

# Geography of Microstate Migration Caused by Environmental Problems: The Case of Tuvalu

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## 환경문제로 인한 미소국가 이주의 지리학: 투발루의 사례

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**Abstract :** The discipline of Geography is broadly concerned with the interconnections between people and the environment. Particularly, this unique human-environment relationship often can be typically reflected from, and well illustrated by, the dynamics of microstates' island environment. While Tuvaluans living on vulnerable, low-lying atolls in the Pacific are not primarily responsible for contributing to climate change, yet they are experiencing its dreadful effects. Population pressure, caused by the differences in population size, distribution, and composition, has been constantly affected by resource unavailability and environmental instability on the islands. It also represents one of our challenges in understanding the complex influence of population dynamics on the living environment. What can be learned from Tuvalu in the context of population geography and environmental geography as well as its relationship with other Pacific island microstates? What are Tuvaluans' migration responses to their atolls' environmental crisis as well as the carrying capacity scenarios related to overpopulation? What are the current living experiences and settlement situations of Tuvaluan internal and external migrants both at home and abroad? This research examines the contemporary migration literature in the context of Tuvalu's population geography, while analyzing Tuvaluan migration patterns, discourses and perspectives in relation to environmental change.

**Key Words :** migration, population geography, environment, Pacific island, climate change

**요약 :** 지리학은 대체적으로 인간과 환경 간의 상호연관에 대해 관심을 가지고 있다. 특히, 인간과 환경 간의 연관성은 작은 도서국가의 환경이 변화하는 모습에서 나타난다. 태평양의 저지대 산호도인 투발루는 기후변화의 원인에 주된 책임을 갖고 있지 않지만 투발루의 인구압은 지속적으로 기후변화로 인한 자원의 이용불가능과 환경적 불안정성에 영향을 받고 있다. 환경지리학과 인구지리학의 맥락 속에서 투발루의 환경적 위기와 이주민에 대한 주변 태평양 도서국과의 관계를 살펴보려 한다. 투발루인의 이주는 인구과잉과 직면된 수용 능력 면에서 어떠한 어려움을 겪고 있으며 국내, 국외 이주민의 정착상황에 대해 알아볼 것이다. 이 연구는 환경 변화의 관계에서 투발루인의 이주패턴, 담론 및 전망을 분석하면서 인구지리학적 맥락에서 현대이주민현을 조사하려 한다.

**주요어 :** 이주, 인구 지리학, 환경, 태평양 제도, 기후 변화

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## 1. Introduction

People of the world are becoming increasingly mobile both within and across international borders to meet their daily socio-economic needs and challenges. Migration is nothing new to daily human activities, but the climate change imperative has created new conditions for population movements, posing a fresh challenge in the relationships between environment and humankind. The Pacific has become a focus of the global debate on climate change induced migration because of the vulnerability of low-lying island microstates, including Tuvalu, Kiribati, the Marshall Islands, and Tokelau to inundation if sea levels continue to rise. While industrial development has brought improved human quality of life for many, the consequence of such development has often been adverse environmental change, which has further led to cases of environmental displacement on an unprecedented global scale. The notion of climate change related population movement has been gaining momentum in recent years especially with regards to low-lying islands, such as Tuvalu (Stojanov *et al.*, 2014). Portrayed as an ‘*Atlantis*’ in the making and a ‘canary of global warming,’ Tuvalu has come to “epitomize the environmental catastrophe of worldwide climate change and sea-level rise” (Chambers and Chambers, 2007, 294). While the present scientific puzzles of climate change remain unsettled, Tuvaluans have engaged in the climate change debate through their own daily experiences of environmental degradation and the reality of vulnerability to climate change—a perception that has also been consistently reinforced by the discourse of its government’s actions and popular media interests worldwide. What can be learned from Tuvalu in the context of population geography and environmental geography as well as its relationship with other Pacific

island microstates? What are Tuvaluans’ migration responses to the atolls’ environmental crisis and the carrying capacity scenarios related to overpopulation? What are the current settlement situations and living experiences of Tuvaluan internal and external migrants both at home and abroad? This research aims to explore the answers to these key research questions by drawing upon local Tuvaluan perspectives and secondary sources collected from the field. With the existing migration literature, some Tuvaluan experiences are compared and contrasted in order to understand the population geography of Tuvalu in the context of environmental migration debate and development challenges.

## 2. Overview of the Pacific Islands development and Tuvalu

Over half of the world’s islands are found in the Asia-Pacific region, and these small islands are indeed a microcosm of the challenges that the world encounters. Owing to its unique island topography and isolated surroundings, relationships between environment and population are intensified in this region. Indeed, environmental disruptions in the Pacific island microstates are easily magnified because of the already severe human pressure on the environment in some places. Due to its limited potential for economic development, absence of exploitable resources and its small size and vulnerability to external economic and environmental shocks, the United Nations designates Tuvalu, along with other island developing states, as the world’s least developed countries (UN-OHRLLS, 2011).

