Climatic Change
DOI 10.1007/s10584-016-1646-9

Spirituality and attitudes towards Nature in the Pacific Islands: insights for enabling climate-change adaptation

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Received: 27 July 2015 / Accepted: 27 February 2016

Abstract A sample of 1226 students at the University of the South Pacific, the premier tertiary institution in the Pacific Islands, answered a range of questions intended to understand future island decision-makers' attitudes towards Nature and concern about climate change. Questions asking about church attendance show that the vast majority of participants have spiritual values that explain their feelings of connectedness to Nature which in turn may account for high levels of pessimism about the current state of the global/Pacific environment. Concern about climate change as a future livelihood stressor in the Pacific region is ubiquitous at both societal and personal levels. While participants exhibited a degree of understanding matching objective rankings about the vulnerability of their home islands/countries, a spatial optimism bias was evident in which 'other places' were invariably regarded as 'worse'. Through their views on climate change concern, respondents also favoured a psychological distancing of environmental risk in which 'other places' were perceived as more exposed than familiar ones. Influence from spirituality is implicated in both findings. Most interventions intended to reduce exposure to environmental risk and to enable effective and sustainable adaptation to climate change in the Pacific Islands region have failed to acknowledge influences on decisionmaking of spirituality and connectedness to Nature. Messages that stress environmental conservation and stewardship, particularly if communicated within familiar and respected religious contexts, are likely to be more successful than secular ones.

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Published online: 07 March 2016

1 Introduction

In terms of human dependence on ecosystems and exposure of these to climate change, the Pacific Islands region is considered among the most immediately vulnerable (Barnett and Campbell 2010). Sea-level rise is causing direct inundation and more regular flooding of coastal lowlands, increased groundwater salinization, and erosion of soft-sediment shorelines, all of which are expected to become more widespread (Nurse et al. 2014). Innovative solutions will need to be found soon as coastal peoples are increasingly displaced and their livelihoods become unviable.

Many proposed adaptive solutions for Pacific islands are based on ones developed in different cultural and environmental contexts, one reason they have met with negligible success (McNamara 2013; Nunn 2009). Cultural appropriateness is key for without community support for a particular adaptive strategy it is unlikely to be sustained, particularly in rural locations where government outreach is often limited. Knowing what Pacific people think about the natural environment and the ways their interactions with it may be challenged, now and in the future, is thus essential to developing and sustaining adaptation.

In the Pacific, as elsewhere, the influence of spiritual beliefs in shaping attitudes towards environmental risk is considerable (Haluza-DeLay 2014). There are practical implications in knowing to what degree such beliefs are privileged over western/global scientific ones and how the success and pace of adaptive activities may be affected in consequence. This paper reports a study of Pacific Islander attitudes towards the environment, its changes experienced and anticipated, with a view towards providing insights into the optimal design of adaptive strategies.

2 Context

The Pacific Basin is dotted with islands – home to some 10 million people – that total around 0.34 % of its total area (Fig. 1). Most people occupy island coasts, dependent on foods acquired offshore or from coastal lowlands. Combined with increased demand on coastal resources, sea-level rise has already had depleted the supply of these foods and is likely to do so increasingly in the future. Coastal adaptation involves a need to relocate vulnerable settlements as well as a renegotiation of traditional livelihoods (Campbell 2014).

A body of knowledge about the natural environment developed in all major Pacific Island cultures. Deities were held to account for much environmental change, particularly disasters, while predictable harvests and reliable supplies of wild foods were invariably sought by maintaining divine goodwill. Despite the almost total Christianization of the Pacific Islands within the past century, echoes of pre-Christian spiritual beliefs pervade many environmental interactions (Donner 2007; Foale et al. 2011).

The foundations of future environmental sustainability in the Pacific Islands are likely to lie in a mix of traditional knowledge and scientific information filtered through worldviews of Pacific Island decisionmakers (Nunn et al. 2014; Olson 1997). In rural contexts, such decisionmakers are likely to be influenced more by tradition and local precedent than science At national level, decisionmakers are likely to be informed more by a combination of their formal knowledge of global change and their traditional understanding of local environments. This study characterizes the worldviews of the latter group through an understanding of attitudes of the next generation of Pacific Island decisionmakers studying at the University of the South Pacific (USP), the foremost tertiary institution in the Pacific region that serves students from 12 island countries (USP 2014) (see Fig. 1).

