Will a Major El Niño Event Disrupt Village Food Production in Papua New Guinea in 2015?

BRYANT ALLEN

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The Australian Bureau of Meteorology has predicted an El Niño event in the Pacific Ocean later in 2015. Large El Niño events have previously caused severe disruptions to village food production in Papua New Guinea (PNG), resulting in widespread hardship and hunger. This In Brief considers the possible impacts of a 2015–16 El Niño and suggests what can be done to address them.

Despite greatly improved monitoring of the Pacific Ocean, 'once an event is underway forecasting its duration and intensity are at best difficult' (US Drought Mitigation Center). Nevertheless, the US Climate Prediction Center says 'there is a greater than 90 per cent chance that El Niño will continue through Northern Hemisphere winter 2015–16 and around an 80 per cent chance it will last into early spring 2016' (9/7/2015).

If an El Niño event occurs in 2015, there is no sure way of predicting the severity of drought, frosts, and food shortages in PNG. A 'warning' index created from an analysis of PNG rainfall data from 1890 to 2010 successfully predicted only 57 per cent of subsequent droughts (Cobon et al. 2015). Even with these uncertainties, it is advisable to prepare for the likely impacts of an El Niño event in PNG.

How Does El Niño Affect Papua New Guinea Food Production?

Around 80 per cent of food consumed in PNG is grown there. A strong El Niño event reduces rainfall significantly in normally wet areas for some months and prolongs dry seasons. This is because PNG's characteristically high rainfall is the outcome of low air pressure; upward movement of air in what is know as the Walker circulation; onshore winds crossing warm seas and picking up large amounts of moisture; and high mountain ranges forcing the warm, moist air up in altitude, where it cools and the moisture condenses and falls as rain. During a strong El Niño event, the western Pacific cools and the Walker circulation reverses, so that cool, dry, high-altitude air descends over PNG. The result is less-than-average rainfall for some months and significantly less cloud cover. At altitudes above 2200 metres, the lack of cloud cover at night allows temperatures to fall to below zero and frosts to occur. Food production can be severely reduced as a result.

Historical records reveal some of the impacts of El Niño. There were 11 droughts associated with El Niño events in PNG between 1896 and 1997, but severe disruptions to food and water were reported only in 1902, 1914, 1941, and 1997. In 1972, the Australian colonial administration, in ignorance of how high-altitude residents move to lower valleys in response to repeated frosts, decreed people should not move, and the Australian Defence Force (ADF) delivered food by helicopters. Following 1972, stories of a more severe highlands food shortage in 1941 began to be heard. A post-1972 examination of newspapers and administration reports found a probably even more severe event occurred in 1914 (Allen et al. 1989). But the pre-1972 documentary evidence was fragmentary and excluded the highlands, where there was no colonial administration until after 1945.

The 1997 event was the most severe since 1914. At altitudes above 1700 metres, repeated frosts killed all sweet potato — the staple food. At lower altitudes, newly planted swidden gardens failed because of lack of rain, and streams used to make sago dried up. Taro growers were forced to remove plants from gardens and place them near large streams to maintain planting stock. Wildfires destroyed villages and killed people and pigs. Large areas of montane forest trees killed by fire in 1997 are still evident on highlands mountain ranges today. Forest fires disrupted long-fallow shifting cultivation systems between the Fly River and the Sepik River (D. Jorgensen pers. comm. 27/7/2015), where rainfall averages as much as 8000 millimetres per year. The Fly River became too shallow for

shipping, and Rouna hydro-power station was closed to preserve Port Moresby's water supply.

By December 1997, national surveys of food and water found that over 260,000 people were eating 'famine' foods such as wild yams, tree leaves, and banana roots. A further 980,000 were eating small amounts of poor-quality garden food. Rural people survived by employing a number of strategies: eating 'famine' food; purchasing imported food with cash raised by selling off pigs or from savings; moving to places where food was available; moving to towns to stay with relatives who had wage paying employment; and receiving rice, flour or cash from relatives in employment. Australia used ADF aircraft to reach 100,000 people without food, living in places only accessible by air.

In 1997, rainfall deficits were greatest furthest away from the equator, but the impacts of the food shortages on people were greatest in the poorest parts of the country. People with wage employment, with relatives in employment or with adequate savings, cared for themselves by purchasing imported food. The best evidence for this is rice import figures that show an increase of 66,000 tonnes in 1997. Of this additional rice, 76 per cent was sold through retail outlets. The balance was purchased by the Japanese, Australian and PNG governments and was delivered as relief food (Allen and Bourke 2001). Most people in PNG had the impression that Australia had rescued them from a catastrophe, though they had largely saved themselves (Allen and Bourke 2009).

What Can Be Done While We Wait to See What Happens?

The situation should be closely monitored. The signs of a developing food shortage are: a rise in sweet potato prices in highlands markets, an increase in retail rice sales and in imports, decreased flows in large rivers, press reports about rural food shortages, appeals for relief, and repeated frosts at higher altitude. These indications require: regular surveys of market prices, reporting of food import figures, and improved collection of meterological data. Members of parliament should be discouraged from misreporting the need for relief food, and government should establish a cross-departmental committee (including the PNG Defence Force) to prepare in advance of a crisis (Barter 2001). The Australian Government should initiate dialogue with the heads of appropriate PNG Government departments and the PNGDF to establish procedures to be followed should Australia be required to respond. Much can be learned from the experiences of 1997–98, both from published reports and from the individuals, of both countries, who were involved.

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Author Notes

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E ssgm@anu.edu.au @anussgm
ssgm.bellschool.anu.edu.au

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