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# AIRPORTS ACTIVITIES AND ENVIRONMENT

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Webinar on Green airports/ 22 March 2023

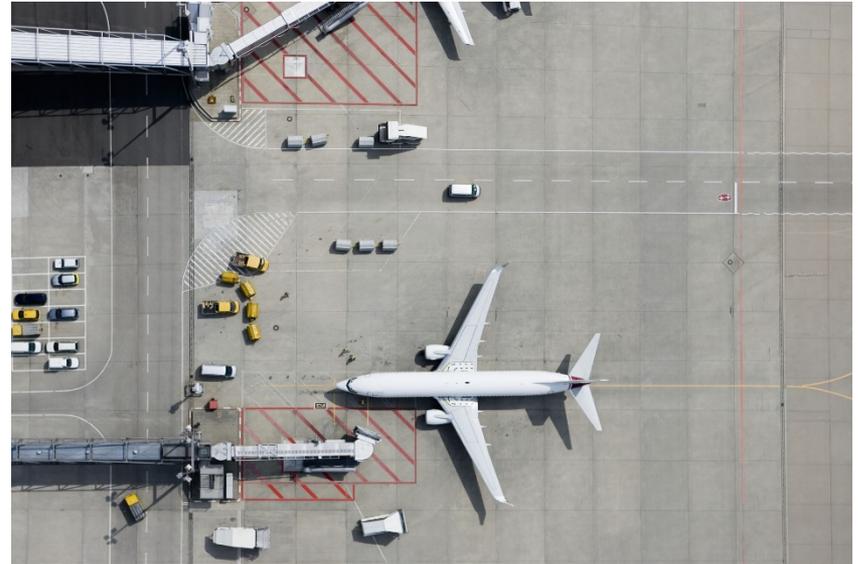


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# Airports and its environs

Airports are defined areas intended to be used either for the arrival, departure, and surface movement of aircraft.

Airports include buildings, installations, and equipment required to achieve the intended use of the airport.

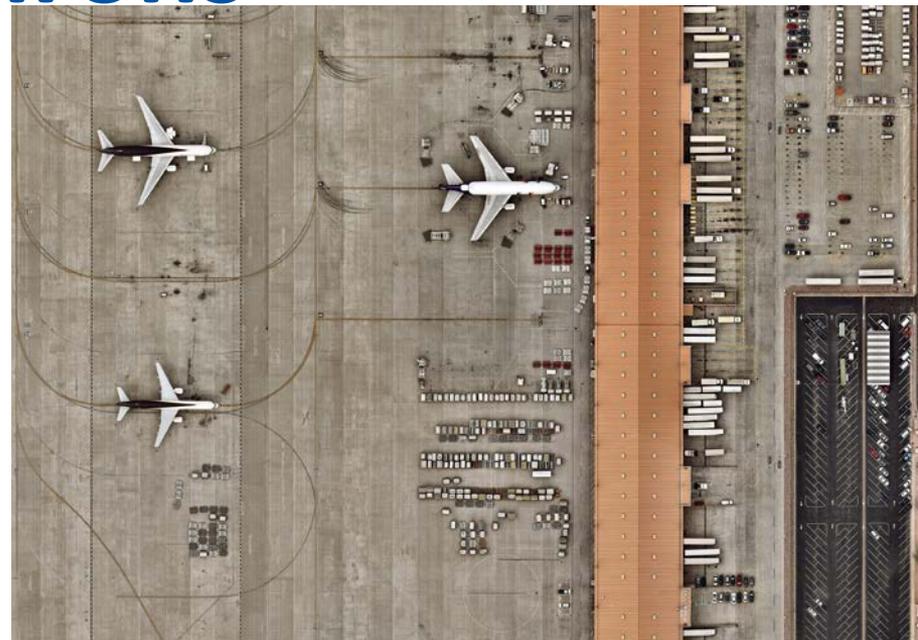




# Airports and its environs

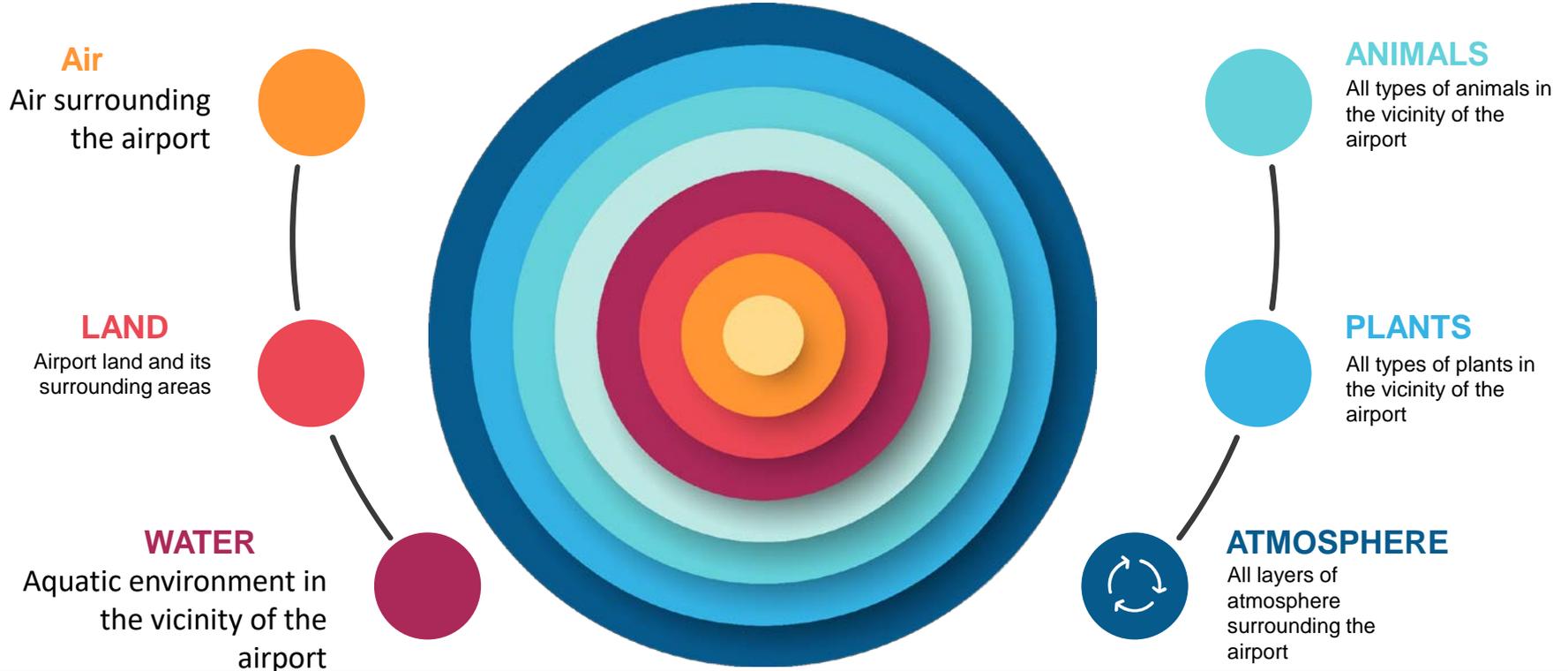
Airports activities include all necessary actions for :