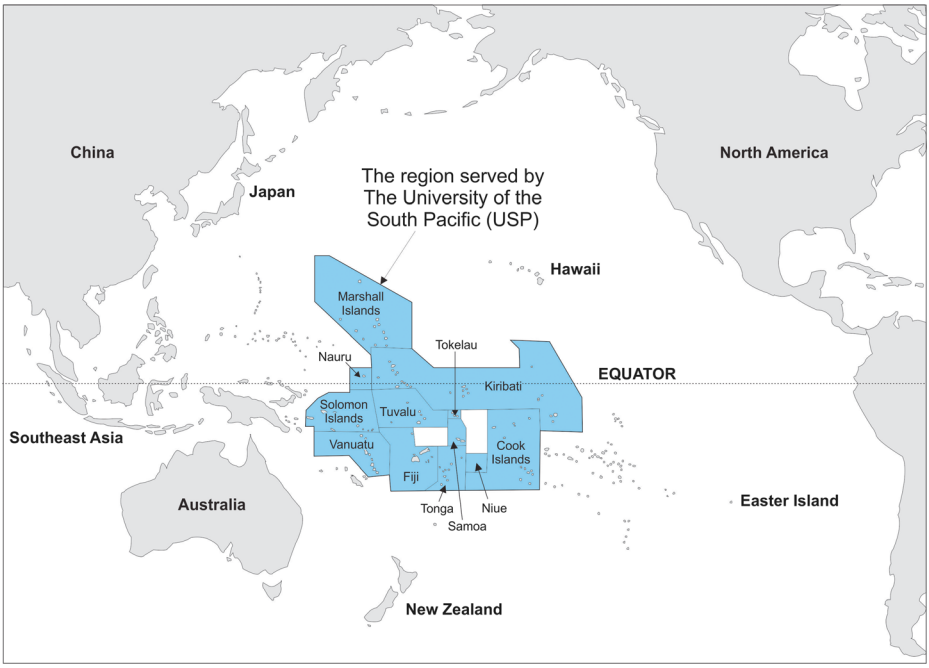

Fig. 1 Map of the Pacific Islands region showing that part served by the University of the South Pacific

3 Methods and sampling

Pacific Islanders studying at USP in 2013 were asked about spiritual beliefs, attitudes towards Nature,[1] and climate-change concern: the survey administered online using Qualtrics™. Since English is a second language for almost all USP students, the survey was written in the English most speak in order to optimize participation. Key questions were comparable to similar surveys (Hine et al. 2013; Maibach et al. 2011).

The student sample closely matched the range of nationalities, gender split, academic bias (measured by Faculty of study), and level of study at USP and is therefore representative of the USP student corpus and, by extension, the next generation of national decisionmakers in Pacific Island countries. Although 1796 students completed the survey, some did so in such incomplete form that it was impossible to analyse responses meaningfully; others were excluded because they incorrectly answered a question intended to ensure that they were reading all questions.[2] This left 1226 responses (Table 1).

Given that most spiritual beliefs in the Pacific are contextualized within formalized religion (Austin 2014), a single question (*Do you regularly attend religious services*?) captured whether or not a participant held such beliefs. If the participant answered yes, then a follow-up question (*How many times a month do you attend religious services*?) measured the strength of their religious adherence, considered to proxy the degree to which spiritual beliefs influence everyday attitudes towards the external world (Iannaccone 1991).

[1] In this paper, Nature is capitalized when used to signify the environment not merely as a natural system but as one with spiritual dimensions, the way Pacific people commonly conceive it.

[2] This question was placed halfway through the survey and asked participants to select 'strongly disagree' in response to the statement that 'polar bears are cuddly'.

Table 1 Sample key characteristics relative to the population of all students at the University of the South Pacific in 2013

	Total population of students at the University of the South Pacific				Sample	
1. Number of students by country						
Country	FTE 2012	FTE 2013	average FTE 2012–13	% (2012–13)	Number	%
Cook Islands	56.8	61.6	59.2	0.5	3	0.2
Fiji	7004.1	7702.6	7353.35	56.1	750	61.2
Kiribati	674.4	731	702.7	5.4	42	3.4
Marshall Islands	81.5	109	95.25	0.7	3	0.2
Nauru	43.1	36.6	39.85	0.3	5	0.4
Niue	8.9	5.8	7.35	0.1	1	0.1
Samoa	296.5	334.2	315.35	2.4	50	4.1
Solomon Islands	2246.5	2415	2330.75	17.8	169	13.8
Tokelau	40.4	36.3	38.35	0.3	1	0.1
Tonga	589.6	647.1	618.35	4.7	37	3.0
Tuvalu	232.8	221.9	227.35	1.7	25	2.0
Vanuatu	1163.4	1200.8	1182.1	9.0	93	7.6
other	144	146.1	145.05	1.1	47	3.8
Total	12,582	13,648	13,115	100	1226	100.0
2. Gender	2012	2013	average 2012–13	% (2012–13)	Number	%
Female	6717	7302.5	7009.75	53.4	533	43.5
Male	5865	6345.5	6105.25	46.6	693	56.5
Total	12,582	13,648	13,115	100	1226	100.0
3. Faculty of principal study	2012	2013	average 2012–13	% (2012–13)	Number	%
Arts, Law and Education	2783.4	3181	2982.2	30.4	281	22.9
Business and Economics	3695.1	4023.2	3859.15	39.4	440	35.9
Science, Technology and Environment	2831.8	3082.2	2957	30.2	505	41.2
cross-Faculty	3271.7	3361.6	3316.65			

