UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

Vulnerability profile of Tuvalu

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Prepared by the Division for Africa, Least Developed Countries and Special Programmes of UNCTAD, in anticipation of the 2012 review by the Committee for Development Policy (CDP), on 12-16 March 2012, of the UN list of Least Developed Countries (LDCs), in accordance with General Assembly resolution 59/209.

Summary

The Ellice Islands separated from the Gilbert Islands, taking the name Tuvalu, in 1975. The territory gained independence from the United Kingdom on 1st October 1978. Tuvalu was admitted in the Least Developed Countries category in 1986.

Tuvalu met one graduation threshold (quality of life) in 1991, 1994 and 1997. It met another graduation threshold (GDP pc) in 2000, then two graduation thresholds (GNI pc; human assets) in 2003. It was not considered pre-eligible for graduation in 2003. Tuvalu again met two graduation thresholds (GNI pc; human assets) in 2006, thereby pre-qualifying for graduation. The country exceeded the same two graduation thresholds (GNI pc, human assets) in 2009, but was not recommended for graduation on grounds of "extreme smallness" and "lack of productive activities", which were considered by the CDP as serious limitations to "the sustainability of the present level of income". In the context of the 2012 review of the list of LDCs, Tuvalu is found to have risen above two graduation thresholds for the fourth time (2003, 2006, 2009, 2012).

After 25 years of LDC status, Tuvalu's exemplification of the "island paradox" is at a historical peak, and the set of LDC criteria contributes to fuelling the paradoxical impression: socio-economic prosperity appears to prevail despite the continuation of acute handicaps and vulnerabilities. This raises the question of the sense of qualification for graduation, and most importantly, the question of structural progress. Are there grounds to consider that Tuvalu has demonstrated any such progress to the extent of being able to stably pursue development efforts with less external support?

The following facts and trends summarize the difficulties Tuvalu faces in achieving structural transformation.

(i) Developing the health and education infrastructure is very difficult in Tuvalu, not only because of the narrowness of the economic base, but also for environmental and geographical reasons, considering the dispersion of the islands, the smallness of land space, and the scarcity of freshwater resources.

(ii) The public infrastructure is principally concentrated on the capital island of Funafuti, where half of the nation resides. In its present state, it can hardly be expected to enhance productive capacities significantly anywhere in the country.

(iii) Existing institutional capacities mainly benefit Funafuti. This leaves a sizeable part of the nation throughout the islands almost totally remote from what could be considered an enabling environment for enterprise development.

(iv) The economic specialization of Tuvalu is bound to remain within the sphere of rental income based on assets that are not synonymous with productive capabilities (effortless benefits): large marine resources that can easily be rented out; a country's name that lends itself to an Internet domain name ("dot tv"); a unique fauna and flora justifying a rich philatelic production. Two specialization avenues for which natural assets would exist, yet not considered potential economic pillars are fish processing and international tourism, notably because of the exorbitant costs and technical difficulties overcoming the fresh water constraint would entail.

The key to understanding the graduation case of Tuvalu lies in the implications of the foregoing. Because a very large part of income flows is of non-productive origin, the fallacious progress recorded in the nation's income translates little (if at all) in welfare gains for individuals and families. Most extended households live on one small salary (often a family member in the public service) and/or sporadic remittance inflows. Given the smallness of the population (11,000, with a small growth rate), the seemingly enviable per capita income of the nation is in fact a limited monetary basis, barely sufficient to cover the high economic costs of smallness

and islandness for the government and households alike (e.g. government subsidies in health and education, energy consumption, etc.). The continuous fragility of all financial balances (at macro and micro levels) owing to the unpredictability of revenue sources allows little or no progress in the people's living standards. For the government, matching uncontrollable revenue sources with irreducible recurrent expenditure is permanently a thorny issue, as the IMF noted in 2011.

Tuvalu's acute dependence on revenue sources beyond domestic control (mainly "unrequited transfers") underscores the importance, for the country, of being able to count on the greatest possible extent of concessionary financing in support of national efforts to maintain living standards. UNCTAD considers this as amply justifying continuation of LDC status.

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Section 1 of this country profile briefly describes the history of Tuvalu's technical qualification for graduation from Least Developed Country (LDC) status. Sections 2, 3 and 4 examine the situation of the country with regard to the three criteria for identifying LDCs, namely, the low-income criterion, the human capital weakness criterion, and the economic vulnerability criterion.

