

Desertification Fact Sheet

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Some basic facts about desertification

➤ Deserts are of two types: Naturally occurring and man made

1.1 Naturally occurring deserts like the Sahara desert were formed by natural processes interacting over thousands of years. The ecosystem of such paleodeserts is balanced and stable and the fauna and flora inhabiting these deserts have over the years adapted themselves well to live in this hostile environment. Some human communities have also learnt to live in and with these deserts. The oases found in such deserts have enabled cities and colonies to flourish around them. Following the discovery of oil in some deserts, such as in the Arabian Desert, people have been encouraged to establish well developed cities with modern amenities there. These deserts are contained by sea or mountain boundaries which prevent their spreading. Many deserts which do not have such limiting boundaries are reported to spread rapidly and engulf fertile land and human habitations. The Sahara, for example, is said to extend southwards at the rate of 5 to 10 kilometres each year; the Thar Desert as well is reported to engulf several human habitations.

1.2 Man-made deserts are large or small land masses which were once known to be fertile and arable but which have degraded since their ecosystem has been subjected to the stress of various human activities beyond its tolerance limit. The Indus valley was once a very fertile region which invited invaders from the North who came into the country through the Himalayan passes. These hordes looted and burnt in their wake, leaving behind a scorched land which gradually turned into the present-day desert. The process of such extreme degradation is known as desertification. The term 'desertification' was not coined until around the mid-twentieth century though one of the first incidents of desertification was encountered in the 1930's, when parts of the Great Plains in the United States turned into the "Dust Bowl" as a result of drought and poor practices in farming.



Fig. 1 Areas at risk of desertification (Countrywatch, no date)¹

1.3 Desertification affects about 74% of the land in North America. This phenomenon is widespread in many areas of the People's Republic of China, while in Africa, more than 2.4 million acres of land are said to be affected by desertification. Ghana and Nigeria currently experience desertification; in the latter, desertification destroys about 1,355 square miles of fertile land per year. The Central Asian countries like Afghanistan, Kazakhstan, Kyrgyzstan and Turkmenistan are also affected. More than 80% of Afghanistan's land is subject to

soil erosion and desertification and in Kazakhstan, nearly half of the cropland has been abandoned since 1980. In Iran, sand storms are said to have buried 124 villages in Sistan Province in 2002, a region which has been largely abandoned since. In Latin America, Mexico and Brazil are affected by desertification. Even many parts of the once fertile west coast of India are on the verge of turning into deserts.

➤ Causes of desertification

In 1988 Ridley Nelson pointed out that the 'why' and the 'how' of desertification are not clearly defined. There is no consensus among researchers as to the specific causes, extent, or degree of desertification. Nevertheless, some reasons have been given for the phenomenon.

Overpopulation, combined with limited arable land, leads to the overuse of available land. Repeatedly growing the same crop year after year without giving rest to the land to allow it to recover results in soil degradation.

Intensive agriculture practices developed in recent years to meet the growing demand for food result in heavy use of manures, fertilizers and pesticides, the remnants of which pollute the soil making it toxic and unfit for cultivation.

Deforestation: Forests have been cut to meet the basic needs of a fast growing population for housing and furniture and to provide fuel for cooking and green manure for the fields. Open ovens used for cooking consumes a lot of firewood and most of the energy produced is dissipated. It is said that in a few years, people in developing countries may have food to cook but no firewood to cook it! Green manure has been traditionally used to manure the fields before they are ploughed. Green manure is obtained by lopping tree-branches. With repeated lopping, the trees have been first reduced to shrubs and finally to stumps. Unfortunately there has been no effort to replant the trees as the material is collected from public government-owned lands.

Overgrazing: In many countries, and especially in India, there are no designated grazing lands. Cattle are driven into the forests to find fodder for themselves. Overgrazing removes the grass cover of the soil. The cattle also break down dry soil turning it into dust. Wet soil is made hard by the pressure of hoofs preventing the sprouting of seeds. The soil is then degraded and desertified. It is said that the Saheli desert is mostly the product of overgrazing.

Slash and burn cultivation is a normal practice of nomadic people who move to a new place every year and burn new forest patches to grow the crops they need. Tribal Tamilnads in South India are known to practice slash-and-burn methods to produce their crops, resulting in near desertification of several tracts of fertile land.

Growing of cash crops after cutting down forests: Forest land is not suitable for growing cash crops and after a few years it turns into non-arable land. The problem with this strategy is that more and more land gets used for cash crops, so that forests are destroyed to make way for more cultivation.

Studies have shown that, in some cases, trade liberalization, economic reforms, and export-oriented production in dry lands can promote desertification by exerting undue pressure on the land to produce more in order to meet the export demands.

