

Reported Drought-Related Effects of El Niño for March 1998.

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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 March to 31 March 1998. 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.

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	Economic crisis in Asia and drought in the tropics may drop the world's supply of oils (plant) and fats this year and improvement in production will not occur before the second half of the year); palm oil production could drop 100,000 tons from last year's 17 million tons.	
USA Arizona California Connecticut Florida Georgia North Carolina Pennsylvania South Carolina South Dakota	Sixth warmest February on record; third highest February rainfall total since 1895; mild winter in the Northeast and Midwest; golf courses have opened early; homeowners have saved heating costs; US is offering \$56 million in food and medical supplies to Indonesia because of drought and economic crises (in addition to \$520 million from USAID and the Agriculture Department already available for technical aid and credit guarantees). Warmer and wetter winter; earlier termite activity. Warmer and wetter winter; earlier termite activity; increased threat of pests and disease (to prevent disease, Riverside County is clearing weeds, draining standing water, spraying for mosquitoes and on guard for rats and mice). Mild weather; Powder Ridge ski area has only been open 53 days (vs. 90 days in average years). Warmer and wetter winter; earlier termite activity. Warmer winter; year-round termite activity. Warmer winter; year-round termite activity. Low snowfall this winter, though recent rains. Warmer winter; year-round termite activity. Warmer winter.	Increased storminess and wetter-than-normal conditions over California and the southern third of the US; warmer-than-normal conditions over much of central North America. Increased termite damage from warmer winter and spring seasons. Fire danger this spring (the last snow-free year had triple the number of forest fires)
West Indies Haiti	Food shortages due to drought affecting cereal harvests.	