1. Historical context

Tuvalu was admitted in the category of Least Developed Countries in 1986. The country met the graduation threshold related to the quality of life criterion in 1991, 1994 and 1997. It then met the graduation threshold relevant to the low-income criterion in 2000. In 2003, Tuvalu exceeded two graduation thresholds for the first time, at 154% and 104% of the graduation lines relevant to the low-income and human capital criteria, respectively. However, the Committee for Development Policy (CDP) recommended that Tuvalu "should not be considered" pre-eligible for graduation despite the country's performance above the two graduation lines. This prudent recommendation was motivated by three factors: (i) the possibility of an erroneous estimate of per capita income in the absence of gross national income estimates[1]; (ii) the possibility of a margin of error in the borderline score of the country under the Human Assets Index (at only 104% of the graduation threshold)[2]; and (iii) the notable fact that Tuvalu was one

[1] The 2003 report of the Committee implicitly regrets the absence, at that time, of gross national income (GNI) estimates for Tuvalu, by indicating that "only GDP per capita data are available" for the country. The CDP thereby implied that, had the two aggregates been available and had there been a significant difference between GDP and GNI (with a GNI well below the GDP), the possibility of having a GNI per capita below the graduation threshold, and therefore no technical pre-qualification for graduation, would have existed. Recent calculations of Tuvalu's GNI (available since Tuvalu became a member of the World Bank in 2010) have revealed that GNI is in fact greater than GDP, by 69% if one considers three-year averages for the 2008-2010 period. It is unclear why the Committee, in the next triennial review of the list in 2006, recalled its 2003 decision in a different tone, namely, by stating that there had been "uncertainty at that time [2003] regarding the quality of the data". See: (i) United Nations, Committee for Development Policy, Report on the fifth session (7-11 April 2003), Economic and Social Council, Official Records, 2003, Supplement No. 13, E/2003/33, p. 23; (ii) United Nations, Committee for Development Policy, Report on the eighth session (20-24 March 2006), Economic and Social Council, Official Records, 2006, Supplement No. 13, E/2006/33, p. 21.

[2] This risk of error, however, is not explicitly referred to in the 2003 report of the Committee.

of "the two most economically vulnerable countries" under the Economic Vulnerability Index[3].

The 2006 review of the list was the first occasion on which the CDP decided to consider Tuvalu pre-eligible for graduation, through the first valid observation of a performance above two graduation thresholds: the country was standing at 141% and 140% of the thresholds relevant to the low-income and human assets criteria, respectively. The Committee took the view ("it was established…") that Tuvalu, this time, met graduation criteria and ought to be considered "eligible for graduation"[4], which technically meant "pre-eligible for graduation" by virtue of the first-observation rule .

The question of Tuvalu's full eligibility for graduation then arose in 2009, when the performance above the same two graduation thresholds (GNI per capita; human assets) stood out more evidently. The country, at that point of time, was standing at 234% and 134% of the thresholds relevant to the low-income and human capital criteria, respectively. The CDP, in three paragraphs of its report (para. 24-26), made a number of important factual observations that brought it to refrain from recommending graduation. It described Tuvalu as "an extreme case of a small archipelagic island country", and underlined this "extreme smallness" further. The Committee's report, at the same time, rated Tuvalu's aid to GNI ratio as "exceptionally high", thereby recognizing an important aspect of the external dependence of the economy.

The report further emphasized the "volatility" of the revenue sources Tuvalu has been leaning on. It cited "remittances" from Tuvaluans working abroad, income from the Tuvalu Trust Fund, fishing licences, and the revenue derived from the "dot tv" leasing arrangements. The "high income" (implicitly "high income per capita") which this situation of volatility has allowed was underlined, although the Committee did not indicate what precise threshold underpinned its impression that Tuvalu's income could

[3] By taking this fact --in addition to the borderline HAI score-- into consideration, the CDP demonstrated its inclination to pay attention to exceptional circumstances such as borderline scores or extreme scores, and to allow such factors to prevail over mere technical observations in the decision-making process.

[4] United Nations, Committee for Development Policy, Report on the eighth session (20-24 March 2006), Economic and Social Council, Official Records, 2006, Supplement No. 13, E/2006/33, p. 22. The Committee accordingly "recommended that information be collected on the situation of [Kiribati, Tuvalu and Vanuatu] before the next triennial review in order to allow a fully informed in-depth assessment".

be regarded as "high". The report emphasized the "negligible primary income generated by productive domestic economic sectors", a statement subsequently summarized through the Committee's recognition of Tuvalu's "lack of productive activities". These factual observations brought the Committee to "question the sustainability of the present level of income", and to decide "not [to] recommend Tuvalu for graduation at the present review"[5].

2. The situation of Tuvalu with regard to the low-income criterion

Graph 1 depicts the evolution of Tuvalu's distance to the graduation threshold relevant to the low-income criterion (which is based on a single indicator, namely, GNI per capita) through the eight historical reviews of the list of LDCs (1991, 1994, 1997, 2000, 2003, 2006, 2009, 2012). All data in the graph have been standardized into an index under which the graduation threshold stands at 100, so that a performance above or below the graduation threshold can be read in percentage terms at any point of history[6]. At the same time, each graph shows a line representing the threshold for adding a country to the list ("admission threshold"). The distance between the admission threshold and the graduation threshold represents the methodological margin between these two borders.