¹www.countrywatch.com/facts/facts_default.aspx?type=image&img=DAG

Consequences of desertification

With loss of forests there is a loss of biodiversity and gene pool reserves. Reforestation done with alien species does not help since the requirements for special plants such as the undergrowth and epiphytes will have lost their 'partners' in the ecosystem.

Without vegetation cover, the top soil is washed away by rain and blown away by winds. The soil washed away by rain usually ends up silting streams and rivers and causing floods. Loss of arable land results in depletion of food reserves. As a consequence, the very livelihood of forest tribals is threatened, especially of those who traditionally have lived from the produce of the forest.

Other consequences:

- Loss of trees affecting the undergrowth, especially the shade-loving herbs and epiphytes.
- Loss of soil fauna. Earthworms which help to turn the soil are especially affected.
- Loss of wildlife due to unavailability of enough or proper food in their regular living space and the resulting intrusion of wild animals into human settlements searching for food.
- Shortage of water due to reduction of catchment areas and drying-up of exposed soil.
- Desertification-induced conditions that intensify wildfires and stirring winds.
- Migration of large numbers of people from the affected areas to cities seeking work and food.
- Increasing difficulty for Ayurveda (Indian medicine system) practitioners, who for ages collected their medicinal herbs from the forests, to get the herbs they need.
- Dust from deserts and dry lands blown into cities around the world. (Dust from Africa reaches Europe through the Passat wind, and even reaches US cities. When dust particles which are less than 2,5 millionths of a meter in size are inhaled, they cause health problems and have been shown to boost death rates).

What can we do about desertification?

➤ Global efforts

1. The ecological crisis is a moral problem as Pope John Paul II has rightly pointed out. It is principally based on selfishness and greed leading to consumerism. Unless there is a real willingness to share the goods of this world justly, there is little that can be done to remove the root causes of environmental degradation. Desertification being also a result of such selfishness, there is an urgent need to create awareness about it. Unfortunately desertification usually is brought to public attention when the process is well underway. It was not possible to combat desertification in the 20th century. Today it is possible to do so provided men and women of good will unite and fight against the encroaching deserts as well as the causes of desertification.

2. The Pulpit, classrooms and social centres should be used to raise awareness about the ecological crisis and desertification.

3. At International and national levels, efforts are made to contain desertification. In the last 25 years, global monitoring by satellites has improved our understanding of desertification. Landsat images of the same area, taken several years apart but during the same point in the growing season, indicate changes in the susceptibility of land to desertification. Studies using Landsat data help demonstrate the impact of people and animals on the Earth. However, other types of remote-sensing systems, land-monitoring networks, and global databases of

field observations are needed to completely understand the desertification process and the problems linked to this phenomenon.

4. Efforts have been made to check the spread of natural deserts as well as man-made deserts. For example, sand fences are used throughout the Middle East and the US, in the same way snow fences are used in the Alps. The placement of straw grids, each up to a square meter in area, has also been found to decrease the surface wind velocity. Shrubs and trees planted within the grids are protected by the straw until they take root.

5. Oases and farmlands in windy regions have to be protected by planting tree fences or grass belts. On a much larger scale, a "Green Wall of China", which will eventually stretch more than 5,700 kilometres in length (nearly as long as the Great Wall of China), is being planted in north-eastern China to protect "sandy lands" – deserts believed to have been created by human activity.

6. Efforts are made to produce through tissue-culture large numbers of trees which are suited for a desert ecosystem. These trees help stabilize the deserts. Such work is being done by the Universities of Jaipur and Jodhpur in Rajasthan, India.

➤ Local efforts

Whereas most of what was said above concerned efforts to deal with global issues — i.e. where individuals or small local groups cannot do anything much — there are areas where individuals and small communities can make a substantial contribution. Some of these are:

- Water harvesting by collecting rainwater. Artificial grooves can be dug in the ground to retain rainfall.
- Contour building and bunds to slow down the fast flow of water which otherwise would carry away the surface soil.
- More efficient use of existing water resources and control of salinity are other effective tools for improving arid lands. Water-saving methods such as drip irrigation allow for the efficient use of water for irrigation of fields and gardens .
- Rational use of resources for domestic purposes – water for cooking, cleaning, bathing, flushing of toilets; solar ovens instead of firewood for cooking.
- Support for the research of natural pesticides; promotion of sustainable agriculture, limitation of overgrazing, reduction of cash crop cultivation on forest land.
- Promotion of reforestation programmes done with native instead of non-native trees.
- Planting of leguminous plants which can fix nitrogen and restore fertility of the soil.
- Proper crop rotation to protect fragile soil, following studies of how sand-fixing plants can be adapted to local environments.
- Planting of windbreaks made from trees and bushes so as to reduce soil erosion.
- Awareness campaigns targeting children and young adults concerning the sacredness of the earth, the forests and water.

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Desertification Blog - Active blog authored by Prof. Dr. Willem Van Cotthem about desertification and techniques to combat it.