Table 1 (continued)

	Total population of students at the University of the South Pacific				Sample	
Total	12,582	13,648	13,115			
Total without cross-Faculty	9310.3	10,286.4	9798.35	100	1226	100.0
4. Level of principal study	2012	2013	average 2012–13	% (2012–13)	Number	%
first-year undergraduate (100-level)	3533.1	3799.2	3666.15	28.0	362	29.5
second-year undergraduate (200-level)	2672.2	3210.7	2941.45	22.4	255	20.8
third-year undergraduate (300-level)	2003.1	2088	2045.55	15.6	397	32.4
postgraduate level	647	796.5	721.75	5.5	137	11.2
other	3726.6	3753.6	3740.1	28.5	75	6.1
Total	12,582	13,648	13,115	100.0	1226	100.0

Questions followed intended to probe respondent attitudes towards the natural world and its current condition. Given that the main USP campus (Suva, Fiji) is urban, the next question (*When you leave the city/town and go into the natural environment*, *how do you feel*?) measured these attitudes by a Likert scale of adherence to three statements (*I often feel that I am part of Nature*; *I often feel a personal connection with things in Nature*, *like trees*, *wildlife*, *or the view on the horizon*; *My own welfare is linked to the welfare of Nature*); this derives from the Connectedness to Nature scale (Mayer and Frantz 2004). The next questions sought respondent views of the condition of the natural environment globally (*How would you rate the condition of the natural environment in the world today*?) and in their home island or local area (*On the island* (*or the place*) *that you come from*, *how would you rate the condition of the natural environment today*?).

The final set of questions sought to discover the degree to which respondents were concerned about climate change. The first (*How worried are you about climate change*?) measured individual anxiety, the next (*If nothing is done to reduce the rate of climate change*, *how big a problem will this be for people in the Pacific Islands*?) asked about future effects of climate change for Pacific people, and the last (*Are you concerned about how climate change might affect YOU and your future*?) used a Likert scale to measure what climate change meant to an individual.

Results were analysed using SPSS version 22. Responses were treated as categorical and therefore mostly percentages are reported. Chi-square analyses (χ^2) were used to test relationships between connectedness to Nature, perception of climate-change impact and condition of the environment, and demographic factors, namely gender, church attendance, year of study (first, second, third, postgraduate), and age (50th percentile split; ≥22 yr. vs <22 yr).

4 Results and analysis

Most participants (80.3 %) regularly attend religious services; of these most at least weekly (89 %), more than one third more than once a week (Table 2). These values suggest that respondents are likely to be routinely exposed to situations in which they contemplate their role in the natural world, a dominant theme in recent Christian expression in the Pacific (Kempf 2012). The proportion of respondents with a declared religious affiliation in this survey is paralleled in official statistics; for example, both the 2007 Census in Fiji and the 2011 Census in Tonga showed that <1 % of the population stated they had no religion. If they are measuring the same thing, the difference between the figures for religious observance in census data (>99 %) and this survey (80.3 %) is likely attributable to the lapses in church attendance USP students experience living away from home and skepticism from exposure to novel situations and curricula. The analysis in this paper assumes all respondents to be spiritually engaged which informs their attitudes towards Nature and concern about climate change.

4.1 Connectedness to nature

Just under 90 % of respondents reported feeling part of Nature, having a personal connection with the natural environment, and thought their welfare was linked to Nature. Such connectedness is rooted in Pacific Island cultures and also driven by experience for participants raised in rural areas. It is unsurprising that most respondents therefore believe their welfare is inextricably linked to that of the natural environment.

Table 2 Proportion of respondents per survey item (n = 1226)

Questions to identify spiritual influences on participants' attitudes			
	Yes	No	
Do you regularly attend religious services?	81 %	19 %	
(If yes) How many times each month do you attend religious services?	Once/month: 11 % Once/week: 53 % >Once/week: 35 %		
Questions regarding attitudes towards the natural world and its current condition			
When you leave the city/town and go into the natural environment, how do you feel?			
	Strongly disagree/Disagree	Neither agree/Disagree	Agree/Strongly agree
I often feel that I am a part of Nature	6 %	5 %	89 %
I often feel a personal connection with things in Nature, like trees, wildlife, or the view on the horizon	6 %	8 %	86 %
My own welfare is linked to the welfare of Nature	5 %	9 %	86 %
	Very bad/bad	Neither good nor bad	Good/Very good
How would you rate the condition of the natural environment in the world today?	68 %	22 %	10 %
On the island (or the place) that you come from, how would you rate the condition of the natural environment today?	40 %	23 %	37 %
Questions asking about climate-change concern			
	Extremely worried	Bit worried	Not really/Not at all worried
How worried are you about climate change?	65 %	31 %	4 %
	Huge problem	Quite a big problem	Small/No problem
If nothing is done to reduce the rate of climate change, how big a problem will this be for people in the Pacific Islands?	86 %	13 %	1 %
	Really concerned	Slightly concerned	Not concerned
Are you concerned about how climate change might affect YOU and your future?	82 %	18 %	1 %