<p>Central America</p> <p>Mexico Mexico City</p> <p>Panama</p> <p>Trinidad and Tobago</p>	<p>El Salvador, Guatemala, Honduras, Nicaragua, and Panama have food supply problems because of losses to the first cereal harvest due to drought (and the second harvest did not make up the difference because of continuing bad weather).</p> <p>Lack of rain has caused increased water delivery efforts over the last two months.</p> <p>Drought; the level of Lake Gatun has lowered; water levels have been lowered in the Panama Canal, ships are forced to carry lighter loads (will affect 17% of the ships, or 1500, through October); cattle have been killed; agriculture has suffered; electricity-generating water resources have been threatened.</p> <p>Fires and low water supplies; 750 fires in the last three months (549 in all of last year); valuable timber losses; burned power poles have affected electricity distribution, caused perishable stock losses and at least one death (from stepping on a downed power line); policing water pipelines; forest animals are being displaced by the fires.</p>	
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<p>South America</p> <p>Bolivia</p> <p>Brazil</p> <p>Roraima</p> <p>Columbia</p> <p>Ecuador</p>	<p>Unusually hot and dry in the northwest and heavy rains and flooding along the coasts of Ecuador and northern Peru.</p> <p>Drought on the altiplano and valleys affected current plantings of cereals and potatoes, and reduced planting in other areas.</p> <p>Drought and fires (though recent rains have eased dry conditions in many areas); fires may have burned 10% of the Amazon; fires entered the Yanomami Indian reservation (on Venezuela's border); two Yanomami villages have lost their crops and turned to hunting/gathering from the forest; rivers in the area have dried up (cutting off aid transport routes to the reservation); possibly the worst burning in the history of the Amazon (will take over a 100 years to fully recover).</p> <p>Worst drought in 30 years and fire (though recent rains have eased the situation); state of calamity declared in January; the Macuxi, Wapixana, and Taurepangi tribes are at risk (drought has caused failure of their manioc crop and supplies are limited); crops losses of \$36 million; built 6,000 small reservoirs and are digging wells to fight the fires; 20,000 cattle have died this year; hauling water from Venezuela in Paracaima (no rainfall yet in this area); 30,000 to 60,000 sq kms; two reported human deaths (a fire-related and a smoke inhalation incident); loss of manioc and banana crops; malaria has risen as mosquito populations increase from drought-created stagnant river waters; respiratory ailments are increasing from smoke inhalation (doubling children's hospital admittances); "incomplete combustion" of humid biomass is releasing more gas and vapors; Argentine helicopter are being used to haul fire-fighting water; the UN sent firefighting experts to assist; 1200 firefighters and experts from Brazil, Argentina, and Venezuela are working; airlines have canceled many flights.</p> <p>Heavy rains along the Pacific Coast and fires in the interior; 7,000 fires destroyed 150,000 ha of forest; Pacific Ocean rose 20cms along the Coast; rains in potential drought areas have dropped coffee prices from 366,875 pesos/bag to 317,750 pesos/bag; farmers planted less dryland crops for fear of drought.</p> <p>Above normal rains along the coast.</p>	<p>No rain until late April was predicted until recent rains fell in several areas.</p> <p>March will be drier than February and January; flora and fauna will be affected by the drought and fires; 7% drop in farm production in 1998.</p>
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<p>South America (cont.) Guyana</p> <p>Leguan and Wakenaam Islands</p> <p>Peru</p> <p>Venezuela</p>	<p>Drought and fires; state of emergency declared (shifts \$6 million in funds to the Civil Defense Commission); water shortage since July 1997 (last year rainfall was 50% of normal); February rainfall was 18.2 mm from a normal 92 mm; March rainfall is 85%- 90% below normal; seeking \$4 million from the UN (to distribute water and food, and subsidize affected farmers); water rationing; logging and mining river transport has ceased in areas (causing companies to close); affected gold-panning; weather forecasts allowed precautionary measures to be taken that reduced agricultural impacts; forest fires in the southern and western sections of the country; preparing to distribute food to Indian villages that lost their crops (cassava and roots); livestock is dying; farmers will cultivate at least 24,000 ha less rice.</p> <p>Drought; in Leguan most farmers did not plant the current spring crop; in Wakenaam 10% of the current spring crop may have been planted.</p> <p>Above normal rains along the coast; higher temperatures; losses to the textile industry (losses in winter clothing sales).</p> <p>Drought; hydroelectric plants have been rationing power.</p>	<p>Gold exports could decrease by 40%.</p>
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<p>Pacific Islands</p> <p>American Samoa</p> <p>Federated States of Micronesia</p> <p>Guam</p> <p>Marshall Islands</p> <p>Palau</p>	<p>Below-normal rainfall and high temperatures (15% below normal rainfall in January, 84% below normal in February, rain and more dryness in March).</p> <p>January rainfall was 39-95% below normal; February rainfall was 70-90% below normal; water on many atolls is becoming salty; surface water on the mountain islands is drying up; many grass fires.</p> <p>Below-normal rainfall (January rainfall was 55% below normal; February was 69% of normal); several hundred drought-related grass and forest fires (consuming thousands of acres) since the first of the year.</p> <p>Severe drought since mid-January; January rainfall was 5-19% of normal; February rainfall was 5-30% of normal; declared a US disaster area; residents are eligible for federal aid.</p> <p>Low rainfall (January rainfall was 38-70% below average; February was 65-75% below normal).</p>	<p>March-April rain to be 30-40% below average; wet weather not to return until October.</p> <p>Record drought for all states; water resources will be depleted a month earlier than during the 1983 drought; very dry conditions until May or June in locations; below-normal rainfall to continue in all states until the beginning of 1999.</p> <p>Record drought (March-June rainfall to be 20% of normal); below-normal rainfall to continue until the beginning of 1999.</p> <p>Record drought; very dry through May or June depending on the location; below-normal precipitation until the beginning of 1999; water wells expected to become brackish on most atolls.</p> <p>Record drought; even drier conditions from March to June (80-85% below normal); below-normal rainfall until the beginning of 1999; possible brush fires and declining water sources.</p>
<p>Australia</p> <p>Queensland</p> <p>Central Region</p> <p>Southern Region</p> <p>Western Region South-East Region</p>	<p>Aid to Indonesia; \$3.6 million (U.S.) in assistance for drought relief and employment creation (\$5.8 million since last October); intervened on Indonesia's behalf to the World Bank; assisting Indonesia with creating jobs and improving delivery of government services.</p> <p>End of March: 21 shires and two part shires remain drought declared along with 603 Individually Droughted Properties in 39 other shires (10% of the land area of the State).</p> <p>Little or no effective rainfall in March; high temperatures; adverse effect on crops (i.e sorghum in the Central Highlands and cane in the Mackay region) and pastures; high demand for irrigation; surface and ground water basins are in general decline.</p> <p>Variable summer rain and a heat wave in parts; variable crop yields (i.e. sorghum), pastures, and storages; the heat damaged mung bean crops and caused some processing problems; water supplies are generally low.</p> <p>Hot, dry conditions; deteriorating pastures. Many areas receiving little or no rainfall; water supplies are variable (low to excellent).</p>	<p>Probability of median rainfall during April-June is from 50-70% for most of the area; declining conditions in most areas if rainfall is not adequate in the short term.</p> <p>Some moisture-stressed crops will have reduced yields and small grain size (some may be used for cattle feed).</p>

