The Effects of Climate Change on Desertification

**Introduction:**

Throughout this course we have looked at cases in which rivers affect multiple countries without concern for political boundaries. My intention with this subject is to show that neither do clouds (more specifically, the hydrologic cycle) have any concern for political boundaries, and the affects of desertification are increasingly important throughout the world, as a third of the world is considered to by dry-lands.

**United Nations Conference on Desertification in 1977:**

Between 1965-1973, the Sahelian zone in Sub-Saharan Africa experienced a terrible drought which resulted in famine and mass migrations from the area. This famine led to the death of a quarter million people and alarm throughout the world. In response, the United Nations Conference on Desertification of 1977 was formed in an effort to combat the effects of the Sahara desert moving southward into the Sahel at a rapid rate. The Plan of Action to Combat Desertification was signed and desertification was brought to the attention on the world stage.
Definition:

There is a very loose definition of desertification that is used by a variety of people. The United Nations Convention to Combat Desertification in 1994 defines desertification as:

“land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Desertification is the degradation of land in arid, semi-arid and dry sub-humid areas. It is caused primarily by human activities and climatic variations. Desertification does not refer to the expansion of existing deserts. It occurs because dryland ecosystems, which cover over one third of the world’s land area, are extremely vulnerable to over-exploitation and inappropriate land use. Poverty, political instability, deforestation, overgrazing and bad irrigation practices can all undermine the productivity of the land.”

Warren and Agnew argue that many people will misname desertification as the expansion of existing deserts in order to receive more donor money or political support, and that an accurate definition is necessary in order to adequately diagnose the problem and to have an appropriate solution. They would prefer to use the word “land degradation” instead, as desertification is only a subset of the wider category of land degradation.

Climate Change:

Rain data shows that the 300 mm/year isohyet line in the Sahel area has moved 100 km south between the periods of 1950-1967 and 1968-1997. This indicates that the area is becoming more and more arid, and that the already stressed populations will become more vulnerable. This is the result of positive feedback cycles on a global and local scale. Global climate change affects desertification through changes of the patterns of temperature, precipitation, solar insulation, and winds. In return, the dying vegetation releases carbon dioxide and erases a carbon sink, so as to increase the global climate change. A stronger feedback loop in the case of desertification exists with the regional climate change. Apart from surface water, the only input to the hydrologic cycle in this region is from transpiration. The vegetation acts as a storage of moisture which it will than transpirate into the atmosphere. However, once vegetation is removed for agriculture or forestry, there is less of a moisture sink, which in turn means less transpiration and less precipitation. The lack of precipitation kills off more vegetation and makes the situation even worse. Studies have shown that the deforestation of rain forests in the Republic of Guinea and the Ivory Coast may be reducing the transpiration inputs necessary for the Sahel region to the north.

Skeptics:

There were many skeptics who arose in the 1980s arguing that desertification doesn’t exist, and that the studies performed are using bad measurements and confusing long term changes with the short term changes that happen from a drought. They used GIS maps to show that the effects of the Sahelian drought in the early 1970’s were recoverable. While the skeptics make a good point that the
word “desertification” should be used more carefully, many studies have come out recently showing permanent changes in aridity over periods of time spanning more than just a drought cycle.

**Efforts to Reverse Desertification:**

At first, many donors would pay huge sums of money to plant large numbers of exotic species of vegetation so as to restore the ecosystem. However, this plan was very short sighted and actually detrimental, as many times the exotics died from shortage of water and actually sucked up too much of the little water available. The most successful projects have been the natural regeneration of native species, in which farmers will set aside parcels of land for keeping vegetative cover. This is a more sustainable form of dealing with desertification, and it requires bottom-up participatory planning methods in order to organize the practice.

**Bibliography**


