Reported Drought-Related Effects of El Niño for April 1998
and a Six-Month General Update

The National Drought Mitigation Center is compiling a list of drought-related effects of the 1997-98 El Niño, as reported to us in news stories from around the world. Our first report "Reported Effects of the 1997-98 El Niño," released in November 1997, examined the effects of several climatic phenomena related to the current El Niño such as drought, floods, and hurricanes. Because of the great variety of impacts related to El Niño and the number of other researchers dealing with this topic, we have decided to focus more on the drought-related effects of El Niño in subsequent updates (although other related climatic hazards such as flooding may be discussed when they coincide with drought issues).

This report summarizes drought-related El Niño effects reported in stories from 1 April to 30 April 1998 and provides a general update of El Nino effects over the last six months. It is important to remember that anomalous weather events happen continually. Because of the interdependence of global circulation patterns, it is often difficult to determine whether El Niño is a direct or indirect cause of certain events, or whether it is a factor at all. It is possible that media attention over the current El Niño has resulted in more effects being attributed to the phenomenon than can be scientifically justified. In addition, reported estimates of damages and other statistics will often vary as new data become available and depending on the methodology used to calculate values.

El Niño's Typical Impacts

In general, when El Niño conditions develop in the eastern Pacific, the first visible impacts include an increase in precipitation in the eastern Pacific, including parts of South America, and a decrease in precipitation for western Pacific locations such as Australia, Indonesia, Southeast Asia, and the Philippines. As the El Niño continues, other impacts include a significant decrease in tropical storm activity in the Atlantic Ocean and a corresponding drought in the Caribbean and Central America. Tropical storm activity increases in the eastern Pacific. Anomalously wet conditions are common across the southern United States and eastern Africa. Severe droughts can also occur in southern Africa and in northeastern Brazil. El Niño events typically weaken during the spring months, although the 1986-87 event remained strong throughout the summer.

The Current El Niño

As of our last report in October 1997, many of the anticipated impacts from the current El Niño had occurred. Some countries, such as Indonesia, Malaysia, Singapore, and Papua New Guinea had been hard hit by drought. However, timely rains saved valuable crops in Australia and India. In other regions of the world, it remained to be seen if the impacts associated with the 1982-83 El Niño, such as floods in the southern United States and drought in southern Africa, would materialize.

To date, the current El Niño remains one of the strongest events recorded. Since October, impacts as a result of the El Niño have been worldwide. In Asia, drought continues to be a major concern in many countries. Wildfires and the associated problems with smog have plagued many areas for months. Fires in Indonesia this year alone have caused almost US$1 billion in lost timber revenues (in addition to damage and losses incurred last year from fires and smog). Water rationing has also become widespread in Malaysia as reservoir levels have dramatically fallen. Many of the Pacific Islands, including Hawaii, are experiencing severe drought. In southern Africa, timely rains have allowed most areas to avoid the disastrous droughts of previous events. Drought has struck parts of West Africa, however, where power rationing is crippling Ghana and Togo as a result of reduced hydropower generation. Heavy rains caused tremendous flooding over large areas of eastern Africa during the end of 1997. In the Americas, droughts and the related wildfires have been major concerns from Mexico to Brazil, and for some nations in the Caribbean. Meanwhile, Peru and Ecuador have experienced devastating floods, and flooding has occurred across large regions of southern South America. Many additional events, large in scale or very localized, have taken place worldwide since October that may or may not have been influenced by El Niño.

As of the end of April, the U.N. Food and Agricultural Organization (FAO) reported that 37 countries faced food emergencies compared to 31 at the end of 1997. This increase is blamed largely on impacts from El Niño. It is also important to note that estimated financial impacts from the current El Niño are as high as US$20 billion (noted in the Asian Development Bank's annual development outlook), compared to over $13 billion for the 1982-83 event.

