine	149.9	Average	10 (53)	06 (10)	07 (37)
Rarawai Mill, Ba	119.0	Below Average	06 (34)	03 (05)	04 (61)
Yasawa-I-Rara Is.	-	-	-	-	-
Viwa Is.	176.8	Average	04 (39)	04 (07)	08 (54)
Lautoka Mill(Research)	229.1	Above Average	04 (36)	03 (06)	06 (58)
Nadi Airport	155.7	Average	04 (19)	04 (19)	06 (62)
Nacocolevu, Sigatoka	171.2	Below Average	06 (11)	09 (57)	05 (32)
Tokotoko, Navua	334.7	Below Average	20 (44)	17 (29)	12 (27)
Laucala Bay, Suva	281.4	Below Average	19 (30)	25 (35)	21 (35)
Nausori Airport	285.6	Below Average	20 (26)	23 (45)	12 (29)
Nabouwalu	160.2	Below Average	22 (30)	18 (42)	13 (28)
Labasa Airport	39.6	Well Below Average	04 (35)	04 (51)	03 (14)
Savusavu Airport	126.6	Well Below Average	06 (19)	14 (54)	09 (27)
Udu Point	-	-	-	-	-
Matei Airport	107.9	Well Below Average	08 (39)	16 (54)	06 (07)
Lakeba Is.	319.6	Above Average	15 (42)	13 (41)	08 (17)
Matuku Is.	-	-	-	-	-
Ono-I-Lau Is.	89.9	Well Below Average	05 (23)	08 (37)	07 (40)
Vunisea, Kadavu	255.2	Below Average	19 (33)	18 (53)	10 (14)
Rotuma	919.9	Above Average	21 (32)	25 (33)	13 (35)

Rainfall in the last three months

Rainfall in August

Rainfall in August ranged from well below average to above average. Matei has now recorded seven, Ono-I-Lau five and Savusavu Airport four consecutive months of below average rainfall.

Rainfall in the Western Division and Rotuma was generally average to above except for Nacocolevu and Penang Mill which recorded below average rainfall.

In the Northern and Eastern Divisions the rainfall trend was similar to the previous month with well below (Labasa , Savusavu and Matei Airports, Vunisea and Ono-I-Lau) to below average (Nabouwalu and Lakeba).

In the Central Division including Monasavu rainfall was below average with Tokotoko, Navua recording well below average.

Rainfall in the three-months from June to August

The Rainfall forecast for the period June to August in the May Fiji Islands Weather Summary was for rainfall to vary around average. The skill level of the forecast was low due to the forecast period being in the Dry Season.

Of the nineteen sites that reported in time for this summary, five sites reported well below average, eight sites below average, three average and three above average.