### 1) Vulnerable island microstates

Many developing island microstates around the world today face a range of barriers to their development, as the

local confined environment is further complicated by population struggles, remoteness, lack of resources, susceptibility to natural disasters, excessive dependence on international aid and vulnerability to global transformation (Campbell, 2006). What has raised an imperative concern in the Pacific Islands are the uncertainties of magnitude and timing of global climate change impacts. For many Pacific islanders, coastal environments are not only part of the cultural heritage, but also a safeguard to the long-standing foundation of economic prosperity. Owing to their geographical uniqueness, islands in the world face more acute challenges, both ecologically and socio-economically, than the continental areas. Indeed, the area of this water-enclosed and limited space offers fundamental life supporting systems which are far beyond its physical boundary, and yet it is also a zone of great instability, with the highest concentration of natural hazards that one could possibly find on earth. With

the expected rising sea levels, adverse impacts of coastal environment changes on the well-being of the Pacific Islands appear to be inevitable.

## 2) Geography of Tuvalu

The name Tuvalu itself speaks of geography. Tuvalu, literally meaning ‘eight standing together,’ is an independent Polynesian microstate comprising 5 low-lying atolls and 4 coral islands distributed over 750,000 km<sup>2</sup> of the South Pacific (see Figure 1). Eight of Tuvalu’s tiny islands have been long inhabited by people with close tribal ties; Nanumea, Nanumaga, Niutao, Nui, Vaitupu, Nukufetau, Funafuti (the capital), and Nukulaelae. The ninth island, Niulakita, has been inhabited by Niutao islanders only since the 1950s. At the colonial convenience of the British, the Polynesian Tuvalu, formerly known as the Ellice Islands, was administratively amalgamated with

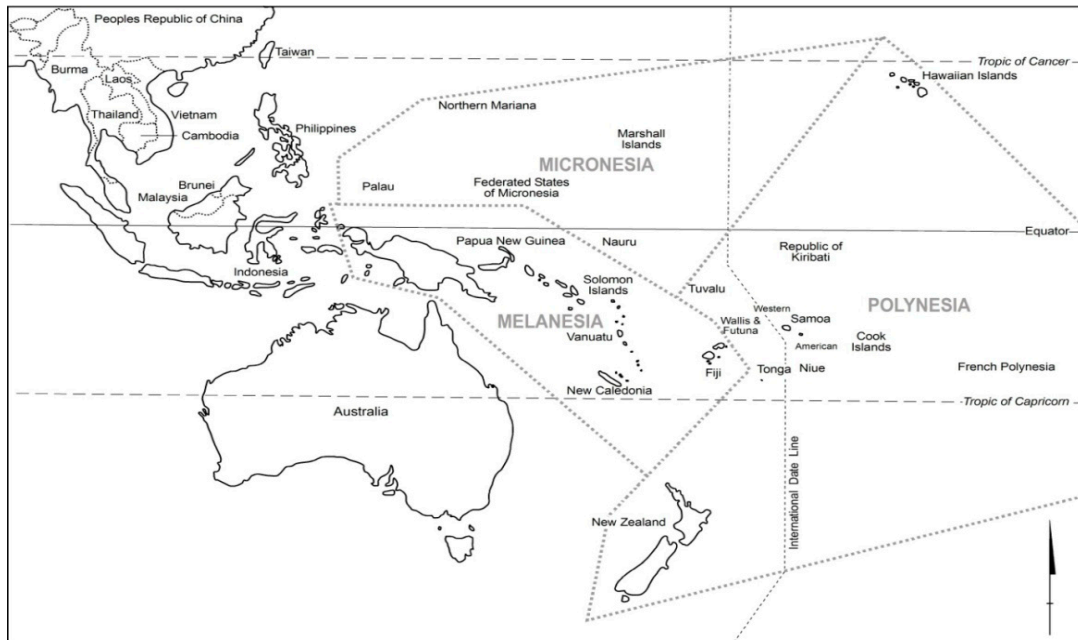


Figure 1 Map of Tuvalu and Pacific Island Microstates (Polynesia, Melanesia and Micronesia)

Source: Hugo, G., and Bedford, R., 2014.

the Micronesian Gilbert Islands (now Kiribati) until its full independence in 1978. Tropical marine environment dominates Tuvalu's climate. Temperatures are uniformly high throughout the year with the mean annual temperature approximately 28°C (a mean maximum of 31°C and a mean minimum of 25°C). Tuvalu's mean rainfall ranges from 2,300 mm to 3,700 mm annually. The average duration of rainfall on Funafuti is 525 hours per year, or about 6% of the total time. Some important climate features in Tuvalu include climate variability and extremes, especially the El Niño-Southern Oscillation and tropical cyclones, which may cause more droughts or floods (Tuvalu Meteorological Service, 2016). By population, Tuvalu is the world's smallest member country of the United Nations, having a population of just 10,800 (ADB, 2015). By territorial size, with a total land area of only 24.4 km<sup>2</sup>, Tuvalu stands as the 4th smallest country in the world. This demographic and geographic scale is also reflected in Tuvalu's economy; a relatively isolated subsistence society, primarily based on fishing and limited agriculture. Such an economy is highly vulnerable to physical environment influences, including climate change and sea level rise. Republic of Korea has established official diplomatic relationship with Tuvalu since November 1978; however, the real exchange between the two remains very limited.

