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El Niño 2014 in the Pacific: Once Burned Twice Shy?

Summary

Societies climate-disaster risk coping capacity and mechanism will be tested once more. A potential major El Niño threat continues to develop in the Pacific (See Fig 1). Following the worst El Niño impacts ever recorded worldwide in 1997-98, questions were raised about what might have been done differently if an accurate forecast had been available several months in advance of the onset of the March 1997 El Niño.

The 2014 El Niño risk and its likely impacts will serve as an important test to shocks in different countries. In many countries vulnerability has increased due to more exposed population as well as more land degradation. The question today is what society is going to do, and to what extent they need to be prepared? Will society respond wisely and incrementally?

The information collected from the selected Pacific countries is neither complete nor comprehensive due to availability of timely information. Nonetheless, drawing on examples from Fiji, Tonga, Cook Islands, FSM, Solomon Islands and Samoa provide useful insights to the current and evolving level of preparedness at different levels and key sectors (e.g water). Unfortunately, there was no feedback from the agriculture focal points in the respective countries.

Findings

The technical climate early warning system has advanced since the last major El Niño. In the Pacific region, National Meteorological Services are becoming aware of the probable development of an El Niño and are monitoring the situation very closely. El Niño risk and the likely impacts have been communicated to the National Disaster Management Organisations (DMOs) and to the wider public through different communication channels. Other improved coping capacities reported include:

- Improved climate information (seasonal tropical cyclone and rainfall/drought prediction);
- Improved link between warning centres, NDMOs and other stakeholders/public;
- Improved public education on El Niño and its impacts;

The key weakness identified is that early advisory/warning information has apparently not yet reached all the relevant sectors and actors (last mile) in the respective Pacific countries. It is also clear that the news is continuing to spread. Despite timely information on the developing El Niño, it is unclear how this will be translated into decision making and concrete actions at the local level in order to reduce the likely impacts. Regular climate information updates may increase the likelihood of countries taking more concrete actions.

This is particularly the case in Samoa, as thousands of people are expected from 1-4th September 2014 for the 3rd SIDS International Conference during the likely peak of the El Niño. A key challenge is to understand the time lag relationship between climate anomaly

and actual impacts in order to be prepared, however actions and steps should never be left to the last minute in order to address the likely knock-on and cascading impacts of El Niño.

Prevailing El Niño Risk and Rainfall Anomaly

According to the National Aeronautics and Space Administration (NASA), El Niño signatures in May resembled the early conditions of the major El Niño of 1997 which was characterized by extreme weather impacts on several continents globally. Scientists at the Climate Prediction Center of the National Weather Service (NWS) announced on May 8 that they foresee a 65 % chance of a transition to El Niño in the summer of 2014. However, climate scientists remain uncertain about when El Niño will develop and how strong it may become. In terms of the El Niño Alert System, the National Ocean Atmospheric Administration NOAA Climate Prediction Center went on El Niño watch in early June. They predict that the chance of El Niño will increase during the remainder of the year to more than 65 % by summer (October-February) (see Fig 2).

The U.K Global Long Range Forecast (not shown) suggest 40-80 % below normal rainfall for the period between August to October in the southwest Pacific in the vicinity of Fiji and Samoa. On a daily time scale, the Climate Prediction Center (CPC) shows a zone of significantly reduced rainfall in the southwest Pacific extending to the east Indian Ocean near the Seychelles ranging up to 10 mm per day (Fig 3). However, higher resolution and updated rainfall forecast from the national countries should provide a clearer picture of El Niño local effects.

While the scientific debate intensifies and monitoring continues globally, we examine how some Pacific Island countries are anticipating and preparing for the potential 2014 *El Niño*.

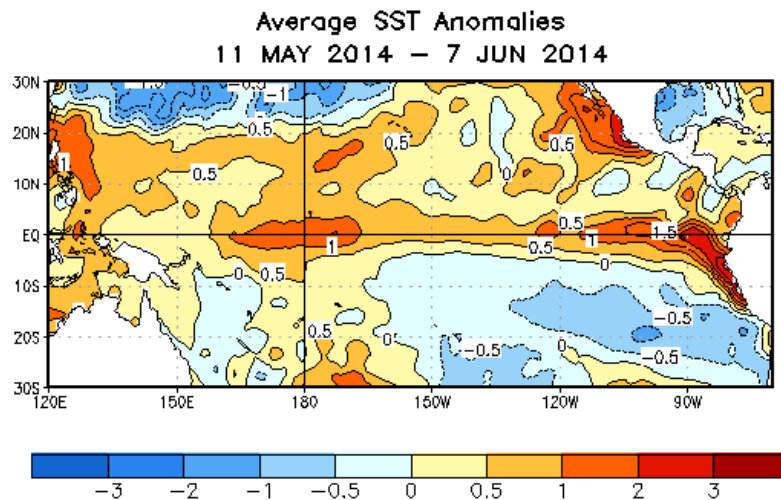


Fig 1: Average Sea Surface Temperature anomalies in the Pacific. Source: IRI/CPC 2014

