PREDICTING ENSO DEVASTATION

Image credit: Jacob Silberberg / Panos

Speed read

- El Nino and Southern Oscillation (ENSO) are temperature anomalies that influence rainfall
- New modelling can predict socio-economic impacts of ENSO at global and regional scales
- More data needed for the modelling to be used in large countries with sub-regions like India

[THIRUVANANTHAPURAM] A new computer model can help forecast the socio-economic devastation caused by rainfall and floods triggered by the El Nino-Southern Oscillation (ENSO) phenomena.

Philip Ward from VU University, Amsterdam, who with his colleagues created the 'cascade' modelling framework, says that it is capable of predicting the effect of ENSO on floods at the global and regional scales.

"During El Niño years, the risk is higher than average in north-eastern India, the findings

suggest," says Ward in an interview with *SciDev.Net*. "On the other hand, some basins in eastern India show lower than average damage during La Niña years."

ENSO refers to the effects of anomalous sea surface temperatures off the western coast of South America that cause climatic changes across the tropics and subtropics. Southern Oscillation refers to temperature variations on the surface of the tropical eastern Pacific Ocean (warming and cooling known as El Niño and La Niña, respectively) and in surface air pressure in the tropical western Pacific.

Ward's approach, published in September in the *Proceedings of the National Academy of Sciences*, combines three different models that predict rainfall, water drainage patterns and also the socio-economic impacts of floods, including on GDP.

The models found abnormal flood volumes across more than a third of the earth's surface during El Nino years when the oceans were warmer than usual, and also during La Nina years when the oceans were colder.

"Our models and results are already at a resolution of one square kilometre which we have found to be very useful for many users of the data in practical applications," Ward tells *SciDev.Net*.

Ward found the anomalies increasing urban damage in some cases and decreasing it in others. This gives rise to an important insight: though media tend to focus on the negative impacts of ENSO, there are positive anomalies that increase rainfall in dry areas as well.

"This (cascade) modelling approach is novel and extremely useful," says Pradeep Mujumdar, a civil engineer who works on flood modelling at the Indian Institute of Science, Bangalore. "People usually look at one or other of these models, and such a cascade model is rare."

The models could also predict flood impacts at the regional scale and at the level of river basins. This is especially important in large countries with sub-regions which experience different effects from ENSO, the authors say.

“To be able to carry out such regional-level studies in India, we need more information about the effect of ENSO. The impacts would also be very different here — there will definitely be more loss of human life. We need more robust impact models to help us with socio-economic predictions,” says Mujumdar.

With climate change, extreme El Nino events will probably increase in frequency. This would mean “increases in flood-risk variability across many, or indeed almost half, of the world’s terrestrial regions in the future,” the authors say in the study.

Source : http://www.scidev.net/south-asia/environment/news/predicting-enso-devastation.html