Figure A

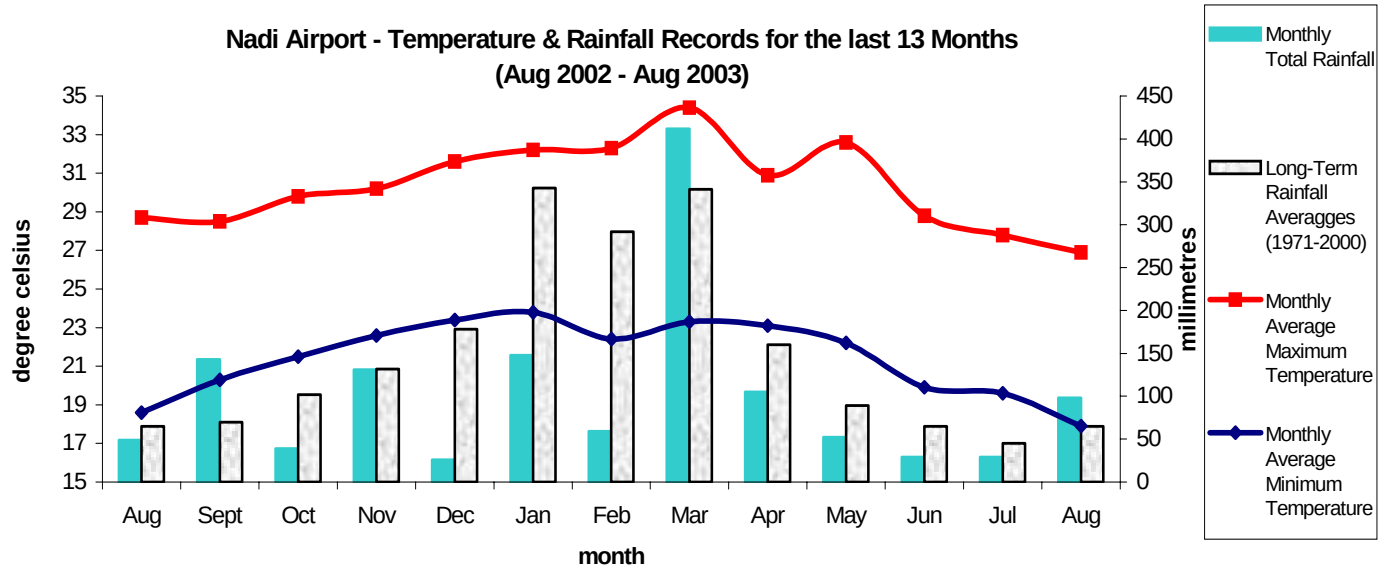


Figure B

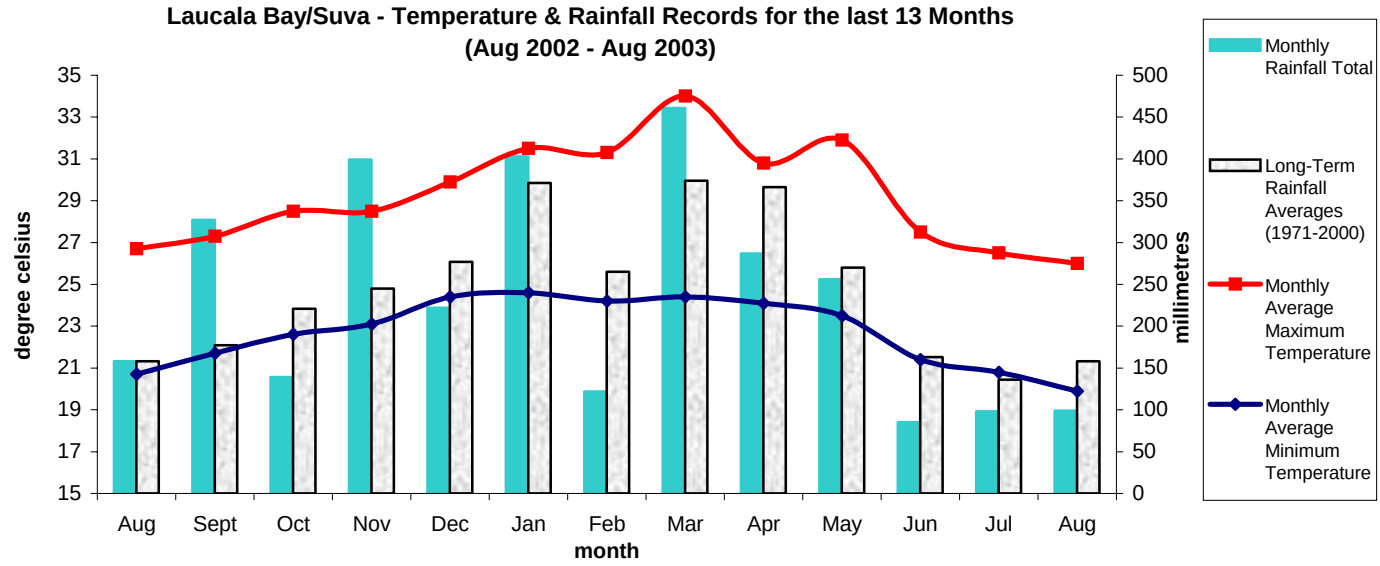
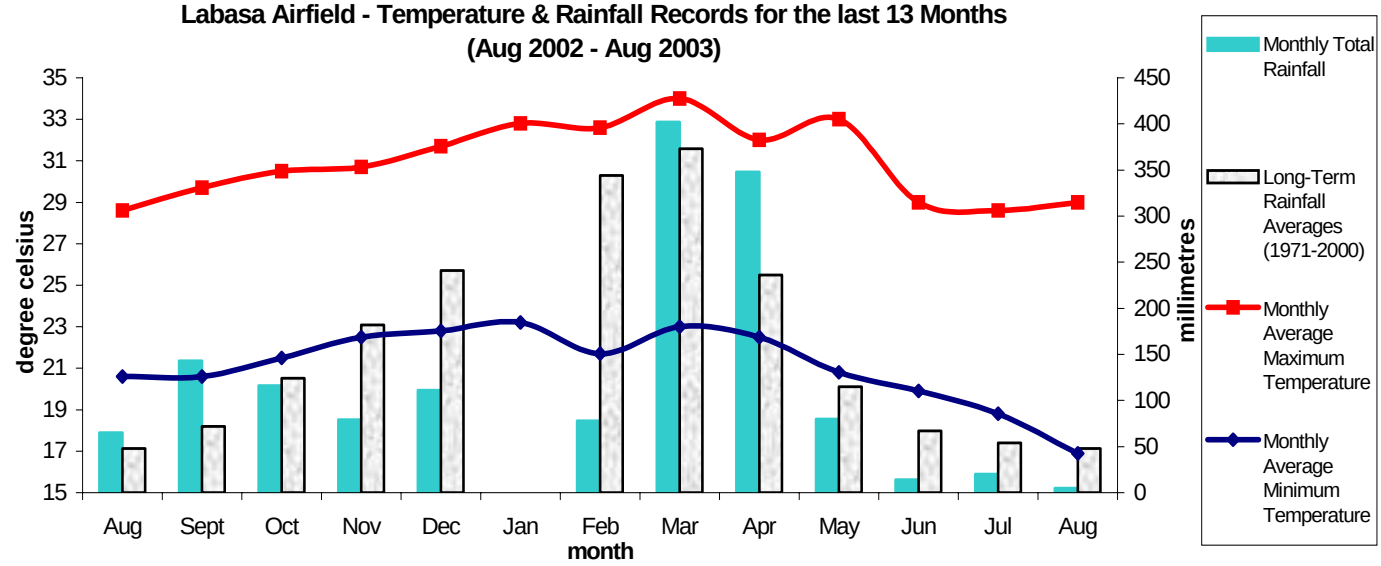


Figure C



Climate in August

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

Day-time temperatures were generally below average at all recording sites across the country. The greatest positive departures from normal wre recorded at Rotuma and Ono-I-Lau which recorded 0.5 and 0.7°C respectively above normal. The greatest negative departures were at Nadi Airport, Vatukoula and Ba which recorded 1.8, 1.7 and 1.6°C respectively below normal.

Night-time temperatures were also generally below average at all recording sites across the country. The greatest positive departures from normal were recorded at Vatukoula and Savusavu Airport which recorded 0.8 and 0.2°C respectively above normal. The greatest negative departures were at Penang Mill, Labasa Airport and Nausori Airport/Lakeba which recorded 2.9, 1.8 and 1.4°C respectively below normal.

Relative Humidity (RH) at 0900hrs was generally average to below average at all recording sites except Nadi Airport and Nacocolevu. The greatest positive departures was +6% at Nadi Airport and Nacocolevu and the greatest negative departure was -6% at Navua and Penang Mill.

