

Agriculture in Southern California

The Central Valley of California is the main area for agriculture. The most fertile land and warmest climate is found in the southern of the two valleys, the San Joaquin valley. However, this southern valley while having 75% of the best farmland gets only 25% of the precipitation. Irrigation is essential. The water that falls in northern California and in the Sierra Nevada mountains to the east (relief rainfall and snow) is stored behind a series of dams such as the Shasta and Folsom dams and transferred to the south by canals and aqueducts such as the Delta Mendota canal. This is the Central Valley Project. The more recent California State Water Project (SWP) has improved and extended the schemes and the California Aqueduct now provides water for irrigation (30%) and also for urban areas (70%). Farming is intensive to get the highest yields possible to pay for the high cost of the water. Crops such as fruit and vegetable are common, grapes (for wine), lettuces, tomatoes, peaches and in the far south citrus fruits. Crops are irrigated by sprinkler systems and farmers use high technology methods, pesticides, fertilizers etc to improve yields. California is the main state for all of the above crops .

Further south the Coachella and Imperial valleys have been irrigated to make farming very profitable. Both are desert areas where annual rainfall averages only 3" and summer temperatures reach 35 C. The Coachella canal and the All American canals from the river Colorado provide the water for the crops and for the urban areas such as Palm Springs. 25% of employment is based on farming, 95% of the USA date crop comes from these areas and lemons, limes and oranges are important.

Agriculture uses a vast amount of water which is very expensive to provide, although many of the dams and reservoirs are multi-purpose. Overuse of water has also led to the salinisation of soils due to high levels of evaporation. In other places poor water management has led to water logging, in both cases land is useless and more soil erosion may occur. Use of ground water supplies has depleted them, lowered the water table and led to ground subsidence.

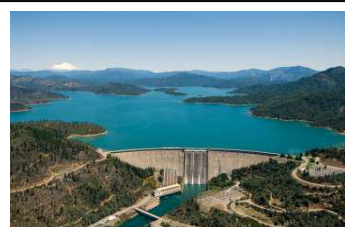
Farmers are now encouraged to use sprinkler systems and drip systems which are up to 100 times more efficient than the old open ditch systems and to grow less water dependent and higher yielding crops. It is likely that in the future farmers will also be charged more for their water.

Other attempts to make water use more sustainable include considering the ecological footprint of all development and stewardship, a partnership with farmers and environmental agencies to manage groundwater supplies, soils and aquatic ecosystems, use more grey water, prevent fires and conserves wildlife, fish and birds.

Multi purpose HEP schemes in SoCal

Over 10% of the energy needs of California are usually provided by HEP, although this has fallen in the recent drought. Most HEP schemes use the higher winter relief rainfall and spring snow melt of the Sierra Nevada mountains stored in reservoirs by dams to produce the electricity. This energy is renewable and 'green' as it produces no carbon dioxide and has no impact on global warming; it is also safe, flexible, cheap, after the initial cost of the dam, and reliable. Most schemes are multipurpose as they also prevent floods, replenish aquifers, provide water for urban areas and provide recreation opportunities.

Some environmentalists oppose large HEP schemes, however, and valuable farmland may be flooded and historical and cultural sites of indigenous peoples such as the 'Wintu' indians may be lost. Dams and reservoirs also have a negative impact on aquatic ecosystems endangering species and reducing biodiversity.



The open plains of the Mojave desert and mountain passes where winds are strong and unhindered by vegetation are perfect for the generation of electricity using wind turbines in large wind farms. A Mega-project at Alta produces enough electricity for 600,000 homes. The area near Palm Springs also has any wind farms, but at the moment only 3-4% of Californias energy comes from the wind. Cheap, clean and renewable it helps with energy security for California and the USA.

Conservation and environmental groups are, surprisingly, against some of the plans despite winds green credentials. Wind farms affect the quality of views and this has a negative impact in conservation areas and National Parks. Tourism can be affected and the turbines have a negative impact on the ecosystem, flora and fauna. Birds are said to be killed by the rotating turbine blades and bats lungs have been shown to explode due to pressure variations.



Winds farm in the Mojave desert

Southern California

Development opportunities / challenges / exploitation / management sustainability

Other threats / issues / development opportunities

Tourism is a very important source of revenue in southern California. The Palm springs area to the south of LA has the benefit of mild winters, very hot summers with temperatures in the high 30's and very low rainfall. Golf is a major attraction but also major water user of water. The Coachella Valley Preserve also uses the desert scenery as a tourist attraction with scenic trails, desert tours, mesas and buttes. There are also desert hot springs, which also produce geothermal energy, and oases with desert palms. The film industry is also based around LA. The ideal, dry sunny weather and the varied terrain drew the film industry to the area in the early 20th Century and it has remained. Hollywood, Universal studios and the Oscars are also major tourist attractions. The aerospace industry was also drawn to the area by the clear skies, low rainfall and attractive lifestyle for employees and the state is still the largest aerospace employer in the USA. Links have been developed with Caltech University research departments and the Jet Propulsion Laboratory. California hopes to develop new groundwater sources and improve recycling in urban areas and industry, especially in view of the recent drought and the chances of future droughts. The River Colorado will be a less important source of water in the future as Arizona takes more water.

Solar power in the Mojave desert

The Mojave desert in Southern California is an excellent place to generate solar energy due to its clear skies and long hours of sunshine. The Mojave Solar Park has been set up with the most recent solar installation at Ivanpah, where enough electricity will be generated to provide for 140,000 homes. It is thought that eventually solar power could provide for all the electricity needs of California. This clean, renewable energy will save 400,000 tons of carbon dioxide emissions. During the building phase it provided 3000 jobs and there will be 90 permanent employees. This brings increased revenue and more taxes to the area which can benefit from the multiplier effect.

There are drawbacks. The area is a National park and the residents and visitors will be affected by increased traffic and noise pollution and the decrease in the beauty of the desert. The energy park covers 14sq km. 100 species of plants are now endangered and animals like the desert tortoise are losing their habitats, having their migration routes threatened. There is a loss of water and a destruction of the soil which can capture less carbon. Not only is the ecosystem stressed but some birds have been burnt and butterflies and dragonflies killed by the concentration of solar energy by the mirrors.



Urbanisation and water supply in SoCal

Water supply is a major problem in southern California. The city of Los Angeles with a population of nearly 4million has always had a problem supplying clean fresh water to the city and its people. Rapid growth in the 20th Century produced a 'spread city' of low rise low density housing, "suburbs in search of a city". The city has spread over the whole of the low lying Los Angeles basin has been called 'sixty mile city' and the water problem is made worse by the lifestyle in California with its swimming pools and lawns fed by sprinkler systems. The State Water Project (SWP) helps bring water for California. 10% of the water comes from underground aquifer sources that are declining, and the rest is imported from further afield, from the River Colorado to the south via the Colorado aqueduct and from the Sierra Nevada mountains to the north via the LA aqueduct. The problem is the simple imbalance between the main water supplies in northern California and the major centres of population in southern California. The SWP provides water for 23 m people.

The recent droughts have shown that this situation is not sustainable and policies are being put in place to improve the water situation. Excessive groundwater extraction has lowered the water tables and allowed the intrusion of salt water into the aquifers in coastal areas. New laws will regulate extraction. There are also attempts to recycle water, especially 'grey' water, to be used for lawn and golf course irrigation. Conservation regimes are being put in place and new toilet flushing systems will reduce water use by 75%. New measures will reduce leakage and evaporation losses which at the moment stand at 25%. Any new urban developments will need to identify sustainable water sources before planning is approved.