For more information, please visit the El Niño section of the National Drought Mitigation Center's web site:

http://enso.unl.edu/ndmc/enigma/elnino.html

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Where?	Current Impacts	Potential Impacts
Non-Specific Areas		Possibly US$20 billion in worldwide damage compared to at least, US$13 billion in damage related to the 1982-83 El Niño.
United States of America		
Hawaii	Drought on the islands of Hawaii, Maui, and Oahu; state of emergency since January 30th; fires; crop losses from 20-100%; many rural families purchasing water from commercial haulers; most people are conserving water.	
Idaho	Warm March with less snow	Low threat of drought this summer (and reservoirs have good carryover from last year).
Montana	About 50% reduction in snowpack in north-central Montana.	Possibly late-summer water shortages in northwestern and north-central regions if rainfall is below average this irrigation season.
Ohio	Dry, mild winter is lowering Lake Erie (one foot from last year's record levels).	
Texas	Lack of rain in the Lower Rio Grande Valley; some farmers are adopting water conservation measures.	
Wyoming		Spring runoff will be normal to below-normal across the state; isolated spring flooding and the potential for summer drought and wildfires.
Central America		
Costa Rica	Drought and fires; 3,488 forest fires in the first quarter of the year burning over 9,800 ha of forests (3,773 fires total last year) mainly in the northeast and northwest; government is developing a drought plan; poachers are illegally hunting animals fleeing the forest fires.	
Guatemala	Low rainfall and high temperatures; state of emergency because of fires; worst fires in memory (burning 247,000 acres in the northern provinces of Peten, Huehuetenango and Atla Verapaz); asking for international assistance to fight the fires.	
Mexico	Drought and hot weather (especially in the central and northern regions); about 7,000 fires have burned 389,000 acres since January 1st in almost all of 31 states; reduced water supplies in some areas (i.e. Mexico City); poor harvest of corn, beans, wheat, and sorghum this year; increased desertification; 40 people arrested in Mexico City for wasting water (500 peso fine or US$60); the 137 irrigation reservoirs are at 33% capacity (at 15,713 million cubic meters as reported on April 11th).	Little rain until the start of the rainy season in June.
Panama	Warm waters (3 degrees warmer); 50-90% of the coral at test sites was affected.	

South America Brazil	Worst drought in fifteen years in the northeast, worst fires on record and haze (though recent rains have brought fires under control); 10 million at risk of starvation; people have raided grain stores; farmers are migrating into the town centers stressing food and water supplies; UN has requested aid (food, medicines, seeds, and tools); Brazil's largest fire-fighting effort (1,700 fighters); government pledged $160 million in aid to victims; malaria-carrying mosquitos are breeding in dry river pools (infecting over 900 Yanomami); malaria and diarrhoea cases, respiratory ailments, and skin infections have increased sharply; thick smoke grounded flights until recently making it difficult to treat malaria cases; Yanomami food supplies were affected (animals they hunt and their fruit tree were burned); fires burned from 2,300 - 11,500 square miles; government, NGOs, and other researchers are forming studies to assess impacts and identify management alternatives; fires released 125 million metric tons of carbon (equivalent of Sao Paulo's emissions over 10 years); deploying personnel to the field to prevent additional fires; the Yanomamis, Wapixana, Macuxi, and Taurepang tribes need seeds and farm tools for planting; government is planning increased monitoring and fire fighting activities (i.e. air surveillance, fire risk maps, farmer firefighting brigades, fire education programs).	Government food distribution until at least June; More fires as farmers clear their lands; establishing a rapid-deployment fire brigade; may hire thousands of unemployed farmers for emergency projects to drill and install wells; recover existing wells through desalinization.
Guyana	Drought; lack of drinking water and food shortages (from salt water intrusion in streams); rice and sugar crop losses; livestock deaths; need potable water, food supplies; equipment (pumps for drilling wells and pumping water), financial assistance to some rice and sugar farmers over the next six months, and paddy seeds for the next cropping season.	
Australia	Ending military food airlifts to Papua New Guinea because of recent rains (though commercial aircraft will still deliver to those in need).	