Soil Moisture and Runoffs

Soil moisture conditions were ranged from ample to moderate throughout the month in the Central Division.

In the Western Division, soil moisture was limiting to dry throughout the month except for Nadi Airport, Lautoka, Ba and Viwa during the third week (and fourth week in the case of Lautoka) when conditions were ample to moderate. Soil moisture returned to limiting to dry for the other sites during the last week.

In the Northern Division, soil moisture was limiting to dry at all recording sites throughout the month.

In the Eastern Division, soil moisture ranged from moderate to dry except for Ono-I-Lau were it was limiting to dry throughout the month.

Rotuma recorded excessive to ample for the first three weeks then moderate during the last week.

The only significant runoffs were recorded at Rotuma (206.1mm) and Monasavu (83.7mm).

Sunshine, Radiation & Winds

Total sunshine hours were below average to average. Nadi Airport recorded 89%, Laucala Bay/Suva, 77%, Nacocolevu 88% and Rotuma 107% of normal.

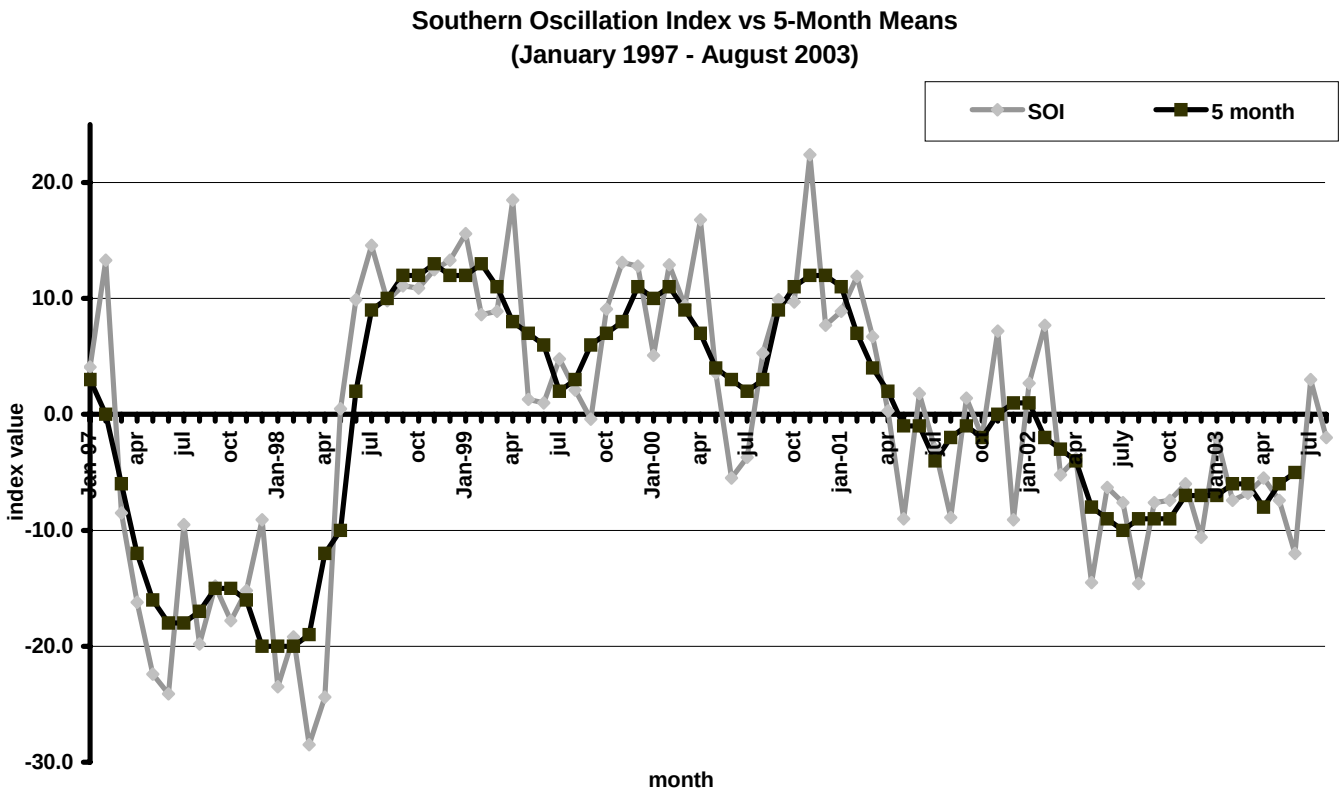
Global Solar Radiation recorded at Nadi Airport was 14.3MJ/Square metre and 10.0MJ/Square metre at Laucala Bay/Suva.

Average Wind speed was below average at Laucala Bay, Nausori Airport, Vunisea and Rotuma and around average at Nabouwalu and Nadi Airport.

Records set in August 2003

Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Max Temp	Monasavu	15.5	4th	Record Low	15.7	1985	1980
Min Temp	Penang Mill	11.3	14th	Record Low	11.7	1951	1930
Rainfall	Savusavu	7.6		Second Mly Low			1956
Rainfall	Monasavu	138.7		Second Mly Low			1980

Figure D



ENSO status and Rainfall Outlook to October 2003

Southern Oscillation Index: The Southern Oscillation Index (SOI) for August was -1.8 (July was 3.0) with the five-month running mean of -5 centred on June (May was –6) (Figure D).

The tropical Pacific is currently in a Neutral state. The model outputs are overwhelmingly in favour of a continuation of this situation during the next eight months. One model out of twelve departs from this scenario. The CSIRO model predicts the weakest of Warm conditions in January 2004. The temperature trends in the model outputs vary from almost flat, to modest warming or cooling.

(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. 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 to be generally below average to average for Fiji with average to above for Rotuma (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 and across the next three months (Table. 2).

Outlook for August to October 2003:

Based on the model predictions and current climatic conditions, Fiji's rainfall is likely to be generally below average to average.

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

Preliminary Climatological Summary for August 2003

PRELIMINARY CLIMATOLOGICAL DATA FOR MONTH 8 , 2003 : SUMMARY FOR DAYS 1 TO 31

	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL		RAIN DAYS	MAX. FALL		AVERAGE DAILY MAX.	#	AVERAGE DAILY MIN.	#	EXTREME MAX.		EXTREME MIN.		TOTAL	
	MM	* %	+	MM	ON	C	C	C	C	C	ON	C	ON	HRS	* %
NADI AIRPORT	98	150	6	29	11	26.9	-1.8	17.9	-0.7	30.5	1	13.5	15	204	89
SUVA/LAUCALA BAY	99	63	21	33	11	26.0	-0.7	19.9	-0.8	29.9	2	16.8	27	111	77
NACOCOLEVU	55	66	5	22	19	26.3	-1.2	16.8	-1.1	31.0	2	12.5	28	162	88
ROTUMA	321	153	13	117	7	29.6	0.5	23.9	-0.1	32.0	20	21.0	26	224	107
VIWA	96	162	8	41	19	27.1	-0.7	22.2	-0.2	30.9	2	19.6	12		
*UDU POINT	Faulty AWS														
LABASA AIRFIELD	5	11	3	2	12	29.0	-0.4	16.9	-1.8	31.7	3	10.7	16		
NABOUWALU	44	42	13	26	20	26.3	-0.0	21.4	-0.2	31.7	20	19.3	15		
SAVUSAVU AIRFIELD	34	29	9	11	2	26.3	-0.8	21.0	0.2	31.5	1	17.5	27		
MATEI AIRFIELD	8	6	3	4	19	26.9	-0.1	20.8	-0.9	29.9	2	18.1	26		
*YASAWA-I-RARA	Faulty AWS														
VATUKOULA	56	83	7	29	19	27.7	-1.7	18.3	0.8	31.2	2	14.2	25		
MONASAVU	139	59	12	75	19	20.7	-0.4	14.4	-0.7	25.0	2	10.5	25		
NAUSORI AIRPORT	84	57	12	47	11	25.5	-0.7	18.2	-1.4	31.2	2	14.4	15		
NAVUA/TOKOTOKO	89	38	12	35	11	25.0	-0.6	18.2	-1.2	29.0	1	13.5	25		
LAKEBA	55	54	8	22	19	25.6	-0.8	19.6	-1.4	30.0	2	15.7	27		
*MATUKU	Faulty AWS														
VUNISEA	37	30	10	15	20	25.5	-0.3	18.1	-1.3	28.1	12	15.0	25		
ONO-I-LAU	36	31	7	13	19	25.6	0.7	19.5	-0.5	27.1	11	16.8	7		
BA/RARAWAI MILL	72	111	4	29	19	28.2	-1.6	17.1	-0.3	31.5	2	12.0	15		
LAUTOKA AES	134	192	6	66	20	27.2	-1.1	19.1	-0.9	29.5	2	16.2	25		
PENANG MILL	41	57	5	18	19	26.9	-0.5	17.8	-2.9	31.0	1	11.3	14		

