**PAESTA Podcast Series – You Asked, We Answered!**

**Episode 25- What causes drought?**

Madison Stewart, undergraduate student, Penn State Brandywine

Hello listeners, my name is Madison Stewart and I am an undergraduate student at Penn State Brandywine. Today I am here to answer the question “What causes drought?” This is a question that certainly has more than one answer. Typically, it is believed that drought is caused by lack of rainfall, which is partly true. However, there are actually different types of drought and each have different causes. [1,2] A meteorological drought is caused by lack of precipitation and moisture. This type of drought occurs when a specific region receives less rainfall than it normally does. For example, 20 inches of rainfall may be normal in some parts of Texas, but not in Washington State. Another way to think of a meteorological drought is in terms of degree and duration of dryness particular to a certain region. Winds and high temperatures are also influencers. Another type of drought is hydrological. A hydrological drought is when water levels are lower than normal in rivers, streams, and reservoirs due to lack of precipitation. Third, there are agricultural droughts. Generally, this type of drought negatively impacts farmers and crops. An agricultural drought occurs when there isn’t enough water to meet the demands of crops during different growth periods. For example, if there isn’t enough moisture or water during a particular stage, plant growth will be affected. This is a problem because it can negatively impact plant populations. Numerous factors cause this, such as not having access to water supplies, the timing of when water is obtainable for use, and lack of precipitation. Lastly, the fourth type of drought being discussed today is socioeconomic drought. This type of drought occurs as a result of the conditions of a hydrological, meteorological or agricultural drought. [2,1] A socioeconomic drought is when the demand for goods is greater than the supply. The lack of supply is due to a shortage in water, which is caused by the weather. An example of this is excessive irrigation**.** Various factors can worsen this type of drought, such as an increase in both population size and demand for goods. This means that humans can play a part in causing drought. Activities that humans perform can lead to drought. How much water we consume and the timing of consumption also act as contributors. Other than the causes of drought we just discussed, there are also multiple factors that contribute to drought.

For instance, drought is connected to climate change. [3] A majority of precipitation is falling as rain. Snow is also melting earlier, which leads to a rise in evaporation and transpiration. Evaporation is when a liquid changes to a gas. Transpiration is the process in which moisture moves through plants and eventually turns to vapor. Therefore, as temperatures rise, both hydrological and agricultural droughts are at risk of increasing because water supply is lacking, which makes it hard to meet demands. [4] In addition, NASA, or National Aeronautics and Space Administration, point out that there are 3 main contributors to drought. The contributors are: land and sea surface temperatures, atmospheric circulation patterns, and soil moisture content. Sounds confusing, right? Well allow me to break it down for you. A change in one of these contributors can cause a change in the other. First we will discuss how land and sea surface temperatures contribute to drought. With the help of global climate models, researchers found that as surface temperatures increase, there is also a rise in water evaporation, which leads to more radical weather events, such as drought. For instance, in the warmer months, the temperature of land surface has a direct relationship to how much moisture there will be. As for soil moisture, when soil is dry, there is almost no water to evaporate, which means the sunlight will continue to warm the surface. Therefore, conditions become drier. This is the start of a snowball effect leading toward drought. When surface temperatures are irregular, this causes atmospheric circulation patterns to be irregular as well. Atmospheric circulation is a big movement of air that spreads heat on Earth’s surface. In turn, precipitation patterns also change. Changes in atmospheric circulation patterns can cause storms to be interrupted for long periods of time. These changes mean that some regions receive above average rainfall, while other regions experience drought. [5] El Nino serves as an example of this. El Nino is when the surface water in the Pacific Ocean and South American Coast increase in temperature. The warm water interrupts storm patterns, making it a contributor to drought. La Nina is also associated with drought. However, this is when surface water in the Pacific Ocean and Coast of South America drop in temperature. Colder water also has the ability to interrupt storm patterns. The Dust Bowl of the 1930s and 1988 drought are two historical droughts and are linked to La Nina. As you can see, there are many causes and contributors to drought and I hope this podcast helped you to gain a better understanding of them. Thank you so much for listening.

*(This audio file was recorded by Madison Stewart, undergraduate student, Penn State Brandywine, on April 12, 2016.)*

**Works Cited**

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[3] Causes of Drought: What’s the Climate Connection? | Union of Concerned Scientists. (n.d.). Retrieved February 2, 2016, from <http://www.ucsusa.org/global_warming/science_and_impacts/impacts/causes-of-drought-climate-change-connection.html#.VrEqzemucb1>

[4] Dry Times in North America : Feature Articles. (n.d.). Retrieved February 10, 2016, from <http://earthobservatory.nasa.gov/Features/NAmerDrought/NAmer_drought_2.php>

[5] Drought. (n.d.). Retrieved February 10, 2016, from <http://education.nationalgeographic.org/encyclopedia/drought/>