Similar to other Pacific islands, Tuvalu is characterised by the so-called "MIRAB" system—a typical island economy that is heavily dependent on "MIgration, Remittances, foreign Aid, and government Bureaucracy" as its major economic activities. The government sector, the largest employer in the country, employing 2/3 of the formal workforce, heavily dominates the money economy of the country. Moreover, Tuvalu's fragile economy is strongly backed by foreign aid from New Zealand, Australia, and the United Kingdom, while Taiwan and Japan have also increasingly become the leading aid donors to Tuvalu. Owing to limited resources and economic scale, most income is earned through foreign exchange.

Tuvalu's extensive marine economic zone is significant for the traditional fishing nations of the East Asia region, with special fishing agreements with Taiwan and Japan also contributing to its national income through fishing licence fees. For many local Tuvaluan families, remittances from merchant seamen working on foreign vessels provide a significant source of income. In addition, unlike other Pacific microstates, some of the world's most unusual industries can be found in Tuvalu. For example, both the sale of delicately printed postage stamps for international philatelists, and renting out its telephone country code '688,' re-routed for '900' sex phone lines, constitute other sources of foreign exchange (Connell, 2003). Furthermore, with the internet boom, Tuvalu was able to generate revenue through the marketing of its internet domain name '.tv,' increasing its GDP by some 50% (ADB, 2003).

### **3) Tuvalu and the environmental catastrophe**

While many researchers are still inquiring or are in disbelief at the possible effects that climate change will bring (Warne, 2015), the tiny atoll nation of Tuvalu is already suffering from the effects of intermittently high sea levels. Tuvalu is the 4th smallest sovereign state in the world, occupying a total land area of only 24.4 square kilometres, with the highest point in the country being 4.5 metres above sea level, while sea-level gauges in the main island of Funafuti are now recording an average annual rise of 5.6 mm (Williams, 2007). Rising seas could be the most devastating consequence of global warming, as the IPCC (2007; 2014) currently predicts that levels will rise 21 to 82cm by 2100. IPCC has warned that more than 50% of the world's population who live in low-lying coastal regions, a rise of 1.4m would be catastrophic and submerge many of the world's largest coastal cities (Williams, 2007). The actual survival of a nation is in question, and Tuvalu faces the prospect of 'climate refugee' status. As indicated above, the urgency of the issue that

Tuvalu is facing has outweighed any other economic development needs of this island microstate. This research study on the case of Tuvalu should hopefully advance our better understanding of the causes and consequences of human mobility at both origin and destination, when a negative environmental event, such as climate change-induced sea level rise, takes place in the context of human-environment dynamics.

The 'land' often connotes unique social and cultural meanings in the Pacific Islands and may represent power structure significance to already land-limited islanders. Land in the Pacific Islands is usually held under customary ownership. Losing 'ground' makes islanders landless and homeless and without status. In Tuvaluan language, "*Fakaalofa*" refers to a landless person and its literal meaning is 'the one deserves others' pity.' Land is not the only thing that Tuvalu is about to lose. Customs, history, language and culture directly associated with place may be swallowed up by the ocean, and may only exist in people's memories. Tuvalu may face challenges to its cultural survival and the preservation of its history and social values. The meanings of 'home' and the identity question to Tuvaluans following inundation will be very different than for other types of migrants whose native motherlands continue to exist for possible future visits. The loss of homeland in Tuvalu may well be permanent.

### 3. Population Geography of Tuvalu

#### 1) Overpopulation and population distribution and changes

The relatively small populations of most Pacific atoll states mean that migration potentially have a greater impact on the socioeconomic structure, local demography, and the political stability of the region. Population distribution on the islands of Tuvalu is

critical in the discussion of population movement, particularly for internal migration within Tuvalu. In addition to natural causes of environmental changes, as human beings are the dominant actor in the environment, there are anthropogenic environmental changes, such as man-made air, water, land, waste and noise pollution. Westing (1992) argues that population movement can be precipitated by a gradual worsening of the environmental situation. "Examples of this long-term resource base deterioration include nutrient losses, soil erosion, deforestation and salinization," and Westing continues that "overpopulation is the main cause of the refugee movements in this category" (1992, 202). Tuvalu's population, and Funafuti in particular, has undergone considerable changes over the recent years. In other words, the carrying capacity of Tuvalu may have been overwhelmed by overpopulation.

According to Tuvalu Statistics Bureau (2007), the total Tuvaluan population reached 11,992 in 2007. As shown by the latest available island census in 2002 from the Government of Tuvalu, Tuvalu had a total population of 9,561 in 2002. Despite the absence of the latest census population data, the spatial distribution trends and changes on each of Tuvalu's 9 islands below are expected to be relatively similar. Tuvalu's population density has increased from 373 persons per km<sup>2</sup> in 2002 to 399 persons per km<sup>2</sup> in 2005 (Tuvalu Statistics Bureau, 2006). The capital island of Funafuti has seen the largest population inflow in the past decade, as more outlying Tuvalu islanders have relocated to Funafuti in search of employment. With already limited land areas, this massive inflow of internal migration into Funafuti has made it one of the highest population density areas in the world with 1,610 people per km<sup>2</sup> (ADB, 2015). Except for Vaitupu and Nukulaelae, all other 6 islands of Tuvalu have experienced negative change in population growth. It should be noted,

however, that Vaitupu's positive growth is mainly attributed to the annual intake of Tuvalu's only public secondary school, Motofua Secondary situated on Vaitupu Island.