With a performance at 419% of the graduation line in 2012, Tuvalu recreates the impression of prosperity that had already prevailed in 2009. The three-year average that had been used in 2009 for the GNI per capita was $2,544. The counterpart estimate in 2012 is $4,993 (2008-2010 average).

2.1 *GNI vs. GDP*

It is noteworthy that Tuvalu's GNI per capita is well above its GDP per capita, by an estimated 69% in 2008-2010. The World Bank's three-year average estimate of Tuvalu's GDP per capita for the same period is $2,961.

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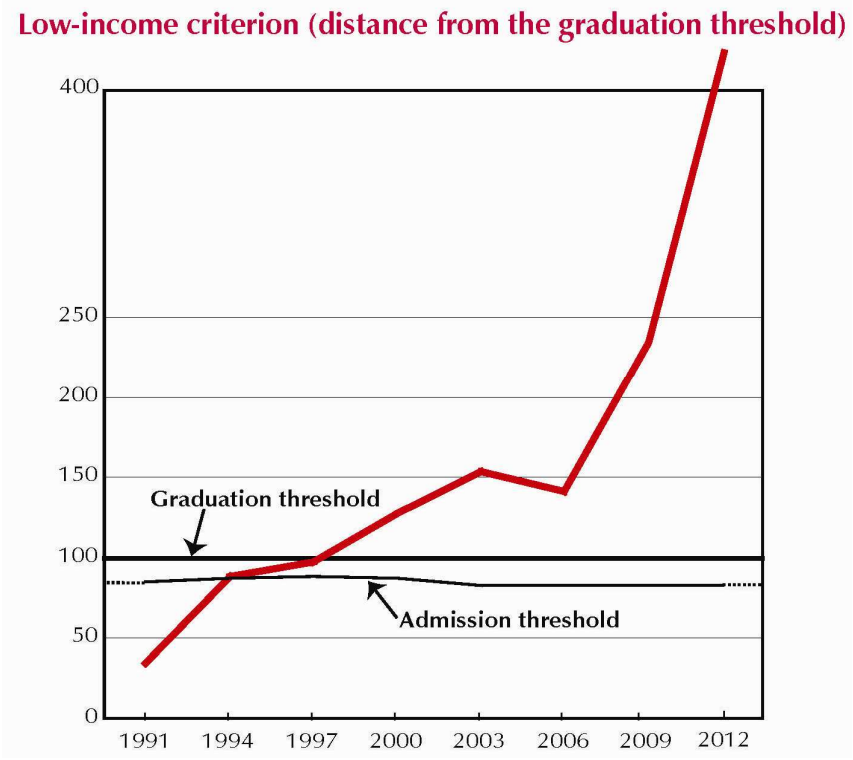
[5] United Nations, Committee for Development Policy, Report on the eleventh session (9-13 March 2009), Economic and Social Council, Official Records, 2009, Supplement No. 13, E/2009/33, p. 24.

In the latest three years for which relevant data are available, GNI was greater than GDP in the following proportions, mainly as a result of remittances from seamen working abroad:

2008: by 62% according to the World Bank; by 61% according to the IMF
2009: by 99% according to the World Bank; by 57% according to the IMF
2010: by 49% according to the World Bank; by 45% according to the IMF.

Seafarers' remittance inflows in 2009 were estimated by the IMF at US $1.7 million, or 6.4% of GDP (a sharp decline from about 10% of GDP in previous years).

Graph 1



[6] The changes that were brought to the methodology over time (EVI replacing EDI in 2000; GNI per capita replacing GDP per capita and HAI replacing APQLI in 2003) do not affect the way the graphs should be read.

2.2 The *income distribution status*

The Millennium Development Goals (MDG) Progress Report 2010-2011 for Tuvalu (May 2011) reports a nation-wide Gini coefficient of 0.34, with little disparity between the capital island Funafuti (where half the population lives) and the other islands. The report also recalls that the Gini coefficient had been estimated at 0.43 in 1994. This indicates that income inequality was lower in 2010 than it had been 15 years earlier. The Asian Development Bank, in 1994, commented upon income distribution in Tuvalu as follows: "Tuvalu society and customs ensure that all are looked after and that income and wealth are distributed reasonably equitably". The 2011 MDG Report notes that substantial progress toward more equitable income distribution took place over a decade, to a coefficient of 0.24 in 2004 (all estimates based on household and consumption surveys).