<p>Southeast Asia</p>	<p>Drought, fire and smoke; \$1.3 billion in smog losses in 1997; fires created three billion tons of carbon dioxide (greenhouse gas) that was added to the atmosphere (same as the entire European Union).</p>	<p>Three possible scenarios; “back to neutral”, La Niña (cold weather event) or a prolonged El Niño with a “back to neutral” scenario most likely (50% chance of occurring); combining 1997 and 1998, fires could cost SE Asia \$5-6 billion if fires continue until the last quarter of 1998 (half due to smog and the other half to the environment); 1998 losses could be 0.5% of the GNP for Malaysia, Indonesia, and Singapore.</p>
<p>Brunei</p>	<p>Drought, fires, and smog; hazardous smoke levels; school closings; thousands attending prayer sessions.</p>	
<p>Indonesia</p>	<p>Drought, fires, and smog (although rains have fallen in West Java, the southern part of Sumatra island, West and Central Kalimantan, South Sulawesi and Irian Jaya); \$1 billion in losses in 1997 (mostly in medical costs, and lost tourism); some protest and riots from high food prices and anger over the nation’s economic and political problems (compounded by drought); rains have helped many crops (rice, cocoa, coffee, rubber, and palm oil); coffee consumption has dropped by 30-35% since last July to save personal money; increased number of Indonesians attempting to enter Singapore and Malaysia illegally.</p>	<p>Coffee output to reach 330,000 tons in 1998 (same as last year due to rains since January); need \$1 billion worth of rice in 1998/99 (April-March) and \$300-500 million in other goods (food, medicines, and hospital supplies); future relief efforts would focus on supplying and distributing commodities, trade financing, subsidizing prices, and increasing employment.</p>
<p>East Kalimantan</p>	<p>Drought, fires and smoke; 350,000 acres of forest, plantation, and farmland destroyed by fire since January; 900-1,000 active fire sites; \$8 million in losses over the last two months; \$6 million pledged by the US and Asian Development Bank to fight the blazes and deal with the smoke this year; increased fire fighting efforts; fires destroying homes; smoke affecting wildlife and thousands of people; a quarter of Kutai National Park (125,000 acres) burned last week and another quarter previously; not enough water to fight fires; fires have destroyed orangutan and other forest animal’s habitat (crocodiles, bears, buffaloes and birds) and trees that they rely on for food; orangutans have been fleeing the fires and are encountering people (often killed for food or by poachers).</p>	
<p>Philippines</p>	<p>Drought and fires; imported 650,000 tons of rice; closed Mount Apo to climbers to reduce fire potential; 12,350 acres of forest burned on Palawan Island (home to several endangered animals); 270 mountain tribesman abandoned their villages.</p>	<p>Could import a million tonnes of rice (including the 650,000 tons already imported) this year if rains fail in May (up from 720,000 tons last year; floods toward the end of the year; 12.72% drop in unmilled rice yield in the first half of this year.</p>