The relationship between the three connectedness-to-Nature questions and gender, age, and church attendance was examined, based on the 5-point Likert scale responses. No gender differences were found (all $p > .05$). Differences did emerge by age group in terms of feeling that one's welfare is linked to Nature (χ^2 (4, $N = 1220$) = 29.10, $p < .001$), feeling a personal connection with Nature (χ^2 (4, $N = 1220$) = 20.51, $p < .001$), and feeling part of Nature (χ^2 (4, $N = 1220$) = 23.87, $p < .001$).

While all respondents reported feeling connected to and part of Nature, differences were noted across the 'disagree' and 'strongly disagree' response options by age. Older respondents were more likely to say that they did not feel a close personal connection with Nature, feel part of Nature, or that their welfare was linked to Nature. For example, in response to the question '*I feel a close personal connection with Nature*', 71 % of the respondents who selected 'strongly disagree' were ≥22 yr. compared to 28 % for those <22 yr., while the sample was evenly split by age ($n = 620 \geq 22$ yr). About twice as many younger people were ambivalent in their response (65 % selected 'neutral') to the question about whether they felt their welfare was linked to Nature.

Year of study was not related to two of the three connectedness questions (feeling part of Nature, personal connection to Nature, $p > .05$) although differences emerged for the welfare question (χ^2 (12, $N = 1151$) = 22.77, $p < .05$). While most did feel their welfare was connected to Nature, this increased with year of study. For example, 46 % of first-year and 56 % of third-year/postgraduate students strongly agreed that their welfare was connected to Nature.

Church attendance was significantly related to feeling part of Nature (χ^2 (4, $N = 1146$) = 13.27, $p < .05$) and having a personal connection to Nature (χ^2 (4, $N = 1146$) = 20.56, $p < .05$) but not feeling that one's welfare was linked to Nature ($p > .05$). Although the general pattern was for participants to report feeling connected to Nature, those who attended church were more extreme. For example, 54 % of regular attendees strongly agreed they felt part of Nature compared to 36 % who selected 'agree'.

4.2 State of the natural environment

Most respondents rate the state of the world's natural environment badly (26 % 'very bad', 42 % 'bad') yet around half (13 % 'very bad', 27 % 'bad') give the same response when rating their home island (or locale). The relationship between the state-of-the-natural-environment questions and gender, age, and church attendance was examined; since <1 % of respondents rated the condition of the natural world as 'very good', this option was excluded from analysis.

Year of study and church attendance were not related to ratings of either global or local environmental condition. Gender and age both showed a similar pattern wherein they were not related to perception of the world's environment but were significantly related to the perception of home environment (gender, χ^2 (4, $N = 1217$) = 10.01, $p < .05$; age, χ^2 (4, $N = 1212$) = 25.14, $p < .05$). Of those reporting their home environment to be in bad condition, females were over-represented when stating that it was very bad (female =62 %, male =37 %) and bad (female =60 %, male =39 %); more older than younger people (64 % vs 36 %) rated it as very bad. Differences also emerged at the other extreme in that 61 % of the participants who rated the condition of their home environment as very good were older and 39 % were younger.

4.3 Climate-change concern

Most respondents worry about climate change, as shown by the response to the question "*If nothing is done to reduce the rate of climate change, how big a problem will this be for people*

in the Pacific Islands?" where the vast majority (86 %) regard climate change as a 'huge' future problem for Pacific people (see Table 2). Most (99 %) stated that climate change would affect them and their future, making it clear that climate change is not perceived as an abstract threat in the Pacific.

Questions about climate-change concern centred on three issues: 'general concern', 'perceived magnitude of problem', and 'personalized concern'. The influence of spirituality, gender, age, home island, area, and year of study on each of these issues is discussed in the subsections below.