The rise from 0.24 to 0.34 in the Gini coefficient (greater inequality) between 2004 and 2010 was a consequence of the global economic crisis (notably between 2008 and 2010), during which the number of Tuvaluan seamen working abroad and bringing or sending remittances to Tuvalu decreased. This loss in remittances darkened the income distribution landscape of Tuvalu as it deprived of sporadic income many Tuvaluan families that could not count on a steady income pattern. The MDG Report indicates that the share of expenditure by households in the lowest expenditure quintile (where many remittance recipients are found) fell from 10.2% of the total household expenditure in 2004 to 8.1% in 2010. The unpredictable nature of household income such as remittances, in the absence of productive capacities, tends to be a factor of growing inequality among Tuvaluans. The latter will increasingly count on the cushioning mechanisms of solidarity.

3. <u>The situation of Tuvalu with regard to the human capital weakness criterion</u>

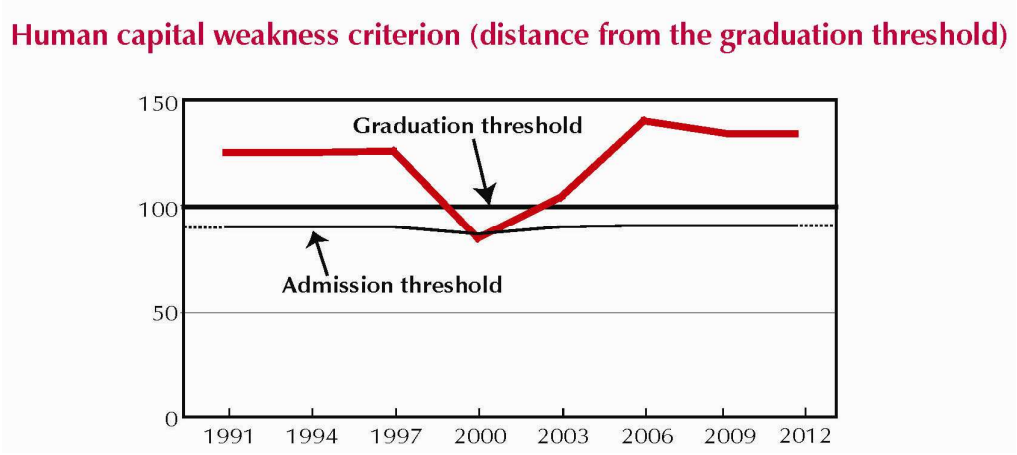
The population of Tuvalu was estimated at 11,100 in 2011. Its annual growth rate has been between 0.2% and 0.4% since 2006. The human capital weakness criterion is based on the composite Human Assets Index (HAI). Tuvalu's performance above the graduation threshold relevant to this criterion has been steady since the 2006 review of the list, as can be seen in Graph 2:

2006: 140.2% of the threshold

2009: 133.9% of the threshold

2012: 133.5% of the threshold.

Graph 2



3.1 *Percentage of population undernourished (component of the HAI)*

The CDP, in 2009, estimated this indicator at 10% (2003-2005 data). The counterpart estimate in 2012 (2006-2008 data) is unchanged (10%).

The MDG Progress Report 2010-2011 provides data on the proportion of the population below the minimum level of dietary energy consumption: all relevant estimates, for rural or urban areas as well as nationally, are below 4%. While the percentage of underweight children was reported to be well under 2% in 2007, obesity was estimated to affect 3.9% of children in the same year. Chronic diseases related to Tuvalu's increasing reliance on imported food are now a major burden on the national health budget, notably because patients in need of dialysis cannot be treated in Tuvalu.

3.2 *Child (under 5) mortality rate (component of the HAI)*

The CDP, in 2009, estimated this indicator at 38 per 1,000 (2000-2005). The counterpart estimate in 2012 (2005-2010 data) is 35.5 per 1,000.

Ministry of Health sources indicate (and the MDG Progress Report 2010-2011 confirms) a child mortality rate of 15.2 deaths per 1,000 live births in 2007, and 24.6 per 1,000 in 2009 (from 58.1 per 1,000 in 1995). In 2009, the infant mortality rate was significantly lower than the child mortality rate (14.8 per 1,000 instead of 24.6 per 1,000), a difference that reflects the positive impact of Tuvalu's immunization policy (measles and other vaccine-preventable diseases).

3.3 *Secondary school enrolment rate (component of the HAI)*

The CDP, in 2009, estimated this indicator at 84.4% (2004-2007). The counterpart estimate in 2012 (2006-2011 data) is unchanged (84.4%).