<p>Southeast Asia (cont.) Malaysia</p>	<p>Prolonged drought; dry spell in Sabah, East Malaysia, has destroyed 2,720 ha of paddy and cash crops (affecting 5,045 farmers); water shortage in eastern, northern and southern Kuala Lumpur (600,000 residents without a continuous supply for the last few weeks); implemented water rationing; deployed 125 extra water trucks, and began construction of two water treatment plants (US\$376.4 million) in Kuala Lumpur.</p>	<p>Palm oil production may drop to 8.7 million tons from last year's 9.1 million tons.</p>
<p>Singapore</p>	<p>Hot and dry weather; water stocks have fallen to 73% at the end of March from 85% at the end of February; water use is up 3.2% from last March; promoting urban water conservation; smog in 1997 cost US\$64 million (\$81.1 million to tourism; \$12.5 million for health costs; and \$9.7 million to the airline industry); 15% decline in tourist arrivals from Dec-Jan from last year's totals.</p>	<p>Water stocks may drop further with the dry season ahead; more stringent water conservation measures may be enforced; 8-10% reduction in tourists in 1998 from 1997 levels (without returning smog this year); US\$930 million in losses to tourism if the smog returns.</p>
<p>Thailand</p>	<p>Drought and fires: fires in the north and northeast (in the Huay Kha Khaeng Wildlife Sanctuary and the Khao Yai National Park - tens of thousands of hectares of forest burned since November) and peat swamp forest fires in the South (at Toa Daeng); 3,600 ha of deciduous forest has burned; up to 90% income reduction to longan orchard growers in northern Lampang province.</p>	<p>Continued fires and drought; reduce Nov-June cane production from 44.56 million tons to 42 million tons; a decline in sugar exports to 2.4 million tons from 4.0 million tons in 1997; rice output is expected to rice 10% because of improvements in crop productivity (i.e. hybrids).</p>
<p>Vietnam</p>	<p>Drought, fires, and pests (though northern farmers have had some recent rain); rainy season ended one to two months earlier than usual in 1997 and precipitation has dropped 10-70% (10-20% in northern provinces; 20-30% in the central and central highland provinces); lowered rivers and reservoirs (lowest in 20 years); seawater is invading rice fields in southern and coastal areas; salinization of the soil has worsened; 290 forest fires last year with 1,361 ha of forests destroyed; 200 fires this year damaging 4,700 ha of forest; police and military forces have been mobilized to monitor forests during this drought; 140,000 ha of rice and other spring crops have been "ravaged" by rats.</p>	<p>Prolonged drought would affect hydroelectric power (the main power supply) and agricultural/industrial production; heat wave until mid-May; drought will affect 20,000-25,000 ha of paddy field in the northern plains, and 40,000 ha in the central provinces; rainy season may be two weeks later than usual.</p>
<p>Kien Giang</p>	<p>Drought; 730 acres of eucalyptus were burned in 17 fires.</p>	
<p>U Minh Thuong</p>	<p>Drought; five fires in the forest buffer Zone and national park destroying 30 ha of cajeput.</p>	
<p>Mekong Delta</p>	<p>Tropical storm and drought; since November crops and forests have been threatened by drought.</p>	

<p>Eastern Asia China</p> <p>Hebei Province</p> <p>Liaoning Province</p> <p>North China</p> <p>Shaanxi Province</p> <p>North Korea</p>	<p>Droughts in the north and floods in the south; drought affected 3.96 million ha of cropland in China by the end of February. Worst drought since 1949 (founding of New China); (although recent rains); drought since April caused decline in autumn crops on 1.95 million ha of farmland, drinking water problems for 1.15 million people and 2.03 million head of domestic animals, and a one billion kg decrease in grain yields last year; 533,333 ha of wheat and the spring sowing are still at risk in the south of the province.</p> <p>Worst drought since 1949; higher than normal temperatures; Nov-Feb precipitation was 40% below average and water levels falling by 43% (in the seven major reservoirs); 18 of 21 major rivers in Fuxin County are dry; affected 1.83 million ha of land; urging water conservation and more efficient irrigation technology.</p> <p>Drought; decrease in winter rainfall by 20-90% from last year.</p> <p>Drought since August (worst since 1949); February rainfall was 70-90% less than the year before; affected over 120,000 ha of farmland and “withered” 73% of the crops.</p> <p>Drought, floods and typhoons over the last three years; in need of 2 million tons of food as well as, drinking water and medicines (although need figures vary widely); World Food Programme appealed for \$378 million in food aid in February; epidemic diseases (tuberculosis, typhoid, cholera) from clean water shortages; malnutrition; many deaths (one source says as many as 3 million in the last two years); many people eating tree bark and pine cones to supplement their diet; increase thievery.</p>	<p>Could run out of food by April; many more deaths.</p>
<p>Southern Asia India</p> <p>Sri Lanka</p>	<p>Drought and pests last year; drought in southern India from June-August of 1997 followed by pests that destroyed cotton and tobacco crops; up to 149 farmers committed suicide because of loan repayment problems.</p> <p>Drought; below normal rainfall on most parts of the island; decline in reservoir levels; stressing water conservation.</p>	<p>1997/98 (Oct-Sept) cotton crop forecast down to 14.8 million bales (17.65 bales produced in 1996/97); current rapeseed crop decline to 1.70 million tonnes from 2.14 million tons previously.</p> <p>A 15% reduction in production if drought occurs; water rationing by mid-April; no rain until the May monsoon.</p>