## 2) Hardship and unemployment

Overpopulation in the confined land areas of Funafuti has not only affected human comfort, but has also pressured the environment resources. Overcrowding has been identified as a major cause of hardship for Tuvaluans:

Hardship was caused by large numbers of extended family members living in one house. Some claimed to have 13-15 people living in a 10x6 metre house, which put pressure on the family's food supply and stress on water supply, sanitation and children's health. ... Mothers stated that overcrowding has a noticeable impact on their children; skin diseases occur when there is poor sanitation and not enough water for washing (Asian Development Bank, 2003, 9).

Overpopulation has also led to high unemployment as there are only a limited numbers of jobs in the atolls. During the fieldwork, the interviews revealed that some young adults hanging around the streets were unemployed. The situation was exacerbated in 2005 when Tuvaluan migrant workers, who were previously employed in the phosphate mine of the neighbouring island nation of Nauru, were repatriated as a result of the phosphate mine closing. The Tuvaluan Government hopes that New Zealand's new initiative of Recognised Seasonal Employer (RSE) work policy will help Tuvalu's unemployment situation. However, as the scheme only runs on a 9-month contract basis, in which RSE Tuvaluan workers must leave New Zealand at the end of their contract, it is unlikely that a long-term problem can be solved by a short-term solution.

## 4. International mobility of Tuvaluans

### 1) Historical overview of Tuvaluans' relocations

It is recognized that the entire Polynesian region is highly prone to migration. Migration is a significant pattern of lifestyle, and even a social routine at times (Connell and Conway, 2000). Among the Tuvaluan migrants who were interviewed, some Tuvaluans had migrated several times during their lifetime with one of them up to 16 times. Hau'ofa (1993) stresses the significance of migration in the lives of Pacific Islanders:

Human nature demands space for free movement and the larger the space the better it is for people. Islanders have broken out of their confinement, are moving around and away from their homelands, not so much because their countries are poor, but because they had been unnaturally confined and severed from much of their traditional sources of wealth, and because *it is in their blood to be mobile* (emphasis added). ... The world of Oceania may no longer include the heavens and the underworld; but it certainly encompasses the great cities of Australia, New Zealand, the USA and Canada. And it is within this expanded world that the extent of the people's resources must be measured (quoted in Bedford, 2007, 1; Hau'ofa 1993, 11-12).

Shortly after the Second World War, two significant population movements occurred in Tuvaluan history, including (1) external relocation from Vaitupu to Kioa, Fiji, and (2) internal relocation from Niutao to Niulakita. In 1951, elders from Vaitupu, under the impulsion of Donald Kennedy, an Australian expatriate, who was also the headmaster of the boarding school, decided to purchase the island of Kioa, an outlier of Fiji (White, 1965). The main reason underlying the purchase was the fear

that resources on Vaitupu island would be too scarce to sustain population growth. A few dozen families relocated to Kioa until 1983, and were eventually granted Fijian citizenship in 2005, even though the island still enjoys some autonomy and has its own administrative body.

British colonial authorities had similar thoughts about Niutao in 1949, then Tuvalu's most-populated atoll, and decided to ship some Niutao islanders to the uninhabited Niulakita atoll. From then on, *Tuvalu*, which literally means 'cluster of eight' standing together, would count 9 populated atolls. Niulakita remains the least populated atoll, with only about 40 inhabitants. These two displacements reveal that the idea of permanent resettlement was considered by some well before the threats of climate change became apparent. Most media reports tend to portray Tuvalu's current possible relocation as unprecedented—these examples show that the very idea of relocation is far from being unprecedented, even if these resettlements were of a much smaller scale. Even before these resettlements occurred, the idea was already considered in the 1890s in response to what was perceived as an overpopulation problem (Connell, 1983).

It was also noted by Munro and Bedford (1980, 3) that this idea was born out of a Malthusian perspective: people feared that they would not have enough food unless the population was kept under strict control. As early as the 1860s, tight population controls included forced abortions and infanticides, and a policy of a maximum of two children per family was implemented throughout Vaitupu. These techniques of population control, though counterbalanced by adoption, were abolished by the missionaries, and population grew rapidly from then on. Interestingly, this Malthusian perspective is still part of the rationale of the current policy of the Tuvalu government to encourage and facilitate emigration.

## 2) Contemporary internal and international migration of Tuvalu

Throughout history, "migration has long been significant in Tuvalu" (Connell, 2003, 94). The forced Tuvaluan labour migration, known as 'black-birding,' first occurred to plantations in Fiji and Australia's Queensland during 1850-1875; later, moved into the phosphate mines of Banaba (I-Kiribati) and Nauru. Tuvalu has come to depend upon overseas migrant labours to support its national development through remittances. Since the 19<sup>th</sup> century, the islanders were seen as the 'first Malthusians' (Munro and Bedford, 1980). Migration further expanded in size and direction after World War II, as Tuvaluans were trained as merchant seafarers for employment on ships of overseas lines, particularly recruited by German ships (Borovnik, 2004). With the exhaustion of phosphate mines in Nauru, migrant workers were repatriated to Tuvalu in 2006, resulting in a significant decrease in remittances. Without higher education institutions in Tuvalu, Tuvaluans are also sent overseas for training through international aid scholarship schemes, particularly at universities in Fiji, New Zealand, Australia and Taiwan. Emigration is increasingly seen as one of the solutions by the Tuvaluan Government to multiple development challenges that are currently faced in Tuvalu. The following section maps out Tuvalu's current major internal and international migration flows.