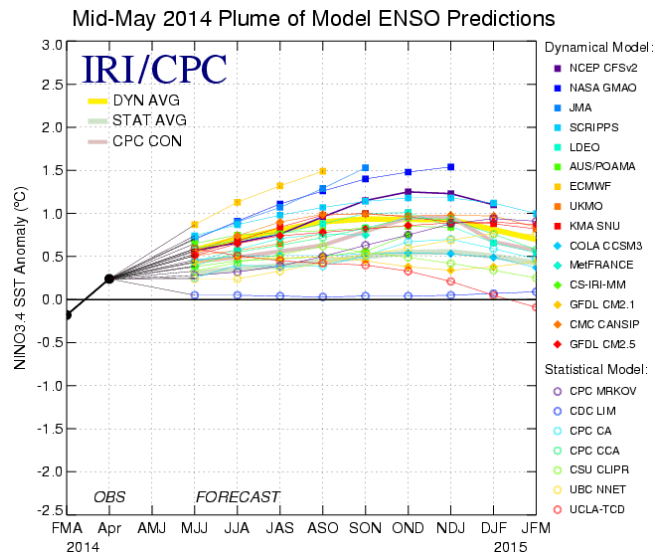


Fig 2: Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Fig updated 13 May 2014. Source: IRI/CPC 2014

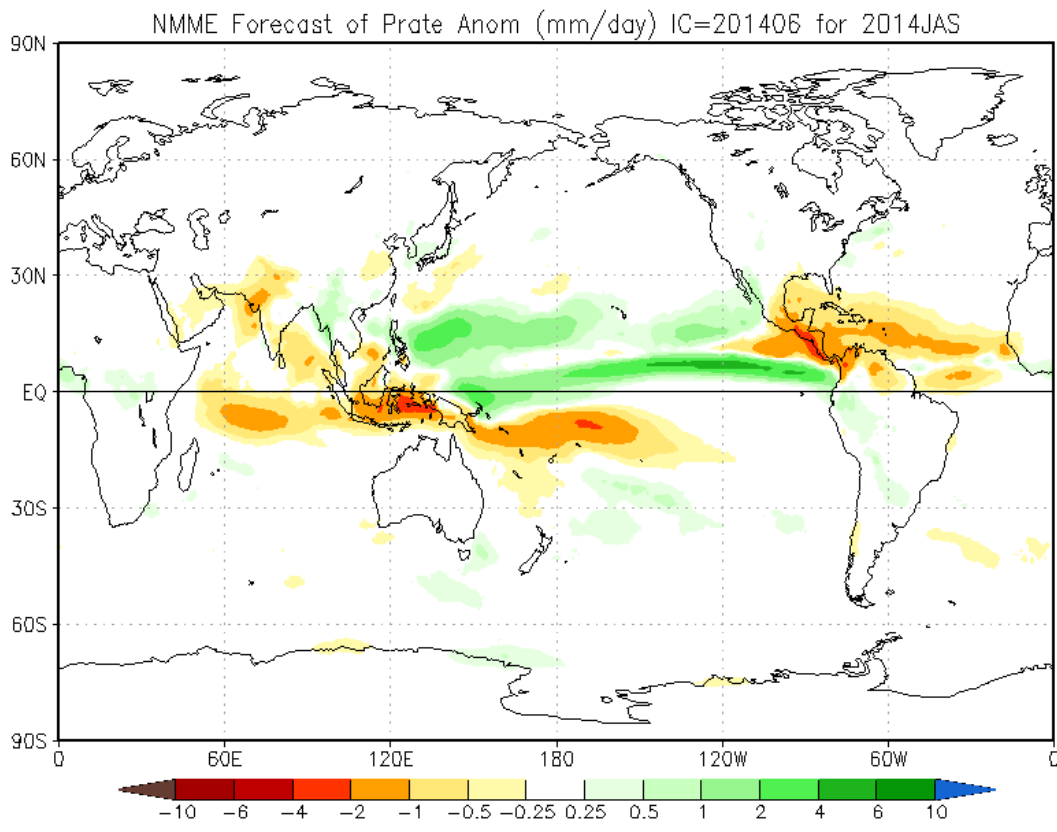


Fig 3: Forecast of daily precipitation rate anomaly for the period July/August/September 2014. Source CPR 2014