<p>Middle East Cyprus</p>	<p>Worst drought in history; all reservoirs now hold only 12.2% of their capacity (they have 33 million cubic meters of water); dam inflow totaled 12.7 million cubic meters this meteorological year (ten year average of 87 million cubic meters); continuing to subsidize borehole drilling for domestic sanitation; making available recycled water for crops.</p>	<p>Plan to build a second desalination plant; planning to complete a pipeline from the Dhekelia desalination plant to the capitol.</p>
<p>West Africa Ghana Ivory Coast Togo and Benin</p>	<p>Drought; lowered reservoir and river levels; reduced hydroelectric power production capabilities; contracted with an independent power producer to provide additional power; the Ivory Coast has agreed to increase the power distribution to Ghana; power rationing since January 10th (first 30%, then 50%, and now use is reduced to 12 hours of power out of every 36). Mixed reports; reported rains by French cocoa traders contested by London-based traders; cocoa traders in Gagnoa and coastal areas reported continued dryness and some fires but little damage to cocoa crops. Losses in available power due to drought in Ghana (Ghana supplies a large portion of their power requirements).</p>	<p>Slightly lower cocoa yields than last year.</p>
<p>Central Africa Tanzania</p>	<p>Drought and floods; the World Food Programme has pre-positioned 16,000 tons of food to distribute to drought-affected people (NGOs have distributed 8,500 tons of the food); some people are walking 50 km to collect their yellow maize ration (although only white maize is traditionally eaten).</p>	

<p>Southern Africa</p> <p>Lesotho</p> <p>Namibia</p> <p>South Africa</p> <p>Zambia</p> <p>Zimbabwe</p>	<p>Previously: late rains in South Africa, Zimbabwe, Lesotho, Botswana, and southern Zambia added to drought predictions but rains in January in some areas dispelled many fears (while floods would affect parts of Tanzania, Malawi, Swaziland, and Mozambique, although few affects in the latter three countries).</p> <p>Currently: prolonged dry spells in South Africa, Lesotho, and Zimbabwe, and excessive rains in Tanzania, Malawi and Mozambique may reduce April harvests. 34% decline in maize harvest from last year's 142,000 tons.</p> <p>Beginning of drought; threatening parts of the far north of the country (especially the Ohangwena and Omusati regions); muhangu crops are being affected; water and grazing for animals is becoming limited; farmers are driving animals inland from the cattle posts early; commercial farmers could lose their crops unless it rains soon; several taxes were increased to prepare for drought, raise some salaries and control the national deficit;</p> <p>Maize production down to 7.3 million tons from last year's 9.0 million tons.</p> <p>Drought and floods; 489 tons of food and equipment (worth \$310,815) to flood and drought victims by the WFP (i.e. maize meal, high protein supplement and vegetable oil, spades, shovels, picks, rakes, wheelbarrows and buckets); over 886,111 people in 34 districts are in need of relief; drought in the Southern Province (the government claims to be ready to avert a food crisis).</p> <p>Late and sporadic rains; reduction in this year's early maize crops (1.41 to 2.01 million tons from last year's 2.1 million tons) as farmers planted less for fear of drought (20-25% reduction in plantings from last year); farmers also purchased less crop inputs (i.e. fertilizers), cared less for their crops, and held onto grain reserves for fear of drought; rain in January caused many farmers to begin replanting a late crop and disposing of their stocks creating a temporary lowering of maize prices (from ZW\$3000/MT to ZW\$2400/MT); the early planted crop has done well and reached maturity while the late crop experienced a dry spell in February (and needs more rain in April to recover).</p>	<p>Poor weather, floods and fear of drought led to a reduction in planted area and will lower cereal output by 8% (maize 15.9%) in southern Africa this year and into next year; maize harvest may range from 14.34 to 17.46 million tons (compared to last year's 17.05 million tons); countries in the region may need to import 4.7 million tons in 1998/99 (April-March).</p> <p>Drought relief needed by 231,000 people in the coming months; below to normal rainfall is expected for the entire country; late rains and dry spells in February have lowered 1997/98 maize estimates to between 92,000 tons and 113,000 tons (from 173,000 tons in 1997).</p> <p>Will conduct another needs assessment from drought and floods in June for contingency planning.</p>
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