### (1) Internal migration within Tuvalu

The first key pattern of migration in Tuvalu is internal movements between different atolls, particularly to Funafuti. Since receiving the donation of *Nivanga*, a vessel from Australia, in the late 1990s, migration and movement between different atolls have expanded considerably. International aid has not only eased the voyage between the atolls, but also provided a major 'pull' factor to improve the living quality, as the capital of Funafuti

underwent rapid development in the late 1990s and early 2000s. Foreign aid enabled the establishment of numerous facilities, including a new A\$11 million government building donated by Taiwan, the Princess Margaret Hospital and a power plant donated by Japan, a telecommunication centre, a wharf, and the maritime training school on *Amatuku* atoll. As migration from outlying islands to Funafuti continues, the government is desperately trying to improve services and facilities on outer islands, in order to slow down such a mounting migration flow.

## (2) Repatriation and immigration to Tuvalu

While some Tuvaluans are emigrating out of Tuvalu, it should also be noted that a group of repatriated migrants and new immigrants are settling into Tuvalu. Although in small numbers, these repatriated Tuvaluans and new immigrants moving to Tuvalu represent a reverse migration flow back into Tuvalu from abroad. This has also proven the 'circular' nature of migration, which is not a simple one-way process, but both ways. Post-employment and training have accounted for the largest repatriation group in Tuvalu. About 800 Tuvaluans previously worked in Nauru in the phosphate mining industry or aboard foreign ships as seamen (WHO, 2007). Since 2006, with the effective closure of neighbouring Pacific Island Nauru's phosphate mine, Tuvalu has witnessed one of its largest repatriation of 378 Tuvaluan phosphate mineworkers from Nauru (Pacnews, 2006). Coupling with the loss of remittances from these workers, the repatriation has presented a major pressure on Tuvalu's economy. With the absence of advanced training or tertiary institutions, "several hundred Tuvaluans are being educated overseas at any one time" (Connell, 2003, 94) has meant that the graduates are also returning home upon completion of their studies. In particular, it is mandatory for Tuvaluan students under the international aid sponsorship to return home after graduation. It is a condition of the aid scholarship that Tuvaluan

graduates must repatriate so that they can contribute to Tuvalu's development with their skills learned from overseas.

Intermarriages and overseas birth have also represented a major repatriation group. As Tuvalu gained its full independence in 1978 from the UK and separated from Kiribati (Gilbert Islands), Tuvaluans, who were born or previously worked in Kiribati, have gradually repatriated from its former administrative capital of Tarawa, Kiribati. The Polynesian interisland marriages, a common practice in the region, also bring in the Tongan and Samoan partners to settle with their Tuvaluan spouse in Tuvalu. In addition, there are repatriated Tuvaluan children who were born overseas, while their parents were receiving training and education abroad, or due to personal preferences to give birth in New Zealand or Australia. Other migration inflows to Tuvalu include aid workers, English language teachers, technical personnel/ experts, missionary workers, and diplomats. These foreigners are considered as temporary migrants, since they are usually stationed in Tuvalu on a fixed-term basis only. The last group includes the Chinese businessmen who purchased the Tuvalu passports, as part of the Tuvalu's controversial 'passport-for-sale' scheme to boost its revenues and investments by establishing import/ export and Chinese restaurant businesses in Funafuti.

As Tuvalu is often portrayed as a 'sinking' nation to seek out-migration opportunities as a result of climate change, it is important to note the in-migration flow of Tuvaluans and/ or foreigners relocating into Tuvalu. Migration is always perceived as a voluntary movement of 'seeking betterment or improvement' in life. However, the concept of 'better' or 'improved' is grounded only in the perspective of each individual migrant. In other words, a migration destination, such as Tuvalu, that is better in the eyes of some, may not be necessarily better for others. In the case of repatriated Tuvaluans and foreign immigrants who I interviewed, particularly the Chinese business migrants and the Tuvaluan-New Zea-



landers, their choice of moving back to Tuvalu was inconsistent with many others who are leaving Tuvalu. Despite being brought to Tuvalu by various reasons, there is a common underlying thread that it is in their belief that Tuvalu is a 'better' place for them as defined in their own terms.