South East Asia	El Niño blocked seasonal monsoon rains; US$1.4 billion in smog damages in 1997; recent rains in Japan, Taiwan, southern China, parts of Singapore, on Malaysia's west coast; in south Sumatra and east and south Kalimantan of Bornea; recent rains have brought the number of Indonesian fires down to 538 from 800 and confined the smog in South east Asia to parts of Borneo island.	
Brunei	Worst drought in thirty years; hundreds of forest fires; smoke and pollution creating smog; airport closures and delays at times; health problems from the smog; school closings and reduced working hours because of smog.	
Indonesia	Delayed and irregular rainfall; drought and worst economic crises in 30 years; rice and overall food price increases of up to 50% over the last 12 months; 440,000 people in 31 districts in eight provinces need immediate food aid from the drought; WFP will provide for pregnant and breastfeeding women and children under 5, and distribute free food on a limited basis; US$620 million government subsidy to import rice, soybean, sugar, soybean pellets, fertilizer, and wheat; delay in the rice harvest because of drought (only 200 tons harvested from last year's 581,000 tons at this time); increasing the price of unhusked rice by 33%; 1997 unhusked rice production fell 3.62% (to 49.3 million tons) from 1996 levels; a switch to maize and soybean planting (increasing average total yields) from rice because of delayed rains; 1997 fire losses of over US$3 billion (conflicting with earlier estimates).	One percent drop in 1998 national output; 7.5 million people in 15 provinces risk food shortages until early next year; record food deficit in 1998 (3.6 million tons); would import 1.5 million tons from April to September and rely on international aid for 2 million tons of rice; lack of water and limited funds for fertilizers and quality seeds could reduce this year's rice harvest (so rice imports could increase); US$198 million support package from Canada (for medical supplies and export credits) along with firefighting experts; 1998 unhusked rice yields could fall 3.6% from 1997's 49.3 million tons; Japan, Taiwan, China and Vietnam pledged to help with rice, sugar, and soybeans.
East Kalimantan	Drought (since the middle of last year) and fires (recent rains but not enough to relieve conditions); 300,000 ha burned since January (over 105,900 ha of logging concessionaire's timber, 75,000 ha on timber estate areas, and 71,000 ha in Kutai National Park); 300+ fires now burning (about 24 are coal fires); US$938 million in losses from fires (excluding environmental, health, tourism and ecological losses) since January; damaged forest by-products (i.e. wood resins and rattan); loss of biodiversity; many orangutans are starving (by loss of their fig trees) or being killed by villagers/poachers when fleeing the fires; international meetings to discuss how to deal with the fires; need air firefighting support; smoke making thousands ill.	Fires out of control until October.
East Timor	Drought; crop yield reductions and food shortages in areas; 10,000 ha of 55,000 ha of corn planted have been affected; government granting food assistance, supplying agricultural equipment and seeds, and promoting income diversifying projects (i.e. fisheries); the government has dismissed claims of mass starvation and food price increases.	
Irian Jaya	Drought since last year; recent rains but not in the worst drought area of Jayawijaya; food shortages; 500 people died from famine last year.	El Nino expected to end in July; regular dry season will start in May, June, or July.

Southeast Asia (continued) Malaysia	"Severe" water shortage; lack of rain and high water demand have depleted water sources and caused rationing in parts of Kuala Lumpur and the Klang Valley (water treatment output is 43% of normal and 1.8 million people have experienced water rationing); drought is threatening 29,400 ha of paddy fields in the state of Kedah affecting about 22,000 farmers; 5,000 paddy farmers could not cultivate 5,000 ha of land in Selangor and Sabak Bernam areas because of drought; peat and forest fires in at least 6 of 13 states; smoke from Malaysian fires and other countries (Sarawak's Air Pollution Index reached a "hazardous level" and has stabilized down to "very unhealthy"); haze from fires (media warned not to focus on the haze problem in attempts to reduce negative publicity which may affect economic development, tourism, etc); school closings and airport closings because of the haze; bottled water price increase of 200%; the government is planning to pump water from other regions (i.e. from Pahang state via a new 45 mile pipeline that will take five months to complete) and stressing water conservation; factories are digging their own wells and spending thousands each month to hire water trucks (although the government is promising to supply 70% of their water needs); millions of dollars in lost sales to manufacturers; retail and tourism losses.	One percent drop in 1998 national output; water shortage until the next wet season in October; Kuala Lumpur's water supply may be dry by mid-May; 22,000 rice farmers in the state of Kedah could lose $12 million due to drought; may need to increase food imports.
Sabah state	Drought and haze; drought and fire cut food and water supply to remote districts; government aid given to the districts of Kudat, Kota Maruda, and Sipitang; drought-damaged crops; 10,000 families may be affected by drought (in northern, interior, and west coast areas); malnutrition in areas; urging factories to reduce operations at times and to wear masks; distributing water with trucks; 33,359 ha of forest have burned; canceled and rescheduled airport flights due to poor visibility.	Food shortages in areas; villagers may be relocated to towns to receive food aid.
Myanmar		Higher than normal temperatures in April-May; reduced monsoon rains from May to October and a two to three week delay in their onset; irregular rainfall patterns with heavy downpours.