There are only two secondary schools in Tuvalu: the government school (Motufoua Secondary School), and the church-affiliated school, both located on Funafuti. The Ministry of Education, in 2008, had indicated a gross secondary school enrolment rate of 69% for the year 2006, an unprecedentedly high performance that was explained by two factors: (i) the re-opening in 2003 of the church-affiliated secondary school, which allowed more enrolment; and (ii) the frequency of repeat students' enrolment in both secondary schools. For the more recent years, the Ministry has provided enrolment figures based on Motufoua Secondary School only, but not responded to UNCTAD's request for enrolment figures from the other high school. In proportion to the known total secondary school-age population of Tuvalu, the gross enrolment ratio provisionally reported by the Ministry (66.6% for 2009, 59.5% for 2010, 60% for 2011) cannot be considered an overall secondary school enrolment ratio for Tuvalu, as it fails to reflect the total secondary school enrolment in the country. The 2010-2011 MDG Progress Report indicates a 98% net primary school enrolment ratio, but remains silent on the secondary school enrolment performance.

3.4 *Adult literacy rate (component of the HAI)*

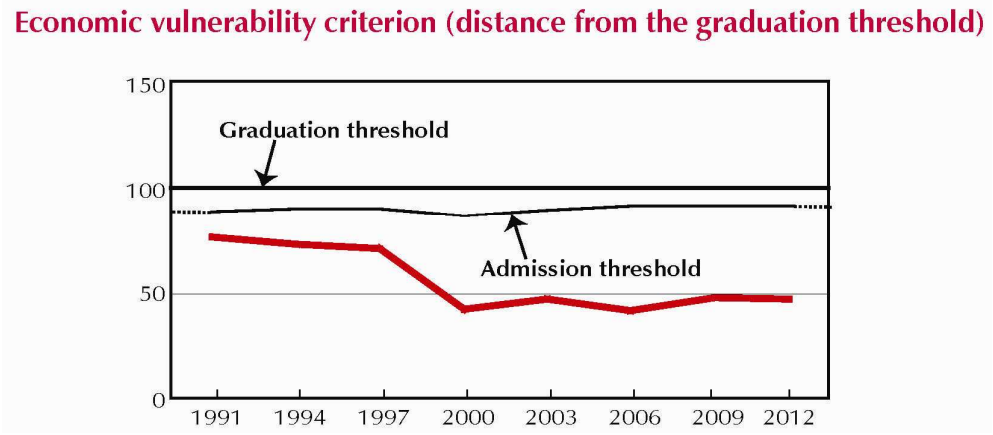
The CDP, in 2009, estimated this indicator at 95.0% (2000-2007). The counterpart estimate in 2012 (2005-2010 data) is unchanged (95.0%).

Ministry of Education officials, in 2011, indicated an adult (age 15-49) literacy rate of 94.9% in 2007, the latest year for which relevant data are known. The rate quoted by the 2010-2011 MDG Progress Report for a narrower cohort (adults of age 15-24) in the same year 2007 brings the country nearer to the 100% MDG target for 2015: 98.6%. Relevant officials yet expressed doubts about such high scores, which are based on answers to simple questions at the time of the population census ("how many years of primary school did you attend?"). Interpreting "eight years of primary school" as meaning literacy would be erroneous, according to census organizers and education officials.

4. The situation of Tuvalu with regard to the economic vulnerability criterion

The economic vulnerability criterion is based on the composite Economic Vulnerability Index (EVI). Graph 3 indicates a long-lasting performance well below the relevant graduation threshold, at only 49.9% of the graduation line in 2012.

Graph 3



4.1 *Exposure to natural shocks*

Tuvalu's high exposure to a variety of natural hazards has been amply recognized by the United Nations. The National Biodiversity Strategy and Action Plan 2010-2015 (May 2010) lists the following 7 **climate-related hazards** as describing the context of high environmental vulnerability Tuvalu is faced with (see Table 1). For Tuvaluans,

"*…when the sea, a fundamental source of security and comfort, is transformed by climate change into a source of threat and fear, the feeling of vulnerability is indescribable*" (Richard Marles, The Punch, 12 October 2011).