General concern Most respondents were either 'a bit worried' (31 %) or 'extremely worried' (65 %) about climate change. Regular church attendees differed in their general concern depending on attendance frequency. Those attending church more than once a week were most concerned ($M = 2.70$, $SD = 0.52$), more than those who limit their attendance to once a week ($M = 2.61$, $SD = 0.54$, $p = .028$), and more than those who attend only monthly ($M = 2.59$, $SD = 0.59$, $p = .064$). This relationship may be explained by the exposure to connectedness to Nature messages which have long been part of religious teaching in the Pacific and may also point to the efficacy of contemporary climate-change messaging by the churches. General concern did not vary by gender. Age differences emerged (χ^2 (2, $N = 1212$) = 10.05, $p < .05$) wherein 70 % of the people who were 'not really worried' about climate change were ≥22 yr.

Given that 94 % of our sample respondents come from high islands and just 6 % from atolls, it is not statistically sound to examine differences. Yet of the 71 participants from atolls, 61 participants were 'extremely worried' while a further 6 were a 'bit worried'.

There is no significant difference by year of study, suggesting students develop views regarding climate change before commencing university and that what they learn there merely strengthens those views. A belief that the condition of the natural world is poor was significantly related to greater concern over climate change ($r = -.237$, $p < .001$, $n = 1226$).

Perceived magnitude of problem and personalized concern Only exploratory analyses are possible when comparing differences by demographic factors in response to the final question in Table 2 because most respondents thought that climate change would be a huge problem for Pacific people. Within this category, there is no difference between older and younger participants but there were more females (57 %) than males (43 %) and a much larger proportion of church attendees (82 %) than non-attendees (18 %). This pattern is almost identical across *personalized concern*.

5 Discussion

Discussion is subdivided according to groups of questions about spiritual engagement (5.1), feeling part of Nature (5.2), condition of the natural environment (5.3), and climate-change concern (5.4).

5.1 Spiritual engagement

Millennia old, Pacific Island societies exhibited spiritual beliefs regarding the natural environment that governed the ways people interacted with it (Crosby 1994). The spread of

Christianity challenged such beliefs causing them to become separated into those that were compatible with Christian teachings and those that were not, the latter then often becoming part of 'folk religion'. The latter runs as an undercurrent through many rural communities in the Pacific today, occasionally finding wider expression for tourism purposes or in festivals marking key events (DeBlock 2013; Pigliasco 2010).

Most USP students are spiritually engaged, which likely informs their attitudes towards Nature and influences their responses to those forces – like climate change – that threaten its integrity. This degree of spiritual engagement invites comparison with similar populations elsewhere, such as those in parts of Africa (Dominguez et al. 2010), Asia (Byg and Salick 2009) and South America (Paerregaard 2013) where spiritual beliefs influence contemporary environmental interactions and perceptions.

Yet the situation in the Pacific Islands contrasts with that in countries where the most detailed studies of people's environmental attitudes and perceptions of climate change have been carried out. These include Australia (Hine et al. 2013), where official data suggests that 62 % of the population are periodically spiritually engaged through formal religious expressions,[3] and the USA (Leiserowitz 2006; Maibach et al. 2011) where the equivalent figure is around 45 % (Rossi and Scappini 2014). The latter figure is of those who attend church at least once a month and is therefore directly comparable to the USP figure of 80.3 %.

5.2 Feeling part of nature

There is a dichotomy between cultures that separate Nature from humanity, as in most western societies, and those in which Nature is anthropomorphized, a part of humanity, as in most Asia-Pacific cultures (Schlehe 2010). This may crudely explain the contrast between those Pacific Islanders who agree that they feel part of Nature (89 %), believe they have a personal connection with Nature (86 %), or whose welfare is linked to that of Nature (86 %), and people from contrasting (western) cultures. For example, a 2011 survey of Australians found that 76 % agreed they were part of Nature while 75 % linked their own welfare to that of Nature,[4] something interpreted as "a substantial proportion of the Australian population sees themselves as very pro-environmental" and that in consequence they regard climate change as "an important matter" (Reser et al. 2012a: 45). These results differ to those from elsewhere in the world where increasing alienation from the environment – so-called 'Nature-Deficit Disorder' (Louv 2011) – is resulting in a lack of environmental awareness.

The idea of 'feeling part of Nature' was inspired by the Connectedness to Nature scale that is a dependable "predictor of ecological behaviour and subjective well-being" (Mayer and Frantz 2004: 503). Across five studies, sampling primarily university students from the USA, these authors showed that connectedness to Nature was reasonably high (e.g., study 1 $M = 3.65$ on a 5-point scale) and related to a range of pro-environmental behaviours and positive environmental values yet inversely related to consumerism. Similar to our findings, no

[3] This represents the end-2013 figure according to the quarterly report of Roy Morgan Research (www.roymorgan.com) that is now projected to be closer to 50 % but like the 2011 Australian Census, in which 81 % of Australians identified with a religion, it does not separate declared religion from routinely-practiced religion, which is what the USP data show.