- The safe landing and take-off of aircraft
- The ground handling of aircraft
- The management of passengers and airport users
- The management of ground transportation and access to the airport
- The maintenance of buildings, installation, equipment





# Components of the natural environment at airports





# Airports and its environs

Airports activities may affect :

- People
- Flora
- Fauna
- Atmosphere
- Water courses
- Air quality
- Soils
- Rural areas





# Airports and its environs

All the components interact in an ecosystem, and disruption to one may have a profound effect on the entire system.

To lessen local and global impacts, it is important that airport operators endeavour to control harmful environmental impacts.





# Environmental impact of airport activities

Aircraft noise

Air quality in the vicinity of airports

Global environmental issues arising from airport use

Environmental issues arising from construction and expansion of airports or associated infrastructure

Water and soil pollution in the vicinity of airports

Waste at airports

Environmental emergencies arising from accidents/incidents involving dangerous goods and hazardous materials



## AIRCRAFT NOISE

Since the introduction of jet aircraft, noise has been considered one of the most important local environmental impact associated with civil aviation.

Noise levels in the vicinity of airports are affected by two opposing trends:

- the replacement of noisy aircraft by quieter ones and
- the increasing number of aircraft movements.

As a result, the level of impact from aircraft noise may decline at some airports but increase at others.



## AIRCRAFT NOISE

Other noise sources that occur on and around airports may include (but not be limited to) :

- aircraft engine testing,
- auxiliary power units (APUs) used during ground operations,
- other equipment such as ground power units (GPUs) and
- ground support vehicles and equipment (GSE).



## AIR QUALITY IN THE VICINITY OF AIRPORTS

Air quality in the vicinity of airports can be impacted by sources such as :

- road traffic,
- aircraft engine emissions,
- emissions from airport motor vehicles and
- emissions from other sources (e.g. heating/power plants incinerators and construction).

Air quality also depends on local climatic conditions



## Source of air pollution at airports

- aircraft engine emissions, in which the principal pollutant is CO<sub>2</sub>, while other pollutants are NO<sub>x</sub>, CO, unburned hydrocarbons and PM;
- engine emissions from airport motor vehicles used by airport operators, air carriers and other businesses based at an airport;
- engine emissions from surface access traffic comprising of passengers' and visitors' motor vehicles, cargo and delivery trucks, service and public transport vehicles;
- engine emissions from railways and maritime sources, as appropriate;



## Source of air pollution at airports

- particulate emissions from vehicle tyre and brake wear;
- emissions from heating/power plants, backup power generators, and incinerators, such as fires set for the purpose of training rescue and firefighting crews;
- fuel handling and storage tanks;
- particulates arising from surface erosion of runways, taxiways, airport and surface access roads;
- natural sources; and
- construction emissions.



# GLOBAL ENVIRONMENTAL ISSUES ARISING FROM AIRPORT USE

- Greenhouse gas (GHG) emissions are gases which persist in the atmosphere, can trap heat and cause an increase in global temperatures, and which have the ability to affect the climate and sea levels.
- GHGs include CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>).
- GHGs are primarily generated by fuel combustion. Of the six GHGs, only CO<sub>2</sub> and N<sub>2</sub>O are direct products of jet fuel combustion.
- GHGs can also be emitted in an airport environment indirectly from other sources, such as electrical power generation and ground access vehicles.



## GLOBAL ENVIRONMENTAL ISSUES ARISING FROM AIRPORT USE

- The ozone layer protects the earth from harmful ultraviolet radiation and is being depleted as a result of complex chemical reactions involving man-made gases.
- Chlorofluorocarbons (CFCs) and halons, foams, solvents, and man-made chemicals are the leading cause of ozone depletion.
- Airlines and airports use CFCs and other ozone-depleting substances (such as chlorinated solvents and oxides of nitrogen) in :
  - air-conditioning and chilling systems,
  - degreasers in heavy maintenance operations,
  - cleaning of avionics circuit boards,
  - fumigation operations, and
  - fire extinguishers on aircraft and in computer rooms.



## ENVIRONMENTAL ISSUES ARISING FROM CONSTRUCTION AND EXPANSION OF AIRPORTS OR ASSOCIATED INFRASTRUCