

# **EVI Report**

## **Environmental Vulnerability Index Fiji Data Profile: Summary Trip Report, December 1999**

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# ENVIRONMENTAL VULNERABILITY FIJI DATA PROFILE

## SUMMARY TRIP REPORT

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**Objective:** To provide expert assistance and training in the identification, gathering and collation of environmental information required for the calculation of the environmental vulnerability index (EVI) for Fiji.

The SOPAC Environmental Vulnerability Project team consisting of Ms Helena McLeod and Mr Reginald Pal assisted the Fiji Government with the help of the Department of Environment (DoE) in preparing their country environmental vulnerability profile.

### ***Brief Summary of Fiji's Environmental Vulnerability***

Fiji is an archipelago consisting of over 320 islands located between latitudes 15 and 22° South and Longitudes 177° West and 175° West. The two main, larger volcanic islands; Viti Levu and Vanua Levu constitute the bulk of the total land area (87%) of 18 272 km<sup>2</sup>. Altitude reaches a maximum of 1324 above sea level on the highest peak of Mount Victoria (Tomanivi). The terrain is mostly rugged inner land with flatter coastal areas.

The total population of Fiji stood at 775 077 in the 1996 census with a growth rate of approximately 1.2% over the last five years and loss in population being mainly through overseas migration. With 46% of the population residing in urban centres in 1996 future trends will put more pressure on the economic and social implications of the country.

Fiji has a tropical maritime climate with common torrential rain. Fiji falls in a tropical cyclone belt with an average of one cyclone passing through Fiji waters every year. Catastrophic climatic events such as cyclones occur from November to April and these can trigger flash flooding in low-lying areas. Changing weather patterns are also a cause of droughts in the country. In 1998, Fiji was hit by the worst ever drought due to the impact of El Nino-Southern Oscillation (ENSO) phenomena crippling the sugar industry and many other agricultural commodities in the Western division of Viti Levu.

The sugar and garment industries and tourism are the mainstays of the economy in Fiji. However, agriculture, fisheries, forestry, pine chips and gold also contribute to the export earnings of the country.

Fiji is potentially subject to natural hazardous events. Geo-hazards are a potential threat to Fiji, given its location in the seismically active Pacific 'Ring of Fire'; Fiji stands the risk of experiencing immensely destructive earthquakes. The 1953 earthquake in Suva caused extensive damage to buildings and total destruction of the wharf, and generated a tsunami that killed six people. Research shows that there is roughly a 10% chance of a similar intensity earthquake striking Fiji in any 50-year period.

There are several resource and environmental issues, common to island nations, affecting sustainable development in the Fiji Islands. These include an array of issues from climate and sea level variability, environmental degradation and pollution to resource management. More specific challenges to sustainable development include coastal erosion, water quality, water availability and sanitation. Sustainable management of resources such as aggregate, terrestrial and offshore minerals and renewable energy are other issues in Fiji's quest for development.

Fiji has ratified many international agreements to ensure effective Environmental Management but with Fiji's own Environmental Legislation still in draft form and the rate at which much of the foreshore and other developments are occurring, vulnerability of the environment is a key issue.

Fiji's flora and fauna are unique with many species being endemic. Human beings have also introduced as many as 966 species (BSAP Report, 1999); endangered and threatened 397 species and driven at least 142 species to extinction.

### ***Meeting Agenda***

SOPAC's National focal point to Fiji, Mr Bashkar Rao from Mineral Resources Department mandated the Department of Environment to carry out the task of organising the EVI meeting. The Director, Mr Epeli Nasome called the representatives from relevant authorities that could be of assistance in providing data for the EVI.

A meeting between the EVI team and all interested government departments and agencies that may hold important environmental information or data that may be of use in the EVI was recommended to be held on July 29, 1999. The convening of this meeting at the beginning would allow the EVI team to provide a detailed briefing to everyone on the EVI project, its development progress, mechanics of the EVI methodology and the current focus of the work particularly in the context of the work to be done in Fiji. This being Phase I of the project meant that any data collected would be preliminary for the testing of the mechanics of the EVI model.

The meeting also provided an opportunity for constructive discussion between the country's experts and the EVI team on environmental vulnerability and EVI issues. Focus was also provided on the need for data for the EVI, how this data may be identified, collected and collated for use in the EVI. Follow-up meetings with each of the participants were then to be scheduled to allow the team more concentrated time with experts to resolve problems with data identification, collection and collation. The primary goal was to try and complete as much of the data requirements as possible.

