

## 5. Climate, Society and Adaptation

To enable societies to cope with climate variability and adapt to climate change, one needs to understand the societal context and suit interventions to it. The institutional structures, policy framework and political process all affect how well societies cope with climate. Our work in this direction has led us in three directions. We have investigated the history of science and technology in Sri Lanka and in particular the history of irrigation. We have also surveyed environmental issues in Sri Lanka particularly hazards and the Environmental Impact Assessment process. We have also paid careful attention to technology development and communication. We describe in detail the communication of climate predictions among international agencies, climate scientists, sectoral experts, mass-media and users. We have analyzed the reasons for the failure in communication of seasonal forecasts during the El Niño of 1997 and the relative success during the El Niño of 2002.

- 5.1. Science and Technology in Sri Lanka
  - Traditional Agriculture and Sustainability
- 5.2. Environmental Issues in Sri Lanka
  - Environmental Impact Assessment
- 5.3. Technology and Communication
  - ENSO and communication

### Projects Status Report

Activity	Objectives	Partners	Status	Next Steps
Environmental Impact Assessment	Assessment of EIA in Sri Lanka. Documentation of EIA studies	University of Peradeniya	Papers published in Institution of Engineers and EIA Review	
History of Technology Studies	Assessment of Context of environmental Technologies		Paper Published in Science, Technology and Society, Manuscript on the history of technology undergoing revision	Publish book on Technology in Sri Lanka
Communication during 1997 and 2002 ENSO	Assessment of communication during the last two El Nino's.		Manuscript available but needs to be developed for publication	Papers needs to be published

# Traditional Agriculture and Sustainability

## Modernization of Sri Lanka's Traditional Irrigation Systems and Sustainability

Arnold Toynbee described the ancient irrigation system of Sri Lanka as an amazing system of irrigated agriculture, which developed over a millennium. The irrigation system was partially transformed during its encounter with British colonialism with new values, technological systems, administrative structures and a legal code. After the Independence in 1948, this transformation continued with foreign aid and technical expertise from the west.

The shortcomings of the modern irrigation systems with respect to planning, policy and sustainability are now recognized (World Commission on Dams and Development, 2000). Here, it is argued that the indigenous irrigation systems in Sri Lanka offer a useful counterpoint of an irrigation system that has been sustained and had many favourable attributes. There are lessons to be learnt from contrasting different modes of irrigation practice in the light of sustainability.



Graphic: Earthen bund and the *Bisokotuwa* or valve pit at the *Kantalai* Tank that was built in the 5th Century and later expanded in the 12th Century. The diagram has been reproduced from a wood-cut in John Davy's "Travels in Ceylon" produced in 1821. The tank's waters cover a surface area of 5000 acres. A multinational corporation constructed a pump house on the bund of this reservoir in 1984 to supply municipal water to the town of *Trincomalee*. The project was financed with foreign aid and promoted by a regional politician. This politician was accused of harvesting the teak plantations along the route of the pipelines. Soon afterwards, the ancient bund burst with the fracture initiating at the steel piles used by the contractor. The flash-flood that followed inundated several villages downstream killing 240, leaving 18,000 homeless and destroying the millennia old, working sluice - an archaeological treasure.

# Environmental Impact Analysis

## PROJECT ASSESSMENT: ENVIRONMENT IMPACT ANALYSIS IN SRI LANKA

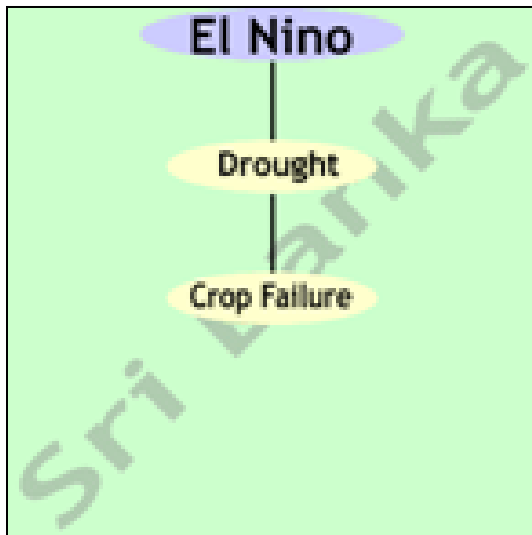
Our past work on EIA leads to an understanding of environmental history, law and protection. Lareef Zubair participated as a trainer and resource person in many EIA workshops and in a post-graduate course. A summary of the status on EIA was reported in the *Journal of the Institution of Engineers* in Sri Lanka and in *Environmental Impact Analysis* and the abstract follows:

While on the whole, the implementation of Environmental Impact Assessment (EIA) in Sri Lanka has been successful, shortcomings and potential for improvement remains. Here, some salient features of the EIA framework and shortcomings in its implementation are highlighted and remedial measures are suggested. Salient features in the EIA process have proven to be the provisions for public and expert participation, the requirement for alternatives, provisions for equity and the use of a prescribed list to identify projects that must undergo EIA review. The implementation of EIA has highlighted several shortcomings. The lack of environmental data has led to various problems in implementation and a system of collating and disseminating environmental data is recommended. Tolerance limits for pollutant release is based only on the effluent quality at present and needs to be augmented. Some EIA reports have considered unlikely alternatives on account of a lack of overall policy guidelines. Policies should be set to guide investors, regulators and the public as to the type of projects that are encouraged and zones where these ought to be located. The monitoring, compliance and enforcement of environmental regulations is the most daunting area that needs improvement. Addressing some of these shortcomings will be challenging given the opposition to the EIA process and lack of funds. But it is all the more important so that the evaluation for environmental impact can become entrenched in project management.

# Technology and Communication

## ENSO and Communication

The provision of climate variability information in Sri Lanka was dominated by the international mass-media. This led to misinterpretations during the 1997-99 ENSO episode. In particular, the media did not communicate crucial nuances in seasonal or regional variations.

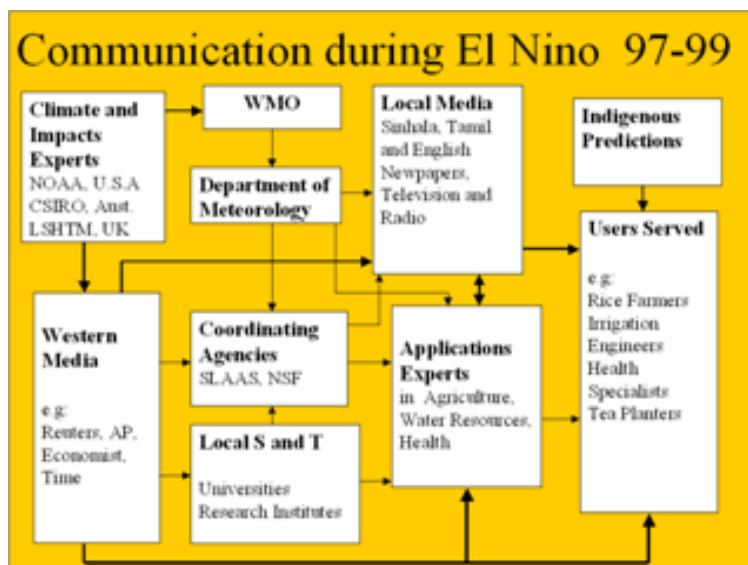


The figure is taken from Thinkquest Website dedicated to providing ENSO impacts.

In contrast to the message conveyed by the mass media, the actual impact of El Niño in Sri Lanka was different. Sri Lanka has a strong wet tendency in the last quarter of the year and a weak dry tendency in first 3 quarters. The contrast in ENSO impacts in India and Sri Lanka has been known since 1982.

With more rainfall in the main seasons, there was more rice production. Thus paradoxically, there is likely to be more production rather than less as conveyed by the international media. Indeed, this was what transpired in 1997.

All of this was known to local and foreign climate scientists. However, users and applications scientists misunderstood all this. The failure in communication can be traced due to direct provision of information from forecast centres in the metropolis to the users without due contextualization.



The situation during the El Niño of 2002 was much more improved. There was direct communication from climate experts to the local scientists and coordinating bodies. The information was much more robust and provided to farmers as exemplified by the forecast issued by Dr. B.V.R. Punyawardena, Agro-Meteorologist, Dept. of Agriculture.

