



AP[®] Environmental Science 2002 Sample Student Responses

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An El Niño is a severe climate shift that disrupts interaction between the ocean and atmosphere. It alters the normal pattern of temperature and wind. Often during an El Niño, the ocean waters increase in temperature. El Niño occurs mostly along the equator, but its effects spread all over the world.

When an El Niño occurs, the climate generally becomes warmer. Warmer climates create suitable conditions for diseases such as malaria to ~~become more~~ occur more frequently. ^{Because the vectors of these diseases thrive in warmer weather.} More frequent occurrences of ~~the~~ transmittable diseases mean that ~~more~~ a greater number of people contract and therefore ~~spread~~ spread the diseases, meaning more people contract the disease. Cholera and yellow fever, the two disease epidemics reported in the article, are diseases that have vectors that become more abundant in warm weather, meaning that an El Niño would encourage the spread of these diseases. Therefore, the article is correct in its reporting of these epidemics.

People in Africa, ~~Asia~~ and South America, as well as parts of Asia, would be most likely to be affected by this link between El Niño and disease. This is because El Niño would be the most influential ~~to occur~~ in a climate that already has warm weather. The equator is the place where El Niño would create the highest temperatures, and these areas are

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located on the equator.

One environmental problem associated with El Niño is the death of many fish that are harvested from the ocean. This is because El Niño warms the water. Fish ~~can only survive~~ have a certain range of tolerance when it comes to temperature, and if the water ~~exceeds~~ temperature exceeds a fish's range of tolerance, the fish will die, and biodiversity is reduced.

Another environmental problem that could occur because of El Niño is extreme environmental conditions such as drought or flooding. With severe weather changes, an area could experience more or less rain than it is used to. This ~~could result in erosion, because~~ more rain could result in mudslides which could damage forests. Less rain could result in drought, ~~where irrigation would have to be used which possibly causing erosion~~. A drought could cause problems such as plants dying and not holding the soil in place, contributing to erosion, or even another dust bowl.

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A) The event of El Niño occurs in the Eastern Pacific waters but affects the entire world.

During ~~an~~ a normal year winds along the Inter Tropical Convergence Zone flow from East to west and push the warm water along with storms to the western Pacific. This flow helps the nutrient rich water in the eastern Pacific to rise and hold many fish.

During an El Niño year the winds either calm or shift to the east and bring the warm waters towards South America. This area becomes active with storms and the water temperature rises. This changes the global track of the Jet Stream, which guides storms and is related to global weather patterns.

During an El Niño year droughts occur in usually moist areas and vice versa.

El Niño is the shift in global weather patterns due to the disturbances generated from the warm ocean water.

B) Climate change and the transmission of diseases can be clearly linked. If an area becomes flooded from the change in the Jet stream due to El Niño, disease can be present in the water and affect many

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people. Bodies and fecal matter can flow in the flooded waters and spread such diseases as cholera and yellow fever.

c) People in less-developed countries and flood prone areas would be ~~affected~~ affected by the link between El Niño and disease. Flooding in South America due to El Niño is a problem because they are less-developed and disease ~~is~~ spreads easily through the flooded waters.

d) Two other important environmental problems are forest fires due to the lack of precipitation in some areas and depletion of natural habitats for animals due to the destructive weather resulting from El Niño.

- a) El Niño is a climate shift that causes ocean ~~waters~~^{winds} along the west coast of South America to change direction, thus disabling the natural upwelling of cold, nutrient rich water along that coastline. Warmer, wetter weather causes violent storms and disrupts ocean and wind currents.
- b) Diseases thrive in warm, wet environments, and the El Niño weather pattern keeps ~~water~~ many areas much warmer and more humid than normal. Both cholera and yellow fever are waterborne diseases, suggesting that the article is correct on its reporting of epidemics of those diseases.
- c) People in South America and Africa, with poor water quality and sanitation would most likely be affected by the disease linked to El Niño. Less developed countries affected by El Niño weather patterns will be most susceptible due to lack of good health care and potable water. ~~Important~~
- d) Without ~~the~~ wind blowing along the ocean's surface in the proper direction, cold and nutrient-rich water off the coast of Argentina cannot surface in the natural upwelling process. This causes food shortages for marine

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organisms in this area and destroys the fishing-based economy of the coastal countries. Climate shifts also occur, pulling precipitation to areas usually dry, which causes severe flooding and erosion, and leaving seasonally wet areas facing severe drought and ecosystem debilitation. ~~Water-dependent regions~~