[4] Since this survey used six Likert categories from 'strongly agree' to 'strongly disagree' whereas our survey used just five, the numbers are not directly comparable. If only the two strongest levels of agreement from the Australian survey are used, the figures become 40 % and 48 % respectively, significantly lower than the USP figures.

difference was found by gender. Connectedness to Nature was related to increasing age in a community sample but not the university samples (Mayer and Frantz 2004).

5.3 Condition of the natural environment

USP respondents strongly believed the world to be in a worse condition than their home island, a spatial optimism bias found in comparable surveys (Gifford et al. 2009) and explainable by a comforting yet irrational distancing of environmental risk (Spence and Pidgeon 2010). This result is also consistent with the idea that 'other places' are less favoured, less desirable, and therefore invariably 'worse' than one's cherished home place, a common human trait. It is also consistent with a worldview that regards Pacific Island environments as more pristine, often God-given, in contrast to a world where a loss of spiritual connections with the land have led to relinquishment of environmental stewardship and deterioration in environmental quality (Tuan 1974).

Our participants rated the condition of the world's environment as much worse than that of their home environment. For example, the condition of the world's environment was rated as 'very bad' (26 %) or 'bad' (42 %) compared to the condition of the home environment (13 % and 27 % respectively). Gifford et al. (2009) found evidence of this spatial bias in 15 of the 18 countries they studied although these did not include Pacific Islands. Our findings therefore add to the larger research base concerning the robust nature of spatial biases. Similar findings have been reported with participants from Australia, where 76 % of respondents rated the condition of their local region towards the good to excellent range of the scale while only 52 % gave the same ratings to the condition of the world (Reser et al. 2012a). Comparison of these ratings between the participants from the Pacific Islands in our study and the Australian participants in Reser et al.'s (2012a) paper suggest that Pacific Islanders are twice as likely to rate the condition of the natural world and their home environment as poor.

Although the Pacific Islands region may not be viewed as densely populated (see Table 3), parts are. Combined with variations in landscape sensitivity and exposure to processes of change, particularly extreme events, variations in population density have produced a diversity of environmental conditions. In this case, 'condition' may be equated with the degree of pristineness of the natural environment and its ability to provide the goods and services its inhabitants have long valued. In general, places where population densities are highest and where the pace of development has been fastest are in a worse condition than places where the converse is true.

In a landmark study, the question of perceived and actual environmental condition, current and future, was compared across 18 countries by Gifford et al. (2009); respondent perceptions were contrasted with an expert assessment. While the spatial diversity of environmental condition (see above) in the Pacific Island countries from which respondents in the USP survey came and a lack of sufficient data to calculate assessment scores do not allow direct comparison with that of Gifford et al. (2009), some objective data are available. We use the Environmental Vulnerability Index (EVI) calculated from available data by the Columbia University Center for International Earth Science Information Network (CIESIN 2007). This EVI was developed originally to measure comparative vulnerability in Pacific Island countries and allows countries to be classified as resilient ($X \leq 215$), at risk ($215 < X \leq 265$), vulnerable ($265 < X \leq 315$), highly vulnerable ($315 < X \leq 365$) or (5) extremely vulnerable ($X > 365$) (Kaly et al. 2004). The EVI measures exposure to future environmental change and incorporates a measure of current environmental condition, allowing its use as a proxy measure for this.

Table 3 Population densities (www.spc.int/prism) and Environmental Vulnerability Index (EVI) scores (Kaly et al. 2004; CIESIN 2007) for Pacific Island countries from which USP respondents originated. Also shown are mean scores for responses regarding the conditions of participants' home countries. The correlation between rank-ordered EVI and participant's ranking is .507 ($p < .001$)

Island country	Population density (persons/km^2)	EVI	Environmental vulnerability classification	EVI ranking (most to least vulnerable)	Mean score: On the island (or the place) that you come from, how would you rate the condition of the natural environment today?	n
Cook Islands	64	383	Extremely vulnerable	4	3.67	3
Fiji	47	335	Highly vulnerable	9	2.98	750
Kiribati	134	385	Extremely vulnerable	3	1.64	42
Marshall Islands	299	348	Highly vulnerable	6	3.33	3
Nauru	499	421	Extremely vulnerable	1	2.20	5
Niue	6	309	Vulnerable	10	–	1
Samoa	64	341	Highly vulnerable	7=	2.96	50
Solomon Islands	22	281	Vulnerable	11	3.00	169
Tokelau	98	341	Highly vulnerable	7=	–	1
Tonga	138	400	Extremely vulnerable	2	2.46	37
Tuvalu	420	359	Highly vulnerable	5	2.24	25
Vanuatu	22	280	Vulnerable	12	3.33	93

In Table 3, for each of the 12 countries from which USP respondents came, EVI scores are given, ranked and classified, alongside the mean scores for the perceived condition of their home locale from each of these countries. The weighted correlation between these ranks was .507 ($p < .001$) although caution should be applied when interpreting this because some countries are home to only a few respondents. Nevertheless, there is a reasonable agreement between the two measures. For example, there is an 80 % agreement when considering the overlap between the top five more vulnerable locations as measured by the EVI and by participants' responses in the current study. This finding suggests that Pacific Islanders from each of these locations have a good understanding of the seriousness of the threat to their homelands, which is consistent with Gifford et al.'s (2009) finding of a strong correlation between citizen and expert rating of environmental vulnerability across 18 nations.

