Statistical Summary

Hydrometeorological Disasters in the Pacific

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INTRODUCTION

It is a long accepted fact that the Pacific is one of the most natural disaster prone regions in the world. Aside from the threat of seismic events, such as earthquakes, tsunamis and volcanic activities, the Pacific region is subject to a wide range of hydrometeorological hazards. These are:

- Tropical cyclones
- Severe storms
- Storm surges
- Floods/ flash floods
- Landslides
- Droughts
- Fires/ wild fires
- Cold Waves[1]

Data on the frequency, type and impact of hydrometeorological disasters in the Pacific are at present comprehensively hosted on the Pacific Regional DesInventar (damage and loss) database – or PDaLo (http://www.pdalo.net). PDaLo comprises synthesised records of around 1200 Pacific events that are officially reported to have negatively impacted at least one Pacific Island community since the 1600s. As a living database that is supplemented on a daily basis, the figures presented in this paper reflect the state of knowledge from PDaLo at the time of writing.

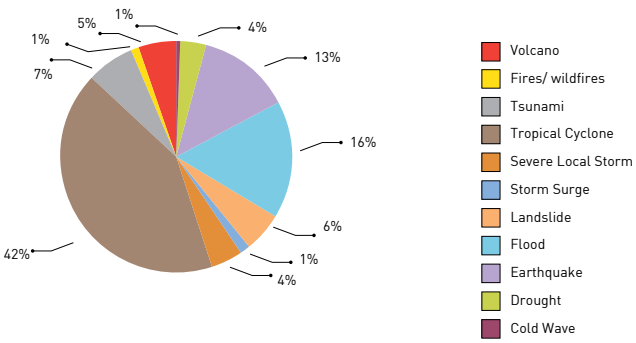


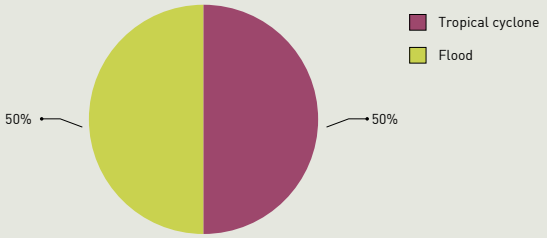
Figure 1 Natural type disasters in the Pacific 1983-2012

HYDROMETEOROLOGICAL DISASTERS 1983-2012

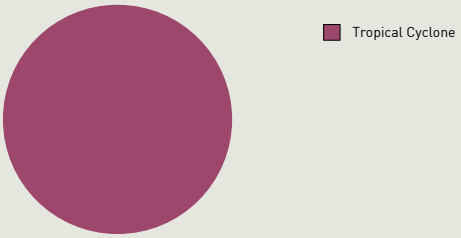
Based on available PDaLo records, Pacific Island countries and territories (PICTs) reported 1105 events caused by 'natural' hazards since records began.[2] Around 615 of these occurred over the 30-year period, extending from 1983-2012. Of those events, the majority were hydrometeorological in nature (Figure 1), covering 20 PICTs. Assuming that landslides are predominantly caused by hydrometeorological events, Pacific hydrometeorological disasters accounted for around 75 per cent of all disaster events reported (69 per cent if attributed to seismic events).[3]

The most commonly reported hydrometeorological disasters were tropical cyclones, accounting for just over half of all hydrometeorological disasters in the region. Floods were the second most common disaster. Fires, wildfires and cold snaps were the least common (Figure 2).

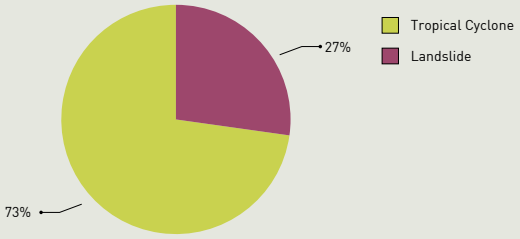
American Samoa



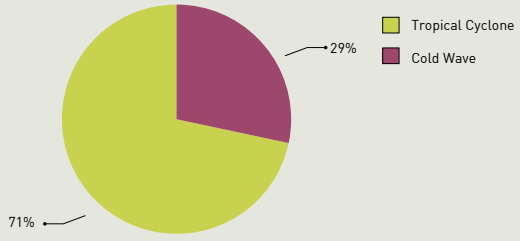
French Polynesia



Wallis and Futuna



Guam



[1] Defined as a drop of atmospheric average temperature well above the averages of a region, with effects on human populations, crops, properties and services (http://www.desinventar.net/definitions_1.html).