Earlier El Niño and Impacts in the Pacific

So what is El Niño and how has it impacted the Pacific in the past? The original definition of El Niño can be traced back to the eighteenth or nineteenth century when Peruvian sailors used the term to describe a warm southward current that appeared annually near Christmas off the Peruvian coast. Currently, the term El Niño is understood as the condition

whereby a warming of the tropical Pacific surface waters occur every two to seven years and associated with changes in the atmospheric circulation in the tropical Pacific and worldwide.

Extreme climate patterns govern weather across the Pacific Ocean resulting in fluctuating droughts and floods globally. El Niño is associated with shifts in global rainfall and tropical cyclone activity. Usually El Niño is characterised with a shift in the cyclone activity to the east near Tahiti. According to the Secretariat of the South Pacific Community (SPC), each El Niño event has resulted in water shortages and drought in American Samoa, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Papua New Guinea, Samoa and Tonga. Drought often threatens food security in the Pacific islands. Most Pacific island countries depend on the agricultural sector for food, income and employment. The agricultural sector is very susceptible and vulnerable to adverse climate fluctuations. The 1997-98 El Niño is recognized as one of the most damaging ever in Fiji and one of the worst disasters ever to hit the nation having severe socioeconomic impacts.



Fig 4: Stream south of Upolu, Samoa: Source: UNESCO 2013

El Niño Observation and Prediction

Understanding of climate variability including El Niño has advanced tremendously since the 1990's. There is a dedicated observing system (TAO-Tropical Atmosphere Ocean project) in place consisting of moored buoys, drifting buoys, ship observations and space based (satellites) observations especially designed to collect important data and monitor key climate signals including El Niño. Dedicated and advanced scientific centres (e.g. NOAA-National Ocean Atmospheric Administration-Climate Prediction Center, Australia Bureau of Meteorology) monitor and predict extreme climate related events as part of the climate early warning services. Scientists are now taking our understanding of El Niño a step further by incorporating the descriptions of these events into numerical prediction models. Climate models produced indicate how the atmosphere-ocean system might evolve over the next few seasons or years as suggested by NASA and NOAA. The results to date, though by no means perfect, give a better indication of the climatic conditions that will prevail during the next one or two seasons.

Anticipation and Preparations

Fiji

The Fiji Meteorological Service (FMS) is aware of and has been continuously monitoring the development of El Niño in the Pacific in 2014. FMS collaborates with the World Meteorological Organisation (WMO), the National Institute of Water and Atmospheric Research (NIWA) and the Bureau of Meteorology (BOM) on quarterly climate updates; El Niño Southern Oscillation (ENSO) remains at the forefront of the climate information updates. FMS conducts own independent analysis using local indicators of rainfall, river flows and other relevant indicators and verifies this with global climate models.

FMS provides regular climate information updates every second month to the National Disaster Management Office. The Director of Meteorology Mr. Waqacelua said that *“In April we have communicated the possibility of El Niño development to the highest level of decision making, the cabinet, through a Cabinet Information Paper. The wider public was informed in April, and May through media release including print, radio, and national TVs”*. FMS also provides information on a quarterly basis to the Fiji Sugar Industry and every month to the Renewable Energy Sector. The Director of FMS clearly pointed out that *“currently we do not have any established warning system in place for ENSO. The information is sent out as an advice”*.

Key improvements at FMS since the last major El Niño in 1997-98 include monthly climate updates, improved tropical cyclone best track data, improved rainfall monitoring, improved seasonal rainfall prediction and a better understanding of rainfall anomalies associated with El Niño events in Fiji and the region.

Tonga

The National Emergency Management Office (NEMO) of Tonga was informed about the El Niño via several sources including the recent Pacific Platform for Disaster Risk Management meeting held between 02-04 June in Suva, Fiji and the local Meteorological Services. The NEMO Director Mr Leveni Aho commented that until 11th June they were not aware of wider public information on the El Niño. Prior to that *“there were water conservation notices immediately after tropical cyclone Ian, but nothing now”*.