Table 1
Tuvalu: seven climate-related hazards

Hazards	**Description**
Sea level rise	Sea level rise in coastal areas means that the sea is increasingly encroaching higher ground on already eroded and vulnerable coastlines. This increases the extent of coastal area subjected to erosion and flooding.
Salt water intrusion	Sea level rise and the porous nature of soils (atoll islands) create ideal conditions for inland intrusion of salt water and increasing salinity of groundwater lenses.
Inundation	Sea level rise pushes water onto the land surface, thereby causing upswelling in low-lying areas, i.e. in most parts of the islands. This results in high frequency of inundation at pulaka pits (pulaka is a root crop and an important source of carbohydrates for Tuvaluans; it is grown in pits dug into the limestone atoll, and fertilized by adding leaves from different plants; the cultivation of pulaka is threatened by inundation: the plant does not thrive in the salt water which seeps into the pits).
Drought	2011 has dramatically reinforced the fear of an increasing frequency of rainfall deficits associated with the El Niño/La Niña southern oscillation phenomenon, a quasi-periodic climate pattern occurring across the tropical Pacific Ocean roughly every five years. In Tuvalu, drought quickly leads to household water shortages and stress on ground water lenses, which affects all biomes depending on ground water resources. (See in main text: description of the severe drought episode of 2011)
Cyclones	Tuvalu is not spared by the risk of cyclones, which can severely destroy coastal areas, crops, vegetation and the vital infrastructure. Given the unique low-lying nature of the islands, cyclones lead to flooding, which increases breeding areas for vector-borne diseases in addition to inundation effects (see Table 2).
Rising sea surface temperature	Rise in sea surface temperatures has had (and will continue to have) coral bleaching effects. It decreases the productivity of near-shore coral reef ecosystems, thereby affecting communities.
Coastal erosion	Studies of land loss in Tuvalu have revealed that, while coastal erosion closely relates to sea level rise, it is also to a large extent human-induced. A 2005 research paper by Chunting Xue stated that "the land loss in Tuvalu is mainly caused by inappropriate human activities, including coastal engineering and aggregate mining, and partly caused by cyclones".

Source: adapted from: (i) Tuvalu National Biodiversity Strategy and Action Plan 2010-2015, Prepared for the Government of Tuvalu with the assistance of UNDP, May 2010, p. 59; and (ii) various academic studies.

Tuvalu endured 19 destructive **cyclones** in 30 years (see Table 2). The country is also considerably affected by the consequences of climate change, given the low level of the atoll islands.

An unprecedentedly severe **drought** episode brought the Government of Tuvalu to declare a state of emergency on 28th September 2011, after the nation had suffered a lack of adequate or sustained rainfall in more than 6 months. The rainfall shortage situation was exacerbated by the fact that the ground contamination resulting from sea level rise deprived Tuvaluans of drinkable groundwater. According to the Secretariat of the Pacific Community/Applied GeoScience Division, the Oct. 2010 to Sep. 2011 period was the second driest period in the 78 years during which Tuvalu has been keeping rainfall records. Scientists point to the *La Niña* weather pattern, a phenomenon which also caused deluges in Australia in late 2010 and early 2011. A *La Niña* event generally involves cooler than normal ocean temperature across much of the equatorial and central Pacific. It often, though not always follows an *El Niño* event, of which *La Niña* is more or less the reverse (*El Niño* refers to the phenomenon of unusually warm water forming across much of the tropical eastern and central Pacific). Tonga and Tuvalu are particularly exposed to the risk of drought during *La Niña*, and to the risk of cyclones during *El Niño*.

One estimates that the 2011 drought episode severely impacted half of the population of Tuvalu, essentially on the islands of Funafuti and Nukulaelae, where water rationing was imposed on the population at the peak of the crisis (40 litres a day for each family, a ration below international standards). One reported consequence of the drought on the outer islands was that taro crops were dying as a result of the lack of fresh water. The two operating desalination plants on Funafuti produce an estimated 48% of the minimum requirement for the 5,300 residents of the island, which largely rely on rain water catchments for drinking water. Development partners sent a large desalination plant and several small desalination units to Tuvalu in a coordinated emergency relief operation. This allowed the amount of clean water being produced for residents to be doubled.

Money and fuel had to be provided by donors, in October 2011, to keep the regular desalination plants going when the drought became acute. Desalination units

were in need of repair at the time of the severe drought 2011. This prompted the state of emergency late September 2011.