[2] Does not include epidemics, technical disasters (such as plane crashes, building fires) and so on.

[3] Landslides may be caused by both hydrometeorological and seismic events but their cause is rarely specified in the records. They may thus be omitted from statistics or attributed for illustrative purposes. If landslides are included in hydrometeorological statistics, hydrometeorological events account for 75 per cent of all natural hazard disasters in the Pacific for the last 30 years. If landslides are instead attributed to seismic events, this proportional falls to 69 per cent. Hydrometeorological events remain marginally more frequently reported in the Pacific in both cases.

At a general level, the PICT most prone to hydrometeorological disasters was Fiji, accounting for 23 per cent of all reported events, followed by PNG (19 per cent) (Figure 3). The threat was not the same in both cases. In Fiji, the biggest hydrometeorological threat over the period was tropical cyclones, while for Papua New Guinea, it was floods (see Annex for details).

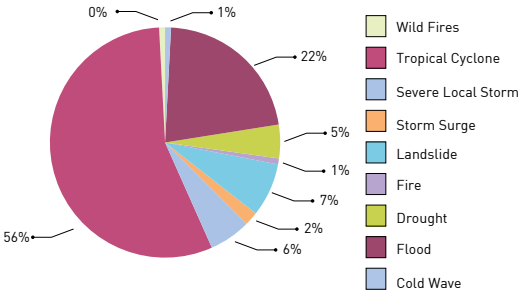


Figure 2 Hydrometeorological disasters in the Pacific 1983-2012 by type

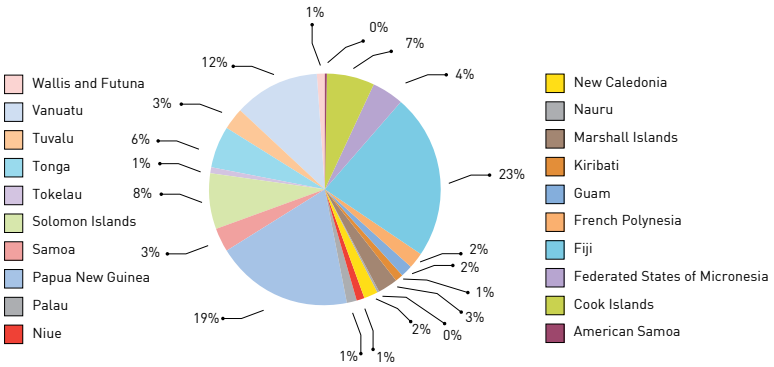


Figure 3 Hydrometeorological disasters by country (1983-2012)

REPORTED COSTS

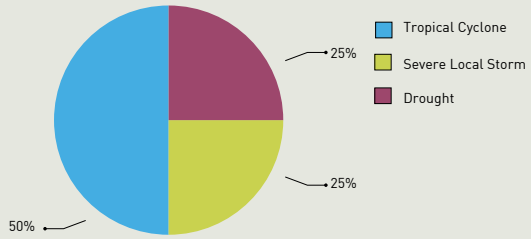
Indexed to 2012[4], the total cost of these disasters over the period was reported to be in the order of USD 3.9 billion. The lion's share of the costs went to Fiji which reported costs of around USD 1.2 billion, followed by Samoa (USD 0.7 billion) and PNG (USD 0.5 billion) (Figure 4). Detailed figures can be found in the annex.

