

# Sample research paper on environmental impacts in aviation

[Engineering](#), [Aviation](#)



Environmental impact of aviation arises from emission of noise from aircraft engines and gases which are released. These gases contribute greatly to global dimming and climate change. Despite the efforts of reducing emissions from automobiles and using less polluting turboprop and turbofan and more fuel-efficient engines, the continuous rapid development of aircrafts contributes largely to the total pollution involved in aviation. This has led to a heated debate about introducing high taxation of travelling by air and including aviation in a scheme of emission trading to ensure that all external costs involved in aviation are considered. This paper talks about environmental impacts in aviation, giving some of the effects and possible measures that could be put in place in order to minimise pollution in aircrafts.

Climate change is a major environmental effect from aviation. Different forms of aviation give out carbon dioxide and greenhouse gases into the atmosphere. When these gases are pumped into the Earth's atmosphere they accelerate global warming and ocean acidification for the carbon dioxide. Aviation industry also contributes to environmental pollution by emission of green house gases. This comes from ground airport vehicles, those used by staff and passengers to check in and out of the airport. Carbon dioxide is also produced from emissions that come from generation of energy used in the airport, the construction of airport infrastructure and the manufacture of aircraft. Other emissions that accompany carbon dioxide include nitrogen dioxide, nitric oxide, carbon monoxide and water vapour. There are four ways in which aircrafts in motion cause climate change. Emission of carbon dioxide from aircraft-in-flight forms the major

contribution to climate change. When the aircraft is in motion, the gases produced are pumped directly to the atmosphere in their exact concentration. Increase in the levels of carbon dioxide in the atmosphere results to climate change. In the event of downfall, rain water combines with carbon dioxide forming a weak carbonic acid which results to formation of acid rain. The second way in which climate change arises is from oxides of nitrogen. At high altitudes around tropopause layer, emission of oxides of nitrogen ends up forming an ozone layer in the upper part of the troposphere. Greater concentrations of ozone in high altitude regions (8-13km) may result to global warming effects. These emissions also reduce methane levels, a green house gas, which results to climate cooling effect. The third way is by the production of water vapour. This is a green house gas which is produced by burning hydrocarbons in the presence of oxygen. Aircraft engines at high altitude produce water vapour which then condenses into droplets forming condensation trails. These trails become line clouds visible in cold conditions and have global warming effect. The fourth way is release of particulates by aircraft engines. These particulates contain sulphate particles and soot. Sulphate particles have the ability of reflecting radiation and therefore bring about a cooling effect. Soot is known to absorb heat and this result to a warming effect. Most of the aircraft engines are powered by combustion and therefore must release small amount of soot. Other forms of environmental pollution in aviation include radiation exposure and noise pollution. Noise is perceived as a form of pollution which is hard to get action and attention on. It is brought about by increased traffic around the airport region, construction buildings around the airport and landing of

planes. Noise pollution has an effect of irritation and unnecessary destruction. Other forms of noise are known to be destructive to hearing system of human. Flying at high altitude like twelve kilometres above, the crews and passengers of jets are exposed to radiation rays. Some cosmic rays are harmful and exposure of the human cells to them has a substantial amount of risk.

In coming up with ways of reducing the effects of environmental pollution in aviation, several measures have been suggested which when put into practise can limit extend of pollution. Improving fuel efficiency through operational management and aircraft technology can reduce the concentrations of harmful gases and carbon dioxide released from aircraft engine and in turn reduces the effects of environmental pollution. This can also be boosted by increasing efficiency of aircraft operation. The aircraft management needs to do a lot research and source for alternative fuels which have less pollution effects and have greater efficiency. Another way that would reduce the problem of pollution is by reducing or limiting air travel basing on social pressure and personal choices, professional and business choices, frequent flyer programs and emissions trading.

The government together with the aircraft management have a big role to play in the reduction of environmental pollution encountered in aircrafts, planes which are in motion, vehicles checking in and out of the airport and most important the aviation industry. Different suggestions have been made and in the struggle of implementing these ideas, the government and management have a role to play in enforcing these ideas and any rules

applicable in order to obtain effective results in terms of reduction of pollution in aviation.

## **References**

Aviation effect on air in quality in the Bay region: environmental studies.

(1971). San Francisco, Calif.: Association of Bay Area Governments.

Schneider, T. (1998). Air pollution in the 21st century priority issues and policy. Amsterdam: Elsevier.

Barnett, V. (1997). Statistics for the environment 3: pollution assessment and control. Chichester: John Wiley.