5.4 Concern about climate change

As with many other surveys within the past decade, concern about the global impacts of climate change is extremely high among USP students with 96 % expressing anxiety. This contrasts with 71 % of British respondents and 66.3 % of Australian respondents reporting similar levels of global concern in a 2011 survey (Reser et al. 2012b: 46–47). On a 4-point scale (where higher scores indicate greater concern), the average levels of concern over climate change were also very similar to the mean for the Australian ($M = 2.83$, $SD = 0.93$) and British ($M = 2.90$, $SD = 0.92$) samples, both of which were almost a whole point lower than the average in our sample ($M = 3.60$, $SD = 0.58$). These values are substantially higher than the 52 % of Americans surveyed in March 2015 who are at least 'somewhat worried' about

climate change (Leiserowitz et al. 2015). The difference between Pacific Islander global concern and concern elsewhere is likely to be the combined result of Pacific worldviews and the influences of contemporary messaging by secular media and religious organizations.

Media messaging is powerful within the Pacific Islands region (Robie 2014) with much emphasis on extreme and negative scenarios combined with uncritical interpretations of local environmental change as the result of 'climate change'. The fact that

> "few Pacific [Island-based] journalists provide adequate background or … the context that is needed to make sense of a news or current affairs development" (Robie 2008: 224)

has inevitably led to a situation in Pacific Island media messages where,

> "the voices of Pacific Islanders are rarely heard … and climate change impacts in the Pacific are usually framed in ways that center the interests and concerns of more powerful countries" (Dreher and Voyer 2015: 59).

For example, recent research has challenged global narratives regarding the extreme vulnerability and lack of resilience to climate change that are apparently characteristic of Pacific Island countries (Farbotko 2010). Yet our results might suggest that Pacific Islands' future leaders subscribe uncritically to pessimist narratives. Given the dominance of 'global' views of climate-change threats in Pacific Islands' media and educational curricula, this is unsurprising. The contrast with the situation in Australia and the USA where people are exposed to more balanced and sometimes more optimistic (including sceptic/denialist) news reporting (Speck 2010) may explain their lower levels of global concern (see above).

Religious messaging in the Pacific is arguably as equally powerful as secular messaging (Haluza-DeLay 2014). Most Pacific Island churchgoers are Christian although they invariably identify more closely with a particular faith group. The Christian churches in the Pacific Islands region link through the ecumenical Pacific Conference of Churches (PCC) to develop common positions on various secular issues, including climate change. The PCC's position on the latter is enshrined in the 2009 Moana Declaration,[5] notable for its prescient acceptance of an imminent need for relocation of vulnerable settlements to less-vulnerable locations. Through the Moana Declaration, individual churches and their representatives have fashioned messages that have spread throughout Pacific Island communities with the result of raising awareness about the effects of climate change. Lower levels of spiritual engagement in richer countries admit a greater role for secular media to influence levels of global concern.

Most Pacific Islanders (99 %) in our survey regard climate change as a 'huge' (86 %) or 'quite a big' (13 %) future problem for the Pacific, more than the 78 % of Australians who rated climate change as a 'very' or 'somewhat serious' problem for Australia in a 2011 survey (Reser et al. 2012b). The difference may be attributable to the pessimist media messaging that dominates the Pacific region in contrast to the broader discussions in the Australian media, much of which is unusually (in a global context) sceptical about climate change (Speck 2010).

The higher level of global versus local concern (+10 % in the Pacific Islands) is not matched by the Australian data (−12 %) yet is consistent in older surveys of Americans; 68 % of those in the 2002–2003 survey were concerned about the impacts of climate change on people around the world but just 13 % on their local community (Leiserowitz 2006). It was easier in the past to believe that such disparities might explain a preference for global action

[5] Accessed online at http://www.oikoumene.org/en/resources/documents/wcc-programmes/justice-diakonia-and-responsibility-for-creation/climate-change-water/pacific-church-leaders-statement

rather than local-level adaptation but these recent data hint at a more complex picture that is likely to be the outcome of different messaging from trusted sources.

