Return of El Nino and possible decline in paddy production during Yala 2003

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Although not as strong as in 1997/98, after a lapse of four years, El Nino; a weather anomaly returned in 2002/2003. The most devastating El Nino occurred during 1997/98. In Indonesia alone, the effects of large-scale forest fires during 1997/98 El Nino were unprecedented, damaging more than 9.7 million hectares of forest area. The smoke and haze from these fires affected not only Indonesia but also other South-East Asian countries, in particular Brunei, Darussalam, Malaysia and Singapore.

El Nino is a disruption of the ocean-atmosphere system in the tropical pacific having important consequences for weather around the globe. Unusual weather conditions such as jet streams, storm tracks and shifting of monsoons occur around the globe. Such disarray is caused by a warm current of water in the Eastern Pacific Ocean. The appearance of the warm waters was first identified by Peruvian fishermen, many centuries ago, and they gave the phenomenon the name El Nino - or the Child - because they always observed it around the end of December, at Christmas time.

Previous anomalies

During the past forty years, nine major EL Nino events have been recorded, the worst of which occurred in 1997/1998. Before this, the El Nino event in 1982-1983 was the strongest. Some of the El Nino events have persisted more than one year. El Ninos reported in 1953, 1957/58, 1965, 1972/73, 1976/77, 1982/83, 1986/87, 1991/92 and 1997/98 years were considerably strong.

The return period of the El Nino event varies, ranging from two to seven years. The intensity/impact and duration of the event also vary from one event to another and hard to predict. Typically, it lasts anywhere from 14 to 22 months and so the shifted rainfall patterns associated with them typically persist for several seasons as well. This can have a significant impact on people living in areas of the tropical pacific since the usual precipitation patterns can be greatly disrupted by either excessively wet or dry conditions.

Shifts in tropical rainfall and winds can also affect outside of the tropics by altering prevailing wind patterns that circulate around the globe and this phenomenon is called tele-connections. There are number of international agencies involved in forecasting and monitoring the developments of El Nino events. World Meteorological Organization (WMO), Bureau of Meteorology-Australia, National Oceanic and Atmospheric Administration (NOAA) and International Research Institute for Climate Prediction (IRI) are some of them. Forecasts and developments of El Nino events are published and updated regularly in their web sites. These agencies predicted the return of El Nino during 2002/2003 well in advance. Such forecasts help countries to anticipate and mitigate impacts of droughts and floods.

Agricultural effects

The agriculture is one of the sectors that can be affected by droughts, floods etc. caused by the El Nino events. Scientists have discovered that for some countries such as India, there is a linkage between agricultural production and El Nino events. There are two paddy cultivation seasons namely Maha and Yala. Studies that have been conducted on this linkage for Sri Lanka have found that El Nino conditions lead to an increase in the average Maha paddy production and a decline in Yala paddy production. Rice is the staple food of the country. Therefore, the implications of this linkage could be useful for making decisions on food security related issues.

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There has been a steady increase in paddy production in Sri Lanka from 1950 to 1990. This rise has been attributed to increased area under cultivation, increased irrigation, improved seed varieties, increased fertilizer application and higher guaranteed purchase prices for rice. Paddy cultivation is acutely dependent on rainfall. It has been pointed out that technological advancements had a greater influence on average yields of paddy than the impacts of climatic conditions. However, it has been found that rainfall variation is a determinant factor that affects the variability of paddy production.

During the Maha season (October to March), generally there is usually enough water for the cultivation of paddy lands all over the country. However, during Yala season (April to September), available water is sufficient for cultivation of lands in the wet zone and major irrigated areas. According to the previous studies, during the El Nino years, paddy production of Maha seasons, frequently increased (10 out of 15 seasons) and the Yala production frequently decreased (10 out of 14 seasons).

Usually, paddy varieties that mature in 4 to 5 months are cultivated in Maha seasons. It has been found that during El Nino years, the rainfall in the first 3 months of Maha rises by 14 percent on average and declines by 19 percent during the last 3 months. These changes to the rainfall pattern are very favourable for paddy cultivation, as rainfall is mainly required for paddy in the early months after planting. The ever recorded highest paddy production of 93 million bushels is expected during the 2002/2003 Maha season. Favourable weather conditions as well as resumption of cultivation of paddy lands, which had been abandoned over the past few decades of the Northern and Eastern provinces, may also be attributed to the increased production.

During El Nino years, there was enhanced rainfall in May and a decline in rainfall during July and August. The Yala seasons cultivation is more vulnerable to drought and other such anomalies. According to the research findings, during El Nino years rainfall has dropped 8 out of 14 seasons and production dropped 6 out of 9 seasons as shown in the figure.

Paddy production

The paddy production of Yala seasons during 2001 to 2003 had been fluctuating around 52 million bushels. If the past trends of factors affecting paddy production continue, the production during this Yala season (2003) may be dropped by 11 percent from 52 million bushels to 46 million bushels. The production may be little higher than the forecast due to the contribution from the cultivation of abandoned paddy lands of the Northern and Eastern provinces.

However, it has to be noted that paddy is cultivated only during Maha seasons in Jaffna and Killinochchi districts. On an average, cultivation of paddy in other districts of these two provinces takes place at low levels compared to the Maha seasons. If the error of the estimation is also considered, statistically with 90 percent assurance, it could be said that the Yala production would be in the range of 39-53 million bushels.

Drop in production has several policy implications. A proper assessment on the domestic production and the requirements could help to make food security related decisions in time. Through proper and carefully planned programs, farmers could be encouraged to store their excess production for them to receive a higher price during next few months due to the possible drop in Yala production.