### (3) Emigration to Fiji

Fiji has one of the most concentrated Tuvaluan populations outside Tuvalu. Kioa is an outlier island to Fiji's Vanua Levu island group. There is still a limited, but sustained migration flow between Vaitupu and the island of Kioa. As the land was purchased by the Vaitupu fund in 1951, normally only Tuvaluans who are of Vaitupu origin are entitled to the land and relocate to Kioa. Kioa remains a Fiji territory, but the land is owned by Tuvaluan settlers from Vaitupu without Fijian citizenship. Kioa islanders' illegal overstayer status finally regularised when the Government of Fiji granted 635 full Fijian citizenships to Kioa islanders from Tuvalu and the nearby Rabi islanders from Kiribati. Although unwelcomed by political parties in Fiji, a recent population transfer proposal was made by a Tuvalu-born Australian environmental scientist Don Kennedy to allow Tuvaluan climate refugees to resettle into Kioa, Fiji (*Pacific Magazine*, February 21, 2006). Kennedy argues "a mass relocation would ensure the Tuvaluan language and culture is preserved instead of being scattered to the four corners of the earth" (quoted in *Fiji Live News Service*, 2006). Tuvalu's Prime Minister, Maatia Toafa, commented in 2006 that his government is considering the idea of moving Tuvaluans to Kioa, but does not regard this as a priority:

The thinking behind it is we might buy some land or try to own land maybe in Australia or New Zealand. I think these are the kind of issues at the moment, because we do not believe that Tuvalu will submerge, eventually, but, I think we're fighting our case on the impact of climate change (Maatia Toafa,

Prime Minister of Tuvalu, 2006, quoted in *Radio New Zealand International*, 2006).

With the presence of the University of the South Pacific in Suva, migration to Fiji is common and important. Tuvaluan students with sponsorships are able to bring accompanying families during the course of study. Moreover, the only outlet for Tuvaluans by air is Nausori, Suva. Another major source of Tuvaluan presence in Fiji is found in international and regional organizations, such as the local offices of UNDP or SOPAC. Tuvaluan civil servants working for these organizations are typically settled in Fiji together with their families. However, migration flows between Tuvalu and Fiji have considerably slowed down since the introduction of visas for Tuvaluans and other Pacific Islanders. Tine Leuelu, Tuvalu's High Commissioner in Fiji, recalls that Tuvaluan presence in Fiji remains strong, and its community organization is active and well-established.

### (4) Emigration to Australia and the United States

Tuvaluan migration to the United States does exist, but is extremely limited. During the course of fieldwork, only 6 Tuvaluans mentioned their family relatives in America. Unlike the size of Samoan and Tongan migrants, Tuvaluans in the United States are anticipated to be in a much smaller scale. However, it is difficult to number Tuvaluan migrants in the United States, as Tuvaluans are not recorded as a separate census data in the Pacific Island category. In addition, over the past years no major increase of native-born Tuvaluans residing in Australia is shown in the Australian census data. It is difficult to trace the figure of Tuvaluans as the Australian census counts 'place of birth,' as opposed to ethnicity. Because of ill-equipped medical facilities in Tuvalu, some Tuvaluans were not born in Tuvalu, but in New Zealand or Fiji. Based on the interview with Tuvalu's Ministry for External Affairs, there are no more

than 300 Tuvaluan residents in Australia, particularly in the areas of Melbourne, Brisbane and Sydney. When compared to New Zealand, the numbers of Tuvaluan migrants in the United States and Australia are insignificant, owing to relatively tougher immigration policies and controls imposed by these countries.

### (5) Emigration to New Zealand

Migration from Tuvalu to New Zealand remains much more significant than to any other destinations. 'Family' and 'International/ Humanitarian' migration streams account for the largest number of recent Tuvaluan migrants to New Zealand. The 'Pacific Access Category' (PAC) scheme grants up to 75 Tuvaluan migrants to New Zealand. The 'Pacific Access Category' (PAC) scheme grants up to 75 Tuvaluan migrants to New Zealand. The 'Pacific Access Category' (PAC) scheme grants up to 75 Tuvaluan migrants to New Zealand. Although New Zealand media rumours have suggested a nationwide resettlement programme agreement made between Tuvalu and New Zealand, there has been no explicit policy to accept Pacific Islanders who have been environmentally displaced due to rising sea levels. An official of the New Zealand Ministry of Foreign Affairs and Trade who wishes to remain anonymous in the interview asserted, 'There is no link between the PAC quota and climate change'. Once these migrants are settled in New Zealand, they may apply to bring other family members under the 'Family' stream. In addition, the introduction of the Recognised Seasonal Employer (RSE) scheme in 2008 also opens another migration possibility for Tuvaluan. The seasonal worker migration scheme allows Tuvaluan (and other selected Pacific Islanders, such as Kiribati, Vanuatu, Tonga and Samoa) to work in New Zealand for up to 9 months, typically in the horticultural sector identified with labour shortages.

## 5. Discussion: Tuvalu's declining carrying capacity and emigration

### 1) Migration: understanding environment-human relationship

In most societies, human activities are often economically constrained and socially constructed by their given environments. The natural environment supplies the natural resources for life's necessities, whereas the socio-economic environment provides development opportunities for individual and community livelihoods. Thus, the key for a traditional society being able to progress to modern civilization relies heavily on a condition where the environment and development are kept in balance. However, when this environment is no longer able to uphold its resource supply for human development demand, since the given environment is irremovable, people moving in search of a new environment to meet their survival needs becomes the norm, as seen in societies practising hunting-and-gathering, shifting cultivation, slash-and-burn and nomadism. These are known as 'environment-induced migrations,' in which environmental factor(s) are regarded as the primary cause of the movement.