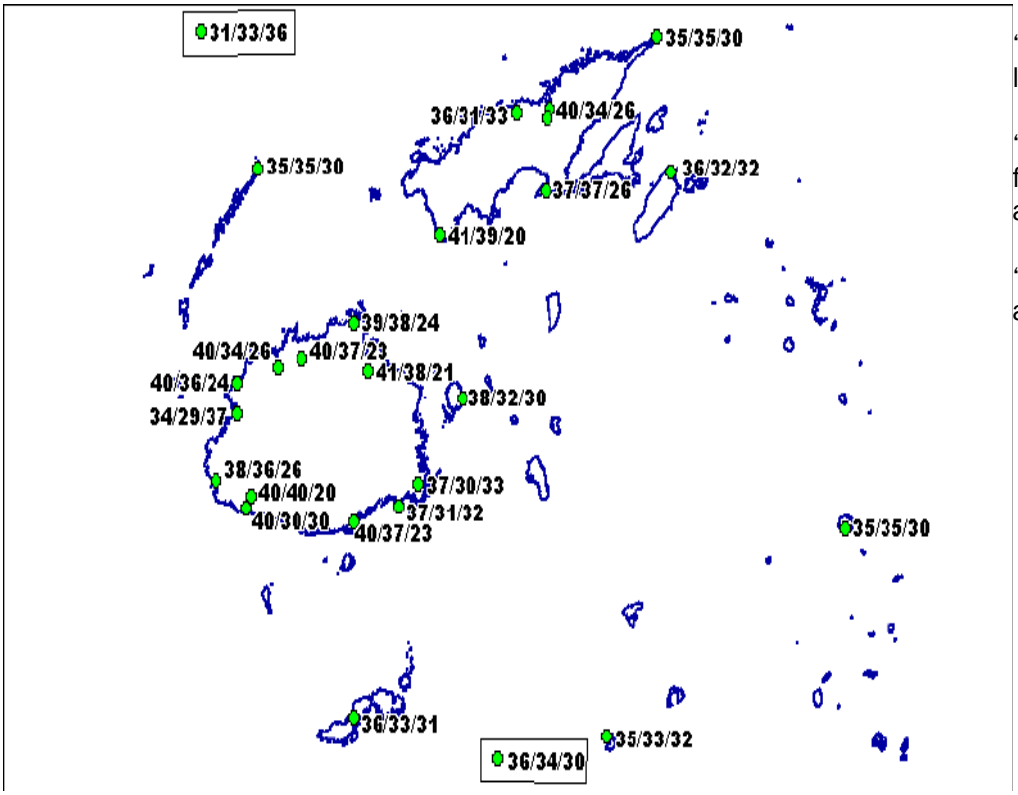
	PE	WATER BALANCE(MM)						TEMPERATURE(C)			HUMIDITY		WIND	SUN	RAD
	MAX.	LAST		DEF	NO	RO	NO	DLY	DRY	WET	RH%	VP		%OF	MJ/
	.1MM	DS	ON	DS	DYS	DYS		MEAN	(AVERAGE AT 9AM)				KT	POS	SQ.M
NADI AIRPORT	37	75	1	59	33 9	0	0	22.4	22.6	19.6	75	20.5	5.3	60	14.3
SUVA/LAUCALA BAY	34	43	9	34	0 0	0	0	23.0	22.9	20.6	80	22.5		32	10.0
NACOCOLEVU	34	75	1	75	50 16	0	0	21.6	22.0	20.4	86	22.9		48	15
ROTUMA	41	42	29	25	0 0	206	5	26.8	27.5	24.0	74	27.3	3.8	64	18
VIWA	39	75	4	68	19 7	0	0	24.6	24.7	21.1	72	22.4			
*UDU POINT	Faulty AWS														
LABASA AIRFIELD	36	75	1	75	106 31	0	0	23.0	24.5	21.0	72	22.3			
NABOUWALU	35	75	6	75	49 15	0	0	23.8	24.1	20.9	74	22.3	8.8		
SAVUSAVU AIRFIELD	34	75	1	75	71 24	0	0	23.6	24.2	21.0	74	22.5			