At the time of the survey, the Water Sector in Tonga does not appear to have been informed about the El Niño yet. Usually the Meteorological Services share this information to the public several months before the event. Any forecasted drought period is normally announced by the water sector and the ministry of Health.

Cook Islands

The National Meteorological office in Cook Island has recently been made aware of the likely chance of an El Niño event developing this year. As a result of this on 10th July, a media release was communicated to the Disaster Management authority and wider public via media, newspaper and TV. Mr Arona Ngari, the Director of the Cook Islands Meteorological Office at Nikao, Rarotonga explained that *“in the Cook Islands El Niño is often, but not always, associated with below normal rainfall for the Southern Cook Islands and above normal rainfall for the Northern Cook Islands*. Key improvements in the NMS to deal with El Niño's and their impact on the country have focused on increasing public awareness and increasing coordination between the National Meteorological Services, the Disaster Management Organization and other public and non-public agencies.

FSM

No information has yet been obtained from the National Meteorological Services in FSM. Nonetheless, a water focal point in FSM sector said that *“It is not clear if the office of Emergency Management has informed the water sector yet. There may have been some communications on the issue, but perhaps I'm not aware of...I have not seen or heard of any information informing the general public of the coming El Niño development. The only information that everyone sees is the news coming out of the CNN. I may be wrong but this is how I see it. I am also not aware of any concrete actions”*. As for infrastructure developments to deal with extreme weather related events it was stated that they are currently upgrading and improving some small community water projects throughout the municipality and preparing to install pumps in some existing wells.

Phillip Joseph, Assistant Secretary for Infrastructure, Department of Transportation, Communication and Infrastructure from FSM said *“I was informed by a co-worker who heard about the El Niño over the radio. The announcement was like an alert to the general public. The announcement was to advise people of a possible drought that will take about 3-4 months. People are starting to construct and fill up their water storage tanks and digging for ground water”*.

Solomon Islands

Solomon Island Meteorological Services reports that they are aware of the chance of the coming El Niño. A press release was done in the media and a copy was also communicated to the National Disaster Management Organization (NDMO). The Meteorological Services is also considering putting an advertisement in all the local papers to advise the population of the upcoming El Niño and the likely impacts. The key improvement includes the strengthening of link between the Meteorological Services and the NDMO.

Samoa

In Samoa, on the 9th May, the Climate Early Warning System Section (CLEWS) of the Meteorological Division informed the public through print and press media about the likelihood of an El Niño developing in 2014. However, the Samoan National Meteorological Division pointed out that *“it is too early to determine the severity of the predicted El Niño event”*. The media reported it as a “warning for the public”. The information relating to the *El Niño* targeted industries, government ministries and emergency managers. In anticipation of the likelihood that El Niño continues to further strengthen in the coming months, the Water, Agriculture, Health, Energy (Hydropower), Tourism (Accommodation Facilities), Marine Ecosystems and Forestry sectors have been advised about the likely impacts.

The Meteorological Division reported in Samoa Observer that in 1997-98; a “full fledged El Niño” led to a 7-month drought and adversely impacted water supplies and farming. There were massive forest fires in the north-western region of Savaii, Asau and Aopo, that burned continuously for weeks. As authorities update climate forecast and decisions, one of the key questions is how to ensure proper supply of water for the wider public; as well as the thousands of delegates attending the 3rd SIDS conference, in particular at the hotels conference venues.

Climate predictions suggest that El Niño warming will likely peak around September 2014, around the time of the 3rd SIDS International Conference in Samoa. The Government of Samoa will have to plan to manage water supplies for both the general public and the thousands of delegates attending at a time of expected drought.

To conclude, all climate predictions suggest different trends of anomalous warming in the Pacific. Societies climate-disaster risk governance and coping capacities will be tested regardless of whether *El Niño* is major, minor or a non-event in 2014. Information about the developing *El Niño* is gradually reaching all countries and levels. However, it is still considered “too early” and it is uncertain how early information will be translated into decision making and concrete actions at the local level in order to reduce the likely impacts. Regular climate information updates and understanding the lag relationship between *El Niño* and actual rainfall anomaly will perhaps increase the confidence of Governments and other agencies to plan for more concrete actions.

About UNESCO

UNESCO Apia Office for the Pacific States particularly its science programme supports sixteen independent countries and one territory in the Pacific in reducing their vulnerability to natural hazards and strengthening their capacity to cope with disasters.

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