In addition, there are also cases of forced environmental migration when environmental collapse has directly resulted from natural disasters in which the permanent abode is lost or becomes uninhabitable. Although the environmental causes that precipitate population movements can vary a great deal from volcanic eruptions, earthquakes, hurricanes, flooding and other extreme weather incidents, the numbers of individuals displaced by environmental migration can be considerable. Environmentally provoked migrants suffer differently from political refugees, as it is the uninhabitable environment that prevents environmental migrants from their return, rather than a well-founded fear of persecution. Never-

theless, environmentally induced migrants and refugees share a very similar fundamental characteristic in the noticeable ‘push’ for their movements—an act of movement that is out of their personal choice, but is often an unwilling necessity.

Since the effects of climate change on humankind are multifaceted, its processes emphasize the interconnectedness and interdependence between environment and people. The relevancy in understanding the relationships between environment and people is particularly valid in circumstances where a group of individuals needs to seek a different place of refuge, either temporarily or permanently, as in their belief that their quality of life could have been jeopardized by a significant environmental disruption. While environment is often regarded as the most basic, but also the most essential, element for the survival of humankind, the destructive impacts of global climate change have introduced unprecedented challenges into maintaining already fragile and unhealthy environments.

With alarming signs of ecological imbalance and deterioration of physical environment continuing to a point where lives could no longer be upheld by existing environmental resources, undertaking a necessary move to a different environment often becomes the only option to escape death. The scenario portrayed here is nothing new; rather it reflects an often overlooked reality that environment-human relationships are closely intertwined and are reflected in the interplay of climate change and population movements. An emphasis throughout this study is to consider other forms of forced migration that occur in the face of new challenges from ecological disruption caused by climate change and that are too frequently unnoticed and underreported. The potential uprooting of the entire population of a state in response to such factors, however, is thus far under-documented in human history.

## 2) Migration and carrying capacity

The concept of carrying capacity is often applied to explain the cause of migration, both emigration and immigration, in a changing environment. As defined by Cocks and Foran (1995), human carrying capacity is ‘the estimated maximum number of people who can live there indefinitely and be given the opportunity to live long, healthy, self-fulfilling lives’ (1995, 67). In order for all lives to continue to survive, it is likely that migration to a new environment will be taking place when the carrying capacity in the existing area has reached its maximum. In addition, from the perspective of environmental sustainability, Martin (1992) asserts that, “a combination of factors, including natural disasters and overpopulation, have caused people to flee from their homes [either] temporarily or permanently because the land on which they live can no longer sustain them. Some of these movements are trans-national, others internal” (Martin, 1992, 13). Although each case has its own unique blend, its own historical, geographical and ecological mix of cause and effects, Mahumd’s study (1994) on environmental refugees in the Philippines reflects the present situation in Tuvalu:

Environmental refugees are a symptom of deeper and more pervasive processes; the heart of the problem is the poverty-environment-population nexus. The people most adversely affected by natural disasters are usually the poorest members of society who are relegated to the most vulnerable areas... This is often because of a combination of population pressure and an inequitable distribution of land. The genesis of an environmental refugee is thus far from simple. The chain of events may start with any number of social, political, or economic factors. This leads to physical changes in ecosystems so that their resilience, sustainability, or productivity is reduced. The changes may be widespread and obvious, may reveal themselves

only slowly, or they may be more or less hidden until a major force of nature- a disaster acts as the trigger event which causes enormous dislocation (emphasis added, Mahmud, 1994, 71).

As part of the Tuvaluan custom, the land, which is not allowed for sale, but only passed down through families, represents the socioeconomic status. People who have migrated from the outlying islands to Funafuti are likely to be the poorest and most powerless members of society as they do not own any land in the capital. As a result, their status as 'outer island migrants' has forced them to cluster at two edges of the main island where the 'borrow pits' (and the waste dump sites) are located—areas that are also particularly prone to flooding caused by high tides and storm surges. With deteriorating environment and population pressure, Tuvalu's case has reflected what Westing argued,

[A] set of reasons for people to be compelled to leave their home area at least temporarily, derives in a sense from a combination of natural and anthropogenic causes. Basically, this is when the carrying capacity of an area for humans has been exceeded. Lack of opportunity in an area for at least some of its inhabitants to earn an adequate living can lead to human displacement. Indigenous (including pre-modern) groups can be displaced when their required resource base is co-opted for some modern pursuit (Westing, 1992, 201).

Hugo (2008) further applies migration to the carrying capacity concept, suggesting three scenarios in the environment-migration relationship, which are also evident in Tuvalu's case. As compared in Table 1, Hugo's argument can be exemplified by fieldwork findings about Tuvalu's environment-migration situation. The chain of events that results in the phenomenon of environmentally induced migration may be stimulated with any num-

ber of combinations of social, political, and economic factors. However, long-term deteriorating carrying capacity explains the major underlying cause of Tuvalu's population movements. Tuvalu's human-environment struggles have also reproduced what Jacobson (1988) stressed about the interconnections between resource base deterioration and natural disasters and population pressure. These crisis events are termed 'unnatural' disasters because of the large human component in their severity:

These unnatural disasters are largely a product of the same kind of land degradation in which financial and population pressures force both farmers and urban dwellers onto marginal lands that soon lose their stability. But in this case the land degradation- while devastating in itself and also to be feared because it is self-reinforcing-inhibits the ability of ecosystems to roll with nature's punches. The result has been that the rare has become commonplace, the extremes of weather that have been endured and survived through the millennia are increasingly turning into [fully] fledged catastrophes on a scale seldom seen before (Jacobson, 1988, 16).