MATEI AIRFIELD	36	75	8	75	81 23	0	0	23.9	24.5	21.7	77	23.8			
*YASAWA-I-RARA	Faulty AWS														
VATUKOULA	37	75	7	75	40 12	0	0	23.0	23.9	19.7	66	19.7			
MONASAVU	26	28	31	28	0 0	84	4	17.5	17.4	15.9	84	16.9			
NAUSORI AIRPORT	34	51	9	47	0 0	0	0	21.8	22.1	19.9	81	21.6	3.0		
NAVUA/TOKOTOKO	34	42	9	39	0 0	8	1	21.6	22.2	19.6	78	20.9			
LAKEBA	36	75	17	75	8 3	0	0	22.6	23.8	20.0	70	20.7			
*MATUKU	Faulty AWS														
VUNISEA	35	75	18	75	20 6	0	0	21.8	22.5	19.3	73	20.1	2.3		
ONO-I-LAU	34	75	1	75	69 22	0	0	22.5	22.2	18.4	69	18.4			
BA/RARAWAI MILL	37	75	1	69	48 14	0	0	22.6	23.3	19.6	70	20.0			
LAUTOKA AES	37	75	6	40	12 4	18	1	23.2	24.0	19.6	65	19.5			
PENANG MILL	37	75	1	75	73 21	0	0	22.4	22.2	19.3	76	20.5			