Virtually all USP respondents believed that climate change would affect them personally, something that may be attributable to pessimistic media messaging reinforced by perceptions/observations of deteriorating Pacific Island environments. It is plausible to suppose that these views are reinforced by contemporary spiritual messages that emphasize failures of environmental stewardship as well as more long-held culturally-contextualized beliefs that interpret such situations as meriting divine punishment, as in comparable situations elsewhere. For example, a study of Tibetan villagers identified a number of spiritual explanations for climate change that involved various types of human misconduct while others were more fatalistic (Byg and Salick 2009). In contrast, research in Tuvalu (central Pacific) found that "climate change was not an issue of concern due to the special relationship Tuvalu has with God" (Mortreux and Barnett 2009: 109) which is likely to be an expression of the people's dominant Christian faith that reinforces their innate cultural resilience, an 'alternative narrative' not yet silenced (Farbotko 2010).

A 2011 survey of Australian and British respondents also asked about the personal impacts of climate change; 62 % of the Australians and 60 % of the British respondents were either 'very concerned' or 'fairly concerned' about personal consequences (Reser et al. 2012b) compared to the 82 % of USP respondents who were 'really concerned'. The mean ratings for Australian and British respondents expressing concern about the personal impacts of climate change were very similar ($M = 2.72$, $SD = 0.90$ and $M = 2.63$, $SD = 0.89$ respectively, on a 1–4 scale); slightly lower than the mean reported in our sample of 2.81 ($SD = 0.41$) which was measured on a 3-point scale. These findings suggest that Pacific Islanders report greater general and personalized concern than many of their local and international counterparts.

Finally, the finding that a larger proportion of participating Pacific Islanders rated the world to be in a poorer condition than their home may reflect the finding noted also by Reser et al. (2012b), such that a pervasive optimism bias serves to reflect 'home' in a more favourable light. In contrast to comments made by Reser et al. (2012b) regarding a 'psychological distancing' which to some degree minimizes personal, immediate threats, the majority of the Pacific Islanders participating in the survey were extremely worried about climate change, and nearly every one noted that it will be a big problem for people in the Pacific Islands if nothing is done to reduce its impacts. This result is informative about the sample, which is regarded as comprising future leaders of Pacific Island countries, yet cannot be readily compared to the broader samples from other surveys cited.

6 Implications for enabling adaptation

The discussion above allows us to characterize the sample population – representative of the future leaders of Pacific Island countries – in a number of ways. It is clear that this population is spiritually engaged to a degree not matched in most developed countries, a trait that reinforces suggestions that religious bodies in the Pacific Islands region should be at the vanguard of climate-change communication targeting its inhabitants (Haluza-DeLay 2014; Nunn 2009). The degree of spiritual engagement helps explain the strong connectedness to Nature exhibited by this population which, given it is a predictor of pro-environmental behaviour, similarly identifies an opportunity for communicating climate-change adaptation in the region through religious messaging around environmental conservation and stewardship.

Combined, these two population traits show that the sample population is receptive to pro-environment messages but is more likely to respond positively when these are conveyed through culturally-appropriate and/or religious channels rather than secular ones. This conclusion is consistent with the observation that efforts at awareness-raising about climate change and spreading ideas about climate-change adaptation in the Pacific Islands region have largely failed over the past 25 years because most involved acultural secular communication (Nunn 2009, 2013).

The sample population also exhibited a belief that the condition of the world as a whole was worse than that of their local area – a common psychological distancing from environmental risk but one, it could be argued, that should be confronted. A major barrier identified to effective sustainable adaptation to climate change in the Pacific Islands region is the 'lack of ownership' that Pacific Island nations have of the climate-change issue, given that almost all adaptation initiatives have been funded by external (donor) money and have been applied using English (rather than preferred vernaculars) and in unfamiliar cultural contexts (Nunn 2009, 2013). If Pacific Island governments were to commit significant amounts of internally-generated revenue to climate-change adaptation and seek to localize information and communication, it is probable that this distancing would be reduced.

Finally, the sample population showed a high degree of concern for the global environment and a sizeable majority considered their future would be affected by climate change. While this situation might encourage the uptake of adaptation initiatives, much of the information likely to have created this situation (from the media and churches) is superficial, unbalanced and invariably non-localized. There are clear opportunities for upgrading the quality and relevance of such information.

7 Conclusions

The results of this study have implications for all who seek to intervene in the Pacific region to help its people adapt to future climate change in ways that are effective and sustainable. High levels of spirituality and connectedness to Nature explain the impotence of secular messaging while the high degree of concern about climate change identifies opportunities for intervention. By targeting students at the leading regional university, this study allows insights into the beliefs of the next generation of Pacific Island leaders. Assuming their beliefs remain unchanged, it seems certain that future leaders in this region will hold worldviews that are filtered through spiritual beliefs, a connectedness to Nature, and a high level of concern, all of which is likely to ensure that national leaders will remain vocal in international fora.

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