### ***Meeting Summaries***

Prior to the meeting proper, EVI briefings and presentation handouts were given to everyone present. The meeting started with the presentation given by Helena McLeod which lasted approximately half an hour. She briefed the participants on the background, definitions, model, indicators and uses for the EVI when fully functional. It seemed to be well received and the general aim of the EVI at the national and regional level seemed to be understood.

After the presentation the indicator sheets were discussed as to how to go about filling it out, etc. Each person was then given the indicator sheets specific to his or her ministry or organisation. This had previously been prepared by Mr Reginald Pal to target indicators believed to be of relevance to particular ministries/organisations.

Below (Table 1) is a list of participants who attended the meeting at the Department of Environment on June 29, 1999.

**Table 1. Names and contacts of participants at the meetings**

<b>Name</b>	<b>Ministry</b>	<b>Position</b>	<b>Contact</b>
Sadeesh Chand	Ministry of Health	Senior Health Inspector	Phone: Fax:
Sakiusa Qereqeretabua	Fiji Visitors Bureau	Tourism and Marine Environment	Phone: Fax:
Sulian T Nuirou	Ministry of Lands and Mineral Resources	Geologist	Phone: Fax:
Ifereimi Dau	Mineral Resources Department	Geologist	Phone: Fax:

Yauka Soro	Marine Department	Hydrologist	Phone: Fax:
Pumale Reddy	Department of Lands	Senior Surveyor-foreshore	Phone: Fax:
Subodh Sharma	Fisheries Department	Acting Senior Fisheries Officer	Phone: Fax:
Elizabeth Erasito	National Trust for Fiji	Acting Director/Biologist	Phone: Fax:
Epeli Nasome	Environment Department	Director	Phone: Fax:
Jone Feresi	Land & Water Resources Management (MAFF)	Agricultural Officer	Phone: Fax:
Nazmin Bi	Fiji Met Service	Acting Senior Scientific Officer	Phone: Fax:

***Ministries/Departments invited but not present at the meeting***

Bureau of Statistics  
 Department of Forestry  
 Department of Tourism  
 Department of Energy

There was active discussion regarding data requirements and use of indicators. The following is a summary of the questions;

- How specific need the questions be (from Lands with regards to question 44) – Answer; as accurate as possible but it is accepted that sometimes only a best guess will be possible. In this situation a breakdown of how the guess was made is appreciated.
- Can we suggest different indicators (from Met) – Answer; we very much appreciate alternative indicators if they have data available for them.

Most departments indicated that they could have the data with us within 2 weeks. This is summarised in the following table;

**Table 2. Time Frame needed for data collection**

<b>Department</b>	<b>Time required</b>
Health	Within 2 weeks
Fiji Visitors Bureau	Early next week
Lands Department	Question 50 should be directed to MAFF Qu. 44 within 2 weeks
Mineral Resources Department	2 weeks
Marine Department	By end of week
Fisheries Department	Qu. 17,18, 21 & 51 - fine Qu. Tonnes coral extracted (26) hopefully Qu. dynamite fishing(19)/ overfishing (49) - best guess Qu.53 given to health. All within 2 weeks
National Trust for Fiji	Qu. 42 & 57 best guess by next week Other questions within 3 weeks (need compilation)
Meteorology Department	Will take July as needs compilation. They'll also suggest alternative indicators
Environment Department	Qu. 11 – liase with other departments Qu. 35 - liase with Ministry of Health Qu 47 - Liase with fisheries Qu. 24 - Liase with lands.

The presentation/workshop was found to be successful and well received and generally data seems to be available and will be forthcoming.

### ***Summaries of Follow-up Meetings***

Data for Fiji was collected in a time frame of 6 months. Follow-ups mostly involved telephone conversations, faxes and e-mails as most participants had indicated a clear understanding of the information required.

During this time frame the Think Tank was held and the indicators underwent major changes. This resulted in the data gathering exercise to be done all over again for the new set of indicators.

With the reporting phase just around the corner with relevant departments not answering some questions. The EVI Team was then joined by Famiza Yunus, who helped in continuing the collection of these data just in time for the end of Phase II Reporting.