*“According to the last update on the current El Niño conditions issued by the International Research Institute for Climate Prediction, there is nearly 100% chance that El Niño conditions will continue for the remainder of 2002 and up to early 2003.*

*Studies conducted in Sri Lanka have revealed that El Niño events are more likely to cause near or above normal rains during October and November of the Maha season. Thus, it could be safely assumed that prevailing rainy weather may continue ... during October-November, 2002.”*

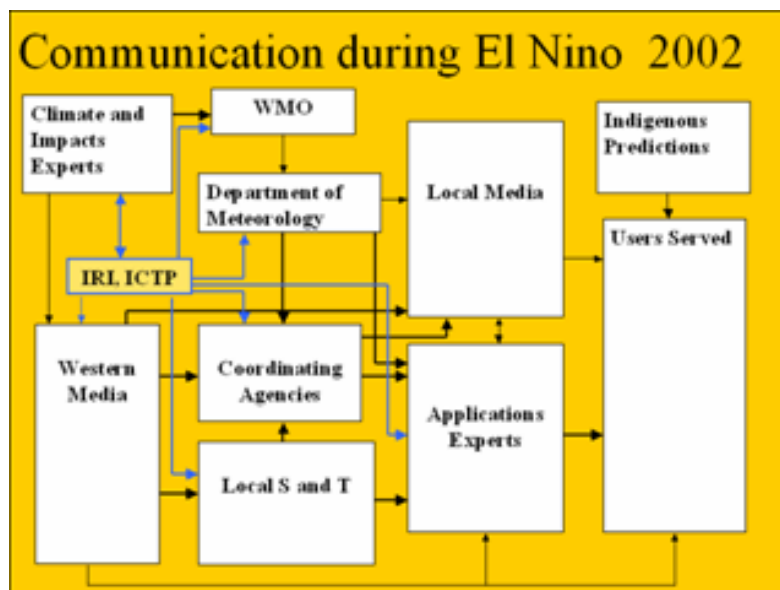
This communication was provided to the extension workers of the Department of Agriculture. Thus unlike in 1997 where both the impact of the El Niño on rainfall and agriculture was incorrectly communicated, was incorrect, a much better understanding of El Niño and its impacts were communicated.

**After the El Niño season of 2002/2003, a bumper rice crop was harvested.**

Therafter, we communicated the reasons for this and suggested that this increase was anomalous and subsidies for fertilizer and insurances schemes for rice prices should remain in place.

In response to our work, the Minister of Water Resources and Irrigation instructed the formation of a national steering committee to carry out a systematic evaluation of seasonal climate forecasts and undertake its appropriate dissemination to all users in January 2003. The IRI supported the national steering committee on climate prediction by providing climate information directly this committee.

After 2004 and the installation of a new government due to changes in policy the Interim Water Resources Authority was downgraded. We continue to provide predictions directly to the participants in the national steering committee.



# Outputs

## Publications

**December 2005:** Modernization of Sri Lanka's Traditional Irrigation System and Sustainability, *Science, Technology and Society*, 10 (20): 161-195.

**September 2001:** Challenges to EIA in Sri Lanka, *Environmental Impact Assessment Review*. 21(5): 469-478

**July 2004:** Empowering the Vulnerable, *TIEMPO*, University of East Anglia, 52:3-6, Also at *SciDev.Net as Communities Facing Climate Change need local science*,

**September 2001:** An Assessment of Environmental Impact Assessment in Sri Lanka, *Environmental Impact Analysis Review*, 21(5): 469-478.

## Feature Articles

**Dec 2003:** Climate and Cricket in Sri Lanka, *Ceylon Daily News*, Sri Lanka.

**June 2002:** Climate Change and National Security, *The Island*, June 22, 2002.

## Presentations and Posters

**March 2005:** Lareef Zubair, Using Climate Information for Disaster Risk Identification in Sri Lanka, *Climate Prediction Applications Science Workshop* March 15-17, 2005, Palisades, New York.

**Oct 2003:** with Vidhura Ralapanawe, Assessment of High-Risk Natural Disaster Hotspots of Sri Lanka, *2003 Open Meeting of the Human Dimensions of Global Environmental Change Research Community*, Montreal, Canada.

**January 2002:** Lessons from the Last ENSO in Sri Lanka, *Department of Meteorology*, Colombo, Sri Lanka.