

DESERT ECOSYSTEM

What is a Desert?

- A desert is defined as a region which receives an annual precipitation of **less than 250mm** [10 inches] on an average.
- Other than low precipitation, deserts are also characterized by scarce vegetation and extreme temperatures oscillating between 115F or more during daytime and 32F or less at night.
- Deserts have dry climate due to rain-blocking mountain ranges and remoteness from oceanic moisture.

What is Desert Ecosystem?

In an ecosystem, the biological community interacts with the abiological physical environment for its survival.

The desert is characterized by **extreme, specialized and very sensitive ecosystem.**

ADAPTATIONS

**The key to survival in desert
organisms**

Adaptations in plants

- Desert plants have highly modified features that helps them to thrive at extreme climatic condition.
- They have short growing seasons and long dormancies.
- The well known desert plant, cactus is a **succulent**, meaning it has thickened, fleshy parts to store water.
- Stem is the only part that stores water and water is stored as a thick viscous liquid.
- Cacti stem is called **phylloclade**.
- Cacti have lost true leaves during their adaptation, retaining only **spines** which are

Adaptations in plants

highly modified leaves.

In the absence of true leaves, the stem performs **photosynthesis** with the help of stomata.

Transpiration, the process in which CO₂ enters and water escapes does not take place during day at the same time as photosynthesis but instead occurs at night because during the cooler, more humid night hours water loss is significantly reduced.

Adaptations in plants

Another significant modification of cacti is its extensive root system.

The roots may grow upto 100 ft under the soil to access water and quickly react to rainfall by immediately absorbing water that reaches the ground surface.



Opuntia



Golden barrel cactus



Tall columnar cactus



Tree-like cactus



Desert lily

Saguaro flower



Adaptations in animals

- **To avoid heat :** The animals avoid being out in the sun during daytime and live in burrows to escape intense heat.
- **To dissipate heat:** Animals have developed long body parts that provide greater surface area to dissipate heat. Light colours are poor absorbers of heat. Most desert animals are pale in colour which prevents their bodies from absorbing more heat from the sun.

Adaptations in animals

- **To absorb water:** Desert animals have extra tubules in their kidneys that help them extract most of the water from their urine and return it to the bloodstream and usually the wastes are secreted in the form of insoluble uric acid. They also filter the moisture out of their exhaled breath through specialized organs in their nasal cavities.
- **To preserve water:** Water is stored in fatty tissue whose oxidation releases energy as well as water.



**Dromedary
camel**

Bactrian camel





Gila monster



Coyote



Desert Iguana



Desert tortoise

Courser bird



Fennec fox



Hawk



**Roadrunner
bird**



Desert Farming

Is it possible?

YES

Desert farming has become a possibility today and the best example is the **IMPERIAL VALLEY**

The Imperial Valley

- The Imperial valley is located in the **Sonoran desert** of Southwestern California.
- High temperature and low annual rainfall of 3 inches [76 mm]
- Thousand's of acres of desert land have been transformed into one of the most productive farming regions in California with an annual crop production worth \$1 billion.

The Imperial Valley

- Water distribution includes 1400 miles [2300 km] of canals and 1100 miles [1800 km] of water pipelines.
- Water is supplied from the **Colorado river** via the All American Canal.
- Major crops grown in the Imperial Valley are **winter fruits, vegetables, cotton, grains and Alfalfa.**



An aerial photograph showing a long, straight canal cutting through a vast, arid, brown desert landscape. The canal is filled with water and runs parallel to a road. The surrounding terrain is rugged and lacks vegetation.

**All American
Canal**

An aerial photograph of the Imperial Dam, a large concrete structure across a river. The river is blue and flows through a valley. In the foreground, there are large, rectangular agricultural fields with a grid pattern, some of which are green, indicating irrigation. The background shows a city and more distant mountains.

**Imperial
dam**