Table 2
The most destructive cyclones in Tuvalu since 1972

Events	Dates	Comments
Bebe	19-26 Oct. 1972 (life span: 7 days)	Severe damage was inflicted mainly on the most populated island, Funafuti. Cyclone killed 5 persons, made 800 residents homeless, destroyed thousands of coconut trees, wrecked 4 ships, damaged food crops, and caused extensive erosion. Most of the damage was caused by hurricane-force winds and an ocean surge that covered half of the island. Reconstruction costs exceeded US $1 million.
Raja	22 Dec. 1987 - 1st Jan. 1988 (life span: 10 days)	Extensive damage was incurred by crops, coastal installations and buildings as a result of strong gusty winds, severe wave action, and flooding of low areas.
Ofa	30 Jan. - 7 Feb. 1990 (life span: 8 days)	All nine atoll groups were severely affected, with most local thatched houses up-roofed and tumbled. One supermarket building collapsed as a result of heavy swells. Staff housing and a chapel on a government secondary school campus were up-roofed and collapsed. Emergency food aid and other humanitarian relief assistance were received from donors and the Red Cross. About 60 households and more that 500 people were affected. Reconstruction costs exceeded US $1 million.
Joni	6-13 Dec. 1992 (life span: 7 days)	Considerable damage was inflicted on local housing and local crops, and coastal erosion intensified.
Nina & Kina	23 Dec. 1993 - 5 Jan. 1994 (overall life span: 12 days)	Considerable damage was suffered by buildings and crops. The newly built wharf on Vaitupu island collapsed under heavy swells, and severe coastal flooding and erosion took place. Widespread damage was also incurred by local crop plantations on several outer islands.
Gavin & Hina	2-12, then 12-17 March 1997 (overall life span: 15 days)	Serious damage was incurred by houses, vegetation and public buildings, and coastal erosion intensified considerably. Large numbers of houses and outdoor kitchen areas were blown down or partly blown. Most pit crops were flooded with sea water. Two primary school classrooms were damaged. A classroom and a dormitory on Vaitupu island (government property) were also severely damaged. Reconstruction costs estimated at more than US $2 million.
Keli	10-15 June 1997 (life span: 5 days)	Most households, gardens and low-lying coastal areas were severely affected. Emergency food aid and other humanitarian relief assistance were received from donors. Reconstruction costs exceeded US $60,000.

Events	Dates	Comments
Ami	11-15 Jan. 2003 (life span: 5 days)	Southern atolls, mainly Niulakita island, were affected. Cyclone devastated the main food crops (breadfruit, banana, pawpaw, potato). A primary school was torn apart by high winds, and coastal erosion intensified heavily. All communications to Niulakita were cut off, and islanders were left stranded throughout the event.
Heta	1-9 Jan. 2004 (life span: 8 days)	Local thatched houses were up-roofed by high winds, and many crops were severely affected, mostly on the outer islands. All shipping schedules were delayed because of very rough seas. As a result, many outer islands were stranded and deprived of weekly food supplies, frozen goods, fuels, etc.
Nancy & Olaf	9-17 Feb. 2005 (life span: 9 days)	The two cyclones and ensuing sea swells upset shipping schedules considerably. This affected secondary students in their first term at school in the only government secondary school on Vaitupu Island (outer island). Students studying in Fiji were stranded.
Percy	25 Feb. - 3 Mar. 2005 (life span: 7 days)	Government vessel MV Manu Folau had to sail to the northern island group with fresh provisions before Percy struck the country. The ship yet had to face gusty winds and very rough seas, and got almost capsized. All passengers found shelter on Nanumaga Island, where the vessel anchored until the warning was lifted.
Mick	13 - 15 Dec. 2009 (life span: 3 days)	Mick disrupted shipping schedules within Tuvalu, and shipping from overseas with fresh and frozen goods, fuels, and hardware materials for Christmas.
Nisha	26 - 31 Jan. 2010 (life span: 6 days)	Coastal areas and low-lying areas were severely affected as Nisha coincided with the "King Tides" (spring tides). There was heavy erosion, and piles of rubbles accumulated along the western coast of Funafuti.
Tomas	11 - 16 Mar. 2010 (life span: 6 days)	The southern group of islands was affected most. Tomas reached category 2 near Niulakita Island, and a gale warning was issued. Shipping schedules were delayed, and international flights to Tuvalu were cancelled.
Wilma & Yasi	23 - 30 Jan. 2011 (life span: 8 days)	The two cyclones delayed shipping schedules, thereby affecting students of the secondary school in Vaitupu. Students studying in Fiji had to travel by boat to Fiji. Outer islands ran out of fresh supplies due to rough seas.

Source: factual information provided by Mr. Tauala Katea in 2011

4.2 *Instability of agricultural production (component of the EVI)*

The CDP, in 2009, observed that Tuvalu had the highest level of agricultural production instability among small island developing States (SIDS) of the Pacific, and that this level was twice higher than the average level of Pacific SIDS other than Tuvalu for the 1990-2005 period. Yet crop production data provided by the World Bank for recent years show no instability, and relevant national statistics are not available. The difficulties Tuvaluans face in growing and producing food for household consumption largely relate to the main environmental constraints on the islands (e.g. impact of inundation on pulaka crops, described in Table 1). This explains the increasing dependence of families on imported food, and the unenviable evolution in dietary habits, which affect the health status of the nation.

Tuvalu's reportedly high agricultural production instability score does justice to the country in the sense that it rightly explains the economic vulnerability of the country, yet by inflating a minor --if at all measurable-- phenomenon. Tuvalu's problem in this regard is agricultural incapacity, not agricultural instability.