1	Greatest average annual deviation in Sea Surface Temperatures (SST) in the last 5 years from the long term mean (30 year average)		
2	Number of days over the last five years during which the maximum recorded wind speed (3 sec wind gusts) is greater than higher than the average maximum wind speed for that month. (Use 30 year average for each month as reference points and to be accumulated over all reference climate stations and be divided by the number of stations)		
3	Number of months over the last five years during which rainfall is greater than 20% lower than the 30 year average for that month (over all reference climate stations / number of climate stations)		
4	Number of months over the last five years during which rainfall was greater than 20% higher than the 30 year average for that month (over all reference stations / number of climate stations)		
5	Number of days over the last five years in which the maximum temperature was greater than 5°C higher than the mean monthly maximum (reference mean is from the 30 year average) (over all reference stations/ number of climate stations)		
6	Number of days over the last five years in which the minimum temperature was greater than 5°C lower than the mean monthly minimum (reference mean from the 30 year average) (over all reference stations/ number of climate stations)		
7	Number of volcanoes with potential for eruption greater than or equal to Volcanic Explosive Index of 4 (VEI 4) within 100km country land boundary per area of land		
8	Cumulative earthquake energy within 100km of country land boundaries per land area with Local Magnitude (ML) greater than equal to six ( $\geq 6.0$ ) and less than or equal to depth of fifteen kilometres ( $\leq 15$ km) over 5 years		
9	Number of tsunamis or storms surges with run up greater than 2 metres above Mean High Water Spring tide (MHWS) per 1 coastline since 1900		
10	Total land area ( $\text{km}^2$ )		
11	Ratio of length of shoreline or land border to total land area		
12	Distance to nearest continent within 10 degrees latitude (km)		
13	Altitude range (highest point subtract the lowest point in country)		
14	Percent of land area less than 10 metres above sea level		
15	Percent of land area below 10 metres in elevation within 2 kilometres to coast composed of unconsolidated sediments (excluding coral reefs)*		
16	Number of known endemic species per square kilometre land area		
17	Number of reported (and verified) organism outbreaks (pathogens, blooms, plaques etc) over the last five years per land area		
18	Total tonnage of freight imported per year per square kilometre of land area		
19	Number of introduced species per square kilometre land area (IUCN Definitions)		
20	Number of endangered and threatened species per square kilometre land area (IUCN Definitions)		
21	Number of species, which have become extinct since 1900 per square kilometre land area (IUCN Definitions)		
22	Percentage of natural and regrowth vegetation remaining (eg. forests, mangroves, prairies, saltmarshes, tundra, desert, savanna)		
23	Tonnage of intensively farmed animal products (includes aquaculture, pigs, chickens, cattle, etc.) produced per year per square kilometre land area		
24	Percent of fisheries stocks overfished (FFA/FAO definitions)		
25	Density of people living in coastal settlements (ie. with a city centre within 100km of the coast)		
26	Total human population density (number per $\text{km}^2$ land area)		
27	Annual human population growth rate (average over last five years)		
28	Net percentage of land area changed by removal of natural vegetation over the last five years		
29	Annual number of international tourists multiplied by the average length of stay in the country over one year per land area (calculated over last five years)		
30	Litres of untreated industrial and domestic wastewater discharged per day per square kilometre of land area		
31	Total tonnage of generated and net imported toxic, hazardous and municipal wastes per square kilometre land area averaged over 10 years		
32	Mean percent of hazardous, toxic and municipal waste "effectively" managed or treated per year		
33	Number of spills of oil and hazardous substances greater than 1000 litres during the last five years on land, in rivers or within territorial waters per square kilometre of land area		
34	Number of nuclear, chemical and other major industrial facilities (eg. oil rigs) that could cause significant environmental damage per square kilometre land area		
35	Number of vehicles per square kilometre of land area		
36	Maximum 24 hour $\text{SO}_2$ concentration ( $\text{microgram}/\text{m}^3$ ) (average over last five years)		
37	Tonnes of nitrogen (N), phosphorus (P) and potassium (K) fertilisers used per year per square kilometre of agricultural land (average last five years)		
38	Tonnes of pesticides used per square kilometre of agricultural land (average last five years)		
39	Number of new fisheries stocks or expanded fisheries efforts (greater than 20% increase in catches) added to the country over last five years (within territory)		

		Total Indicators an:		
		Perc		

\* Indicators not included in the calculation of percentage indicators collected.



## ***Conclusions***

The collection of an environmental vulnerability data file for Fiji which was the main objective of the meeting was extremely successful. At least 38 of the 49 indicators for which data was sought were collected (81%). This meets the criteria of eighty percent (80%) as recommended by the experts at the Think Tank for an accurate calculation of the EVI.

The success of the data gathering process in Fiji was mainly due to the Secretariat being based in Suva allowing follow-ups to be done in-house.

Some delays were experienced in gathering data due to the changes to the indicators made during the EVI Think Tank in September 1999.