It should be noted that environmental factors are always mixed with a combination of other family, economic and social factors. Most of these would-be migrants have had family in New Zealand already, and these family ties are a strong 'pull factor' as well. Migration is often considered to be in the interest of the children, and thus as a risk-reduction strategy for the family. Sir Toaripi Lauti, Tuvalu's first Prime Minister (1978-1981), believes that precautionary migration is important as 'prevention is better than cure. However, some Tuvaluans see the current relocation opportunity as an "unaffordable dream," when considering the total expenses involved in the initial application process. Needless to say, the dif-

Table 1. Comparison of carrying capacity scenarios with Tuvalu's case of migration

<i>Where does migration fit into carrying capacity framework? Hugo, G. (2008)</i>	<i>Exemplified by Tuvalu's Environment and Migration</i>
1. In-migration (and immigration) into an area can potentially increase the pressure placed by population on regional environments.	Environmental pressure is manifested by population growth as a result of increasing births and in-migration to Funafuti from outlying islands.
2. Deterioration of environments can cause outmigration (and emigration) from an area.	Concerns about sea level rise, inundation, extreme weather events, insufficient freshwater, poor agricultural productivity, and waste problems have contributed to Tuvaluans' emigration.
3. Countries and regions with abundant and valued environmental attributes and resources will attract in-migration (and immigration).	Tuvalu's socioeconomic capital of Funafuti attracts internal migration, whereas New Zealand's (and other countries) safer environment, employment and opportunities attract Tuvaluans' international immigration.

Source: Hugo, G., 2008; carrying capacity framework compared with author's fieldwork findings.

difficulty of obtaining an approved 'genuine' job offer from New Zealand employers has added complexity to the migration trauma. One Tuvaluan community leader even condemns the schemes of New Zealand as a new form of 'slavery' immigration, in which many educated Tuvaluans are giving up their stable 'white-collar' government employments in Tuvalu to end up being cleaners or fruit-pickers in New Zealand.

## 6. Conclusion

Although the movement of a few hundred Tuvaluans to New Zealand may only be a tiny fraction of the entire international migration figure, Tuvaluan migration has presented several new ways of thinking to explain human mobility in the era of climate change. As demonstrated throughout this research, it is increasingly evident that the emerging scenario of environmental change has further compounded other more established push-pull factors and has provided a new imperative for migration decision-making. Sea level rise that poten-

tially leads to the ongoing trend of Tuvaluan emigration is one of the many concerned environmental failures experienced in Tuvalu. Nonetheless, a full range of environmental failures that are also significantly related and evident in Tuvalu, particularly the extreme weather events, agricultural un-productivity, lacking freshwater and overpopulation in relation to the pressing human-environmental carrying capacity, have all contributed to the environmental dimension of Tuvaluans' emigration. One may agree with the following statement from the International Organisation for Migration, concerning the rigidity of current refugee definitions:

Today's refugee definition excludes many people with refugee-like characteristics, but who cannot establish individualized persecution. Many of those in the so-called 'grey zone' are fleeing for reasons of **poverty, environmental degradation, underdevelopment**, or armed conflict, but are not exclusively covered by any specific agency, definition or mandate (emphasis added, IOM, 1991).

Tuvalu is currently facing such a set of circumstances, including poverty, environmental degradation and un-

derdevelopment. It is necessary to consider that people living in areas which are prone to be rendered uninhabitable by climate change have the early option to migrate elsewhere, especially to countries that are largely responsible for climate change. Findings from the field showed that Tuvaluan migration existed long before the debate of climate change became popularized in late 1990s. However, climate change, and to a much greater degree, the overall declining environmental carrying capacity in Tuvalu, have provided a new imperative for Tuvaluan migration. The 'environmental driver' has increasingly become a significant push factor in Tuvalu's migration, in addition to other social and economic push-pull impediments.

Migration caused by environmental change, as exemplified by Tuvalu's case, has wider relevance for further research in other small island developing states, such as Kiribati, Marshall Islands and the Maldives. For instance, the Maldives, considered the most climate-vulnerable island nation in South Asia by Asian Development Bank, has officially announced plans to purchase future homelands elsewhere, possibly in India, Sri Lanka or Australia, as "an insurance policy" to relocate its entire population should sea levels rise further (Harman, 2014). Similarly, the President of Kiribati, Anote Tong, has requested other nations to offer land to I-Kiribati that, "we are waiting for a contribution from any country of a piece of land so we can move to it" (Powell, 2008). For all countries, matching the needs of environmentally induced migrants with humanitarian migration schemes in the era of ever changing climate remains a critical challenge. Current policy practices in the world have turned a blind eye on the significance of environmental factors in migration, as it is difficult, if not impossible, for an individual to prove that her/his move is triggered by the environment. Given the challenges presented by current and future climate change-induced displacement, ensuring adequate and appropriate humanitarian immigration response to avoid escalating crises will surely be a

key development priority in this century.

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