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.

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. Water balance calculations are approximate and are intended for guidance purposes only. Also, 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.

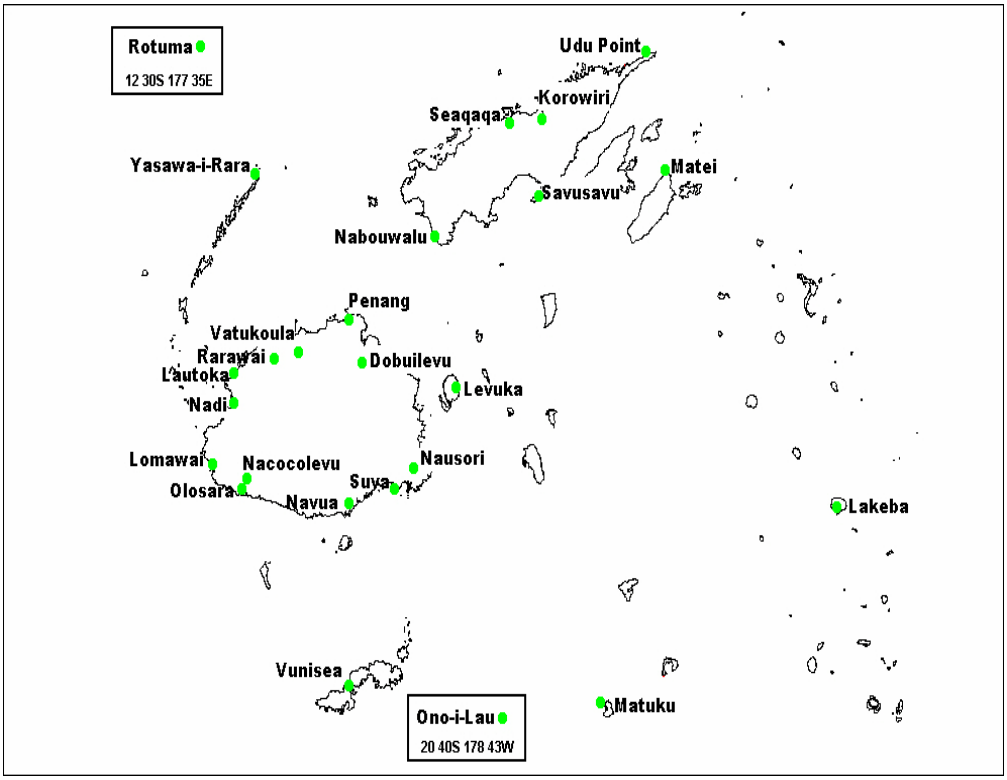
Three Month Rainfall Outlook Probabilities for September to November 2003

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	365	514
Vatukoula	207	352
Rarawai	204	361
Penang	237	351
Lautoka	190	235
Nadi	211	342
Lomawai	192	336
Nacocolevu	243	353
Olosara	230	367
Yasawa	190	367
Central Division		
Navua	649	892
Suva	441	742
Nausori	432	684
Eastern Division		
Levuka	355	546
Lakeba	298	392
Matuku	224	367
Ono-I-Lau	200	347
Vunisea	297	302
Northern Division		
Labasa Mill	244	370
Seaqaqa	267	442
Nabouwalu	352	506
Savusavu	373	507
Udu Point	377	561
Matei	470	663
Rotuma	728	927

TABLE 3: Monthly Rainfall Outlook Probabilities for September to November 2003

	September		October		November	
Station Name	**Average***	**Probability#**	**Average***	**Probability#**	**Average***	**Probability#**
Western Division						
Dobuilevu	119	**36**	153	**65**	220	**40**
Vatukoula	78	**33**	99	**50**	150	**22**
Rarawai	74	**30**	107	**41**	144	**24**
Penang	96	**44**	114	**44**	160	**48**
Lautoka	72	**33**	102	**47**	137	**41**
Nadi	70	**43**	102	**45**	132	**38**
Lomawai	71	**30**	71	**47**	145	**42**
Olosara	103	**32**	91	**40**	123	**26**
Nacocolevu	92	**33**	98	**52**	136	**27**
Yasawa-I-Rara	66	**44**	105	**32**	129	**44**
Central Division						
Navua - Tamanoa	229	**42**	280	**53**	306	**65**
Suva	177	**30**	221	**54**	245	**56**
Nausori	165	**46**	205	**49**	245	**56**
Eastern Division						
Lakeba	101	**49**	123	**54**	142	**37**
Ono-I-Lau	108	**37**	86	**58**	115	**35**
Northern Division						
Korowiri	75	**40**	127	**31**	189	**29**
Seaqaqa	82	**36**	142	**38**	209	**30**
Nabouwalu	113	**36**	170	**42**	174	**50**
Savusavu	133	**24**	171	**32**	188	**43**
Udu Point	113	**46**	165	**22**	203	**65**
Rotuma	238	**50**	340	**38**	282	**61**

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.