Southeast Asia (continued) Phillippines	Drought and fires; El Nino affected 90% of the country and caused a 50% reduction in rainfall; reduced farm yields and plantings; imported 640,000 tons of rice this year; more than 2 million people in 11 provinces in Mindanao affected by drought (over 50,000 ha of land affected and 42 deaths); government released $83 million pesos (US$1,890,000) for drought aid in Mindanao (rice purchases; operation costs, medicines, education programs, and for a malnutrition program); government rice loans being administered at US$18.3 per bag; fires on Palawan island (over 50 fires in two weeks that burned 20,000 ha and cost $12 million before being controlled), in Benguet province (250 ha), and the Maragusan Valley; a total of three fire-related deaths (a firefighter and two children) and an increase in respiratory ailments from smoke on Palawan; in the south, at least 14 tribesperson deaths after eating wild yams (and many hospitalized) leading to rice distribution efforts by the government; attempted cloud-seeding to induce rains over Palawan; drought affected sugarcane planting and caused stunted growth (pushing back milling from August to December 1998).	One percent drop in 1998 national output; rise in the 1998 inflation rate; 20% drop (360,000 ton deficit) in 1998/99 sugarcane yields from current crop damage (loss of US$134 million dollars); importation of sugar in 1999; release of additional US$5.2 million dollars for a poverty alleviation fund from the Presidential Palace.
Vietnam	Drought and heatwave in southern and central Vietnam (although recent rains in most areas may rescue some cash crops (i.e. sugarcane, coffee, and rambutan); millions of dollars in crop losses (from drought and salt water encroachment); 900 forest fires this year burning 35,000 acres of woodlands and killing 10 people; increased respiratory, intestinal, and digestive disorders due to the heat; lowest water levels in 20 years in areas of the Mekong Delta; increased commercial sales of water (up to 25% increase in areas) to many families (in Daklak, one in ten families has enough water); salt water intrusion in the southern coastal provinces (more than 40,000 ha of grain crops damaged); stress on coffee crops (in Daklak Province, 25.5% [72,000 acres] of coffee is damaged and 17,300 acres dead); “serious” loss of forest cover, and a reduction in river system flows.	No rains until at least early May in Daklak province (usually rains begin in late April); 1998 rice imports of 1.2 - 1.5 million tons; import 300,000 tons of rice prior to July; 12% decrease in first semester grain production in 1998.

East Asia China	Rain in parts of northern and northeastern China have eased drought conditions (although reservoir levels are still lower than normal and soil moisture is still relatively low over 27 million acres of farmland); low precipitation and high temperatures (three to seven degrees) in April for a large part of northeastern China and the eastern part of Inner Mongolia causing low soil moisture (down 45-70% in areas); drought in western Guangdong province (damaging 128,500 ha of farmland [84,200 ha seriously hit]) has affected maturation of early spring rice in Maoming and Zhanjiang (precipitation down 33% and 30%, respectively, from Jan to March of last year); the cities are increasing crop irrigation efforts (over 700,000 Maoming farmers are watering daily); government will begin a three-year cloud seeding campaign over the headwaters of the Yellow River; drought in the Sichuan Province since last summer (116 of 180 counties have experienced drought affecting 1.4 million has of summer grain crops with significant damage on 53,000 acres; drought prevented planting of rice seedlings on 530,000 ha and 10% of cotton and corn seedlings have withered; government allocated eight million yuan for minimizing losses).	
North Korea	Three years of flood and drought (last drought may be El Nino related); South Korea is offering aid if North Korea grants concessions (to reunify the countries); many people are relying on foreign food donations and gathering roots and plants; vulnerable groups (i.e. children, hospital patients, elderly) are doing better and school enrollment is increasing because of foreign aid; still malnutrition in areas; on April 1, the World Food Program appealed for 725,000 tons of food for 7.4 million people (almost 1/3rd of the population).	
Russia Vladivostok	Drought and fires; 30 flare-ups daily.	
Central Asia Nepal	Drought last year causing poor current harvests; hundreds of people migrating from Humla district to India (most living on nettle leaves and subsidized food); many schools do not have regular classes from food shortages; some rice has been airlifted to the region.	
Southern Asia Sri Lanka	Above average March/April temperatures in areas (about 3 degrees).	Drought could affect crops in coming months and high temperatures could be present for the next few weeks (until the end-May monsoons arrive); tea crop may be affected this year, especially in the district of Uva (Sri Lanka's forecast is for 1.6 million tons from last year's 1.7 million tons).