4.3 *Victims of natural disasters (component of the EVI)*

This new component of the EVI (an enriched version of the indicator of homelessness, with expanded reference to survivors' need for "food, water, shelter, sanitation or medical assistance") is pertinent to Tuvalu given its exposure to natural shocks as described in the previous section. The social fabric of Tuvalu is a natural response to food and water-related concerns, thereby rendering any measurement of such needs difficult. At the same time, the need for sanitation and medical assistance is likely to be more or less the same for all Tuvaluans (victims or not victims of natural disasters), making it difficult to estimate the share of the concerned population. In all, the question of shelter --bringing responses to homelessness-- stands out as the crux of the matter, probably the only measurable component of the victimization issue. The CDP, in 2009, had observed a level of homelessness higher in Tuvalu than in all other Pacific SIDS except Samoa. An estimated 5 to 6% of the population were rendered homeless during the 1990-2007 period.

4.4 *Instability of exports of goods and services (component of the EVI)*

The CDP observed, in 2009, a level of export instability 70% higher in Tuvalu than in other Pacific SIDS. Grounds for considering Tuvalu's export economy as unstable could only be found in the extreme smallness of the export base, while the evolution would appear remarkably stable if compared with the export receipts of any larger country. Between 2006 and 2010, total exports of goods and services fluctuated between 2.9 and 4.1 million Australian dollars (with service exports weighing 4.8 times more than merchandise exports on average during that period). These economically small values involve a margin of fluctuation of more than 40%, which can be considered an indication of economic instability.

4.5 *Primary activities as a percentage of GDP (component of the EVI)*

The CDP, in 2009, estimated at 15.2% the share of agriculture and fisheries in GDP (based on 2007 data). In the absence of updated national accounts, IMF, in 2011, estimated the share of agriculture in the domestic value added (GDP) to have fluctuated between 21.2% and 22.4%. It is unclear whether "agriculture", in these IMF estimates, is synonymous with primary activities as a whole, encompassing fisheries inter alia. One is tempted to make this assumption, given the smallness of Tuvalu's agricultural sector.

With its extreme smallness and geographical remoteness, and given the environment-related constraints it faces, Tuvalu's economy cannot significantly specialize outside the sphere of rental income (mainly fishing licenses and "dot tv" revenue). The idea of atoll tourism development (Maldives type) is in theory applicable to Tuvalu, but has been too costly to attract foreign investors.

4.6 *Merchandise export concentration (component of the EVI)*

The CDP, in 2009, observed a merchandise export concentration 17% greater in Tuvalu than in other Pacific SIDS. In the absence of any physical export from Tuvalu other than small quantities of bêche-de-mer (reported in 2008, not confirmed in 2011), one may disregard this component of the EVI.

4.7 *Economic size and distance from main markets (components of the EVI)*

These two components of the Economic Vulnerability Index are referred to, in the 2011 report of the CDP, as a "size sub-index" and a "location sub-index", both considered as criteria of exposure to external shocks (four exposure criteria are used by the CDP, and merged into an "exposure index", one of the two essential arms of the EVI). Not surprisingly, Tuvalu's extreme demographic and economic smallness was a predominant factor of the economic vulnerability of the country as estimated in 2009. The economic remoteness of Tuvalu was also recognized in 2009, though Tuvalu's ranking under this index surprised the reader by appearing to be lower (demonstrating lesser remoteness) than the rankings of countries that, unlike Tuvalu, benefit from geographical proximity to at least one large economy[7]. In Tuvalu, remoteness affects each atoll in relation to the rest of the country, and the national economy as a whole in the absence of progress in international air transport links.

4.8 *Share of population living in low-lying areas (new component of the EVI)*

This new component of the Economic Vulnerability Index is explained in paragraph 55 of the 2011 report of the CDP, and graphically represented in paragraph 59 as an "environment sub-index". It is regarded as a criterion of exposure to external shocks, alongside size, location, and economic structure. The two hypothetical elevation thresholds of 3 metres and 10 metres referred to in paragraph 55 rank Tuvalu (as it would for essentially all atoll countries or territories) at peak levels of the relevant index. While 100% of the population of Tuvalu resides at levels of elevation below 10 metres, over 90% of households are found in inhabited areas at levels not exceeding 3 metres. Most of these areas are not "low elevated coastal zones", but more or less uniformly low-lying dwelling zones, behind beaches or coast lines, at levels of altitude barely higher than coast elevation levels[8].

[7] Main examples are: Malawi, Paraguay, Swaziland, Uganda, Uruguay, Zimbabwe.

[8] The following sentence is found in paragraph 55 of the 2011 report of the CDP: "Low elevated coastal zones are defined as areas contiguous to the coast below a certain elevation threshold". The words "contiguous to the coast", meaning "next to" the coast, exclude coastal areas (where essentially nobody dwells --in the sedentary sense), thereby confirming the pertinence of the indicator for Tuvalu. The Committee meant the share of population in low-lying areas, not in low coastal zones.