

Climate and Coconut Plantation in Sri Lanka...

Coconut is grown in over 90 countries within the humid tropical regions. It is a perennial crop which has a prolonged reproductive phase of 44 months. Weather and climate affects all stages of the long development cycle extending to 44 months, thus there is possibility for prediction based on climate monitoring. Here we report on the climate impacts on coconut production and the prediction of crop production. The work included climate, climate variability and climate change diagnosis, crop climate impact analysis and assessment of climate on the coconut productivity. We collaborated with the Coconut Research Institute (CRI) and the Department of Meteorology supported by the SysTEM for Analysis, Research and Training (START) through the Sri Lanka Association for Advancement of Science (SLAAS).

Climate and Coconuts in Sri Lanka

Coconut cultivation sustains the livelihood of large numbers in the tropics and is the most important crop for food security after rice in Sri Lanka. Coconut is vulnerable in particular to drought and there is concern as to how coconut plantations can cope with climate variability and adapt to climate change. These issues were addressed by a team of scientists including meteorologists, agricultural economists, crop scientists and statisticians drawn from Sri Lanka's Department of Meteorology and Coconut Research Institute in collaboration with IRI Scientists from 2002-2005.



Left: A flowering bunch of coconuts at the research station of the Sri Lanka Coconut Research Institute and Right: Project Scientists observing the harvesting of coconuts



Coconut is distributed in the tropical regions with large plantations in Indonesia, Philippines, India and Sri Lanka



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Valuation of Climate Influences on Coconut Production in Sri Lanka

Coconut cultivation contributes 2% to Sri Lanka's GDP. Production and GDP values of coconut have fluctuated between US\$ 115 million in 1950; US\$ 177 million in 1986, and US\$ 139 million in 2002. We have assessed the economic value of climate variability employing a percentile analysis on an array of 31-years national annual coconut production data. This analysis shows that the foregone income from coconuts due to low rainfall varied between US\$ 32 - 73 million while the incremental income to the economy in crop glut extremes varied between US\$ 42 million and US\$ 87 million. Droughts led to annual economic losses estimated at US\$ 32 million to US\$ 73 million. In years of extreme crop surplus, the economy gains US\$ 42 - 87 million.



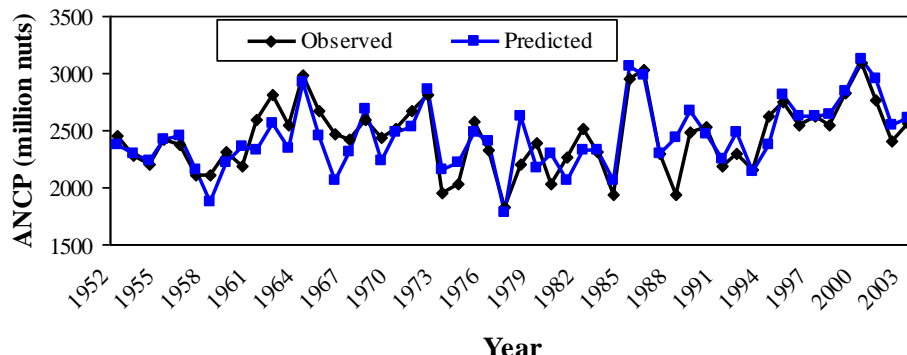
Impact of extreme climate events on coconut production.

Source: (Fernando, N, Zubair, L., Peiris, T.S.G., C.S. Ranasinghe and J. Ratnasiri, (2007)). US \$ = approximately Rs.105 on 20 December 2004

← Coconut Plantation in Sri Lanka

Production extreme	Year	Production (million nuts)	Change in Production (million nuts)	Foregone/incremental value (million US\$)
Shortage	1973	1948	484	32
	1977	1821	611	49
	1984	1942	490	73
	1988	1937	495	54
Glut	1985	2958	526	42
	1986	3039	607	46
	1999	2828	396	59
	2000	2096	664	87

Coconut Yield Prediction



The predicted and observed annual coconut production based on a model that accounts for technological change and seasonal climate (Peiris, Hansen and Zubair, 2006).

Further work

Further work is needed to improve predictions by season and region and to estimate the effectiveness and economic benefits that might be achieved through adaptation.

References

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Our work is oriented towards developing useable scientific information that can be applied in diverse sectors. We build capacity through education, training, and collaborations.

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