Northeast Africa		
Ethiopia	Dry spell from mid-March to mid-April (especially in the belg areas of South Tigray and north Wello Zones); in warmer valleys, some drought stress has affected crops (significant damage if the dry spell continues); poor rains in the first half of last year, erratic rainfall from July to August, and heavy rains in October and November reduced Ethiopia's two harvests; drought and poor harvests in the regions of Tigray and Amhara; need 60,000 tons of food for 800,000 people.	1997/98 grain production (from the main crop season) yield decline to 8.8 million metric tons from 11.8 million in 1996/97 (which could increase grain prices or reductions in reserves) because of "erratic and unseasonable rain", reduced agricultural inputs, and pests; 420,000 tons of food needed to feed 5.3 million people.
Sudan	Drought and civil war in the South; delay in the rainy season (should have started in March or April); 7,000 children under five treated at Medicines Sans Frontiers health centers in the last two months (35% severely malnourished and 70% underweight); 350,000 people at risk (including 120,000 displaced by fighting and unable to harvest crops); 250,000 may be starving; 47 people killed in a wildfire in southwest Sudan; distributing relief supplies and appealing for additional foreign aid.	In the south, hundreds of thousands of Sudanese face famine without additional aid (i.e. crop seed and farm tools).
West Africa		
Burkina Faso	Worst drought in two decades; lack of domestic water and a rise in commercial water prices; water rationing in areas; government distribution of water by truck in areas; crop losses in the last planting season caused a 165,000 ton grain shortage; over 800,000 people threatened with famine.	Water shortages until the next rains due in late May.
Ghana	Drought; food shortages hitting 30,000 people in the Upper East region (also in the Northern and Upper West Regions); foreign aid is being delivered (i.e. maize, beans , vegetable oil, cereal and rice) either at subsidized prices (19-50% reduction) or free of charge; drop in reservoir levels; water shortages in the Central Region (closed Cape Coast University, postponed the re-opening of second cycle institutions, and water rationing); hydroelectric power rationing (two hour of electricity per day in areas); water shortage at Tamale disrupted the Eid-Ul- Adha religious festival.	
Ivory Coast	Dry season from December to March; threat of prolonged dry conditions affecting the 1997/98 midcrop of cocoa was dampened by recent rain (sending future prices lower).	
Nigeria	Prolonged drought and late rains; problems in the first planting season because of heat and drought.	Imminent food scarcity this year; little rainfall in the south for the near term; dusty haze in the north; heat could persist for most of the second quarter.

Central Africa		
Uganda	Delay in the rainy season in the east and south.	
Kenya	Good weather, yet dry conditions in a few areas; reduced crops west of the Rift Valley belt in the areas of Kericho and Nandi from dry weather. (Last year drought in the first half of the year and heavy rain in the last quarter affected production).	
Tanzania	Drought and then floods last year led to famine this year in parts; food donations of 1,400 tons of maize in Singida Region (needs 6,300 tons); below average rainfall from late February to March (delaying planting and may limit total area planted); production losses from crops planted since December if the dry spell continues; a dry February and March have influenced commercial food flows which contribute to lower food prices.	
Southern Africa	February dryspell followed by good rains in March (though localized areas of erratic rainfall damaged some crops).	Total cereal reduction in SADC countries of 8% from 1996/97 yields (up from a January forecasts of 20-30% reduction).
Lesotho	Unusual weather; significant damage to the maize crop which could reduce yields by 30 to 40% from the previous season.	
Madagascar	Erratic rainfall in 1997 and early 1998 did not affect crops significantly (except in southern areas in 1997) but did allow locust swarms reproduction that are “seriously” threatening current rice crops.	
Zimbabwe	Many farmers planted less crops or none at all, planted low yield crop varieties, used less inputs and weeded less to save resources, and held on to their stocks for fear of drought.	Maize production decline to 1.42 million tons (down 18% of average); grain imports may be required.
Botswana	“Irregular, untimely, and insufficient” rains; 66% drop in cereal production (though mineral revenues can cover food import costs).	
Namibia	Easter weekend rains in all four northern regions revived wilting mahangu (millet) crops, although, lower crop production from reduced planting (more rains are needed to sustain the region); encouraging farmers with excess grain to sell it to central depots (to store for possible drought relief).	May need to import 60% of its cereal from a five-year average of 40%.
South Africa	Slightly below average rainfall but no widespread drought; less than 0.5% reduction in national economic growth; maize planting decreased from 3.361 million ha last season to 2.956 million ha this season for fear of drought (although average yields may be higher because farmers only planted their best fields); because of less planting, certain commodities may be affected (i.e. 15% drop in cereal production leaving little if no surplus for export).	