While Fiji did sustain the highest number of events and reported costs, a high number of events does not automatically imply large costs. This is because:

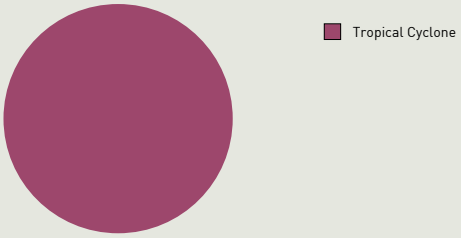
- Data on the impact of disasters in the Pacific are highly patchy. Disasters are often reported but their costs not assessed in money terms, either at all, or in total. As a result, the costs of some disaster may be missing from the picture so that a PICT with many disasters may officially only report relatively low costs.
- No disaster is the same as another. The intensity and scale changes from one event to the next.

This latter point is evidenced by the fact that Samoa reported relatively few hydrometeorological disasters over 1983-2012 (ranking 8th out of 20 PICTs), yet came second in terms of costs reported. The cost of hydrometeorological disasters in Samoa was particularly influenced by Cyclones Ofa and Val that hit in 1990 and 1991 respectively.

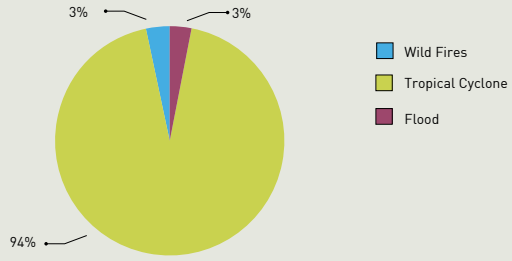
Tokelau



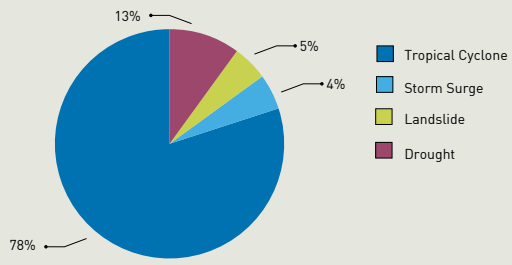
New Caledonia



Cook Islands



FSM



[4] All costs reported over time have been converted to constant dollars, representing the value of those costs in 2012.

DATA CHALLENGES

As implied, the patchy nature of data on Pacific hydrometeorological disasters means that the cost of these disasters is massively understated. In the first instance, few countries or territories in the Pacific assess all costs associated with a disaster. Conventional assessment focuses on damage costs but does not assess losses arising from that damage (such as the cost of interrupted transport arising from damaged roads).

Moreover, PDaLo records presently indicate that 44 per cent of all hydrometeorological disasters reported in the region contain no values at all for the cost of the event (204 out of 461 events without costings).

Typically, droughts and fires are not costed. Of those few that are, droughts appear to be the most costly of all disasters, on average (Table 1) which would suggest that not valuing these events could harm regional ability to strategically plan for risk reduction. On the other hand, fires appear to be least costly on average (Table 1) so their omission could be less important.

In practice, the relevance of averaging disaster costs is questionable. The variation in scale of disasters suggests that average values may have little meaning, especially when not all disasters are valued in the first place. Nevertheless, there may remain some argument to generate averages so that Meteorological Services and Disaster Management Organisations have a broad sense of the probable magnitude when a disaster of a specific type occurs, if one does not already exist.

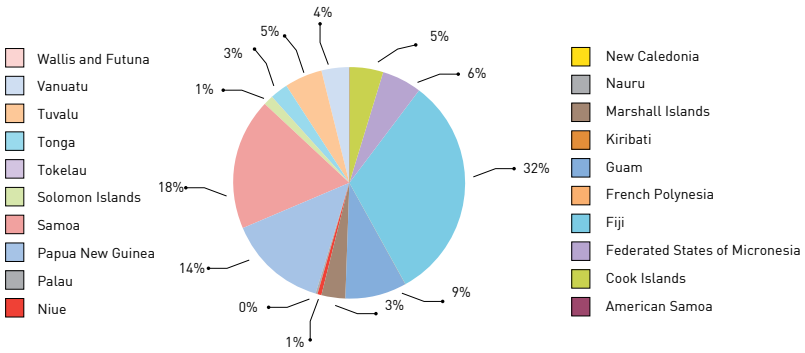


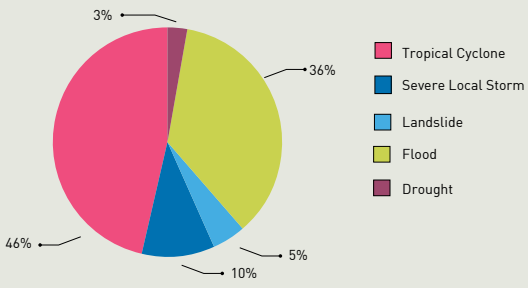
Figure 4 Cost of Pacific hydrometeorological disasters (1983-2012) USD [5]

Table 1 Average reported disaster costs by type (1983-2012[6])

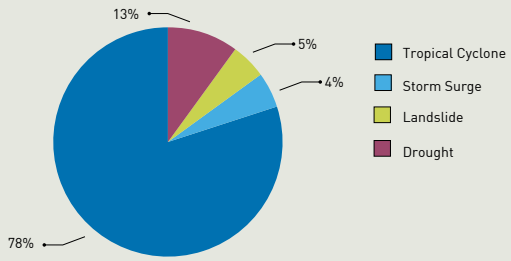
	USD	BASED ON % OF EVENTS COSTED
Fire	n.a.	0
Drought	55033145	18
Wild Fires	72958	33
Storm Surge	376733	33
Landslide	164504	35
Cold Wave	371617	50
Tropical Cyclone	20893212	59
Flood	6277392	63
Severe Local Storm	5866828	70

As a proportion of total disasters reported, the PICTs most likely to provide data on the costs of their disasters are the American Territories of American Samoa, Guam and FSM (Table 2). Conversely, data gaps are most prevalent in the French Territories and the non-American affiliated Micronesian countries (Nauru and Kiribati) where over three quarters of all disaster records lack any information on the costs of the event (highlighted areas in Table 2). Lack of data on costs for Nauru and Kiribati most likely reflects limited opportunities to assess the events, while it is possible that data for French Territory events in fact exists, but has not yet been tracked for inclusion to PDaLo. Clearly, there is a need to identify options to address these gaps where regional programmes and solutions are to be targeted.

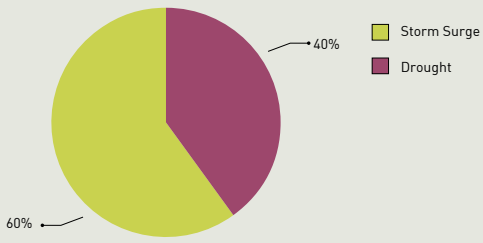
Fiji



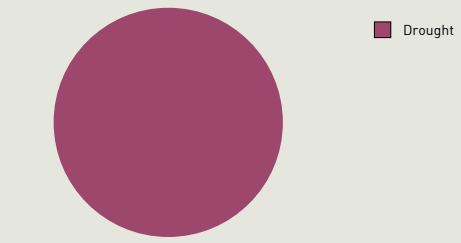
RMI



Kiribati



Nauru



[5] Values are indexed to 2012.

[6] Values are indexed to 2012.

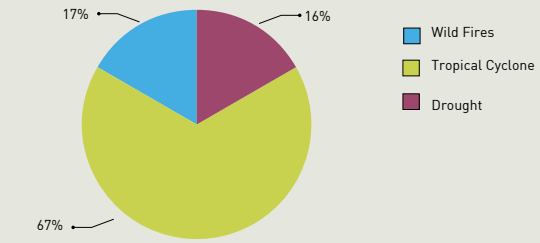
The fact that almost half of all existing records on hydrometeorological disasters in the region lack any cost data will undoubtedly impact the ability of the region to plan strategically to reduce risk. While disasters remain unvalued, PICTs will be hard pressed to make a convincing argument to increase investment in solutions. How can a Meteorological Service or a Disaster Management Organisation convince Treasuries or development partners to dedicate budgets to hydrometeorological disasters when they cannot state how much these events actually cost? How can they persuade agencies to develop strategies for different groups when they do not know how much one sector loses compared to another, or in what way?

Actions to address data gaps in assessing and reporting the costs of disasters in the Pacific will improve over time. However, the existing gaps present challenges for strategic investment.

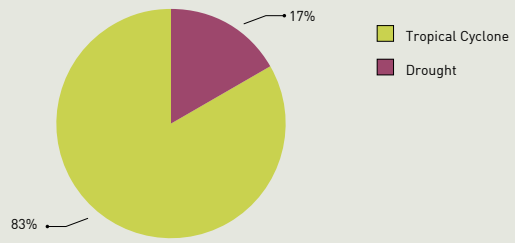
Table 2 Data omissions by PICT

EVENT FREQUENCY BY PICT	# EVENTS	USD 2012 TERMS	# EVENTS NOT COSTED	% EVENTS NOT COSTED
American Samoa	2	71 664	0	0
Guam	7	338 511 810	1	14
Federated States of Micronesia	20	220 732 676	5	25
Cook Islands	31	193 757 561	8	26
Fiji	106	1 240 684 667	32	30
Tuvalu	13	203 972 251	4	31
Samoa	15	724 443 599	5	33
Papua New Guinea	89	543 116 440	40	45
Tonga	27	103 976 856	13	48
Tokelau	4	5 227	2	50
Marshall Islands	13	125 331 578	7	54
Vanuatu	56	146 212 618	31	55
Solomon Islands	36	50 054 003	23	64
Niue	6	24 692 421	4	67
Palau	6	10 458 235	4	67
New Caledonia	9	1 489 245	7	78
Kiribati	5	63 820	4	80
French Polynesia	11	85 291	9	82
Nauru	1	0	1	100
Wallis and Futuna	4	0	4	100
TOTAL	461	3 927 659 963	204	44

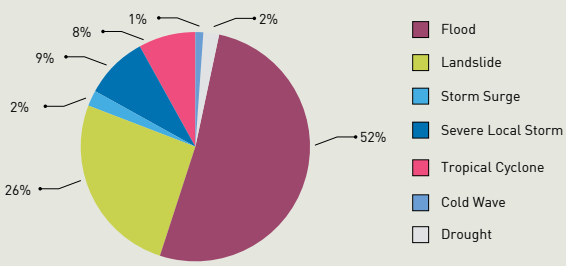
Niue



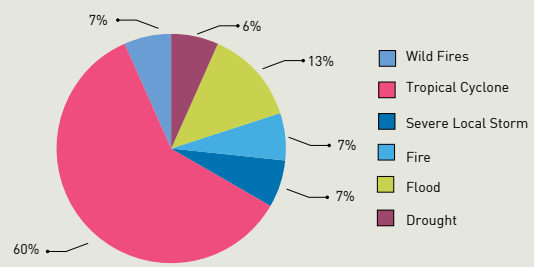
Palau



PNG



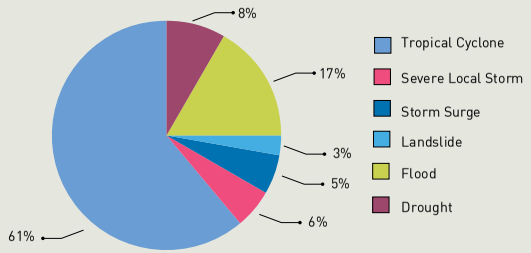
Samoa



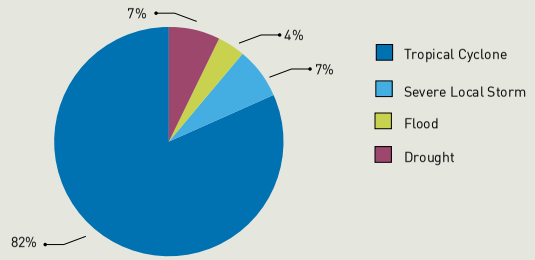
Annex – Reported number of disasters by country (1983-2012)

	# EVENTS								
	COLD WAVES	DROUGHTS	FLOODS/ FLASH FLOODS	FIRES/ WILD FIRES	LANDSLIDES	STORM SURGES	SEVERE STORMS	TROPICAL CYCLONES	TOTAL
American Samoa			1					1	2
Guam	2							5	7
Federated States of Micronesia		2			1	1		16	20
Cook Islands			1	1				29	31
Fiji		3	38		5		11	49	106
Tuvalu	1	2		1				9	13
Samoa		1	2	2			1	9	15
Papua New Guinea	1	2	46		23	2	8	7	89
Tonga		2	1				2	22	27
Tokelau		1					1	2	4
Marshall Islands		1	2	2		1		7	13
Vanuatu			3		1		2	50	56
Solomon Islands		3	6		1	2	2	22	36
Niue		1		1				4	6
Palau		1						5	6
New Caledonia								9	9
Kiribati		2				3			5
French Polynesia					3			8	11
Nauru		1							1
Wallis and Futuna								4	4
TOTAL	4	22	100	7	34	9	27	258	461

Solomon Islands



Tonga

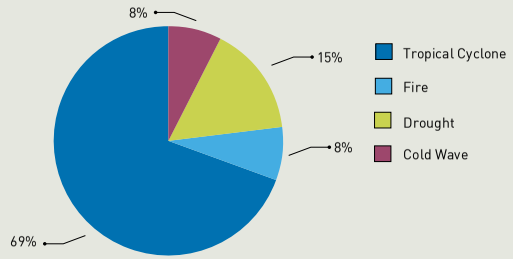


Annex – Reported cost of disasters by country (1983-2012)

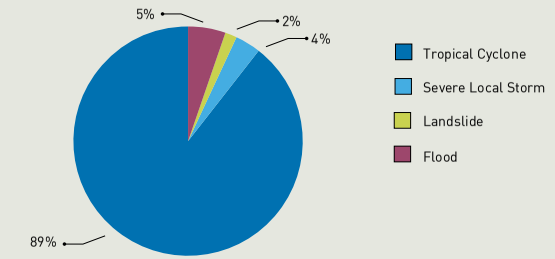
PICT	EVENT USD [7]								
	COLD WAVES	DROUGHTS	FLOODS/ FLASH FLOODS	FIRES/ WILD FIRES	LANDSLIDES	STORM SURGES	SEVERE STORMS	TROPICAL CYCLONES	TOTAL
American Samoa			62404					9260	71664
Guam	76584							338435225	338511810
Federated States of Micronesia		[no costings]			143034	[no costings]		220589642	220732676
Cook Islands			64833	[no costings]				193692728	193757561
Fiji		84577932	268718313		25528		37186388	850176506	1240684667
Tuvalu	666649	21127194		[no costings]				182178408	203972251
Samoa		[no costings]	1944979	72958			72843050	649582612	724443599
Papua New Guinea	[no costings]	114427453	120844420		1805480	533189	233874	305272024	543116440
Tonga		[no costings]	10664				972872	102993321	103976856
Tokelau		[no costings]					1010	4217	5227
Marshall Islands		[no costings]	12967	[no costings]		533189		124785422	125331578
Vanuatu			2746962		[no costings]		68916	143396740	146212618
Solomon Islands		[no costings]	1070183		[no costings]	[no costings]	163626	48820194	50054003
Niue		[no costings]		[no costings]				24692421	24692421
Palau		[no costings]						10458235	10458235
New Caledonia								1489245	1489245
Kiribati		[no costings]				63820			63820
French Polynesia					[no costings]			85291	85291
Nauru		[no costings]							0
Wallis and Futuna		[no costings]							0
TOTAL	743233	220132580	395475724	72958	1974043	1130199	111469735	3196661491	3927659963

[7] Values are indexed to 2012.

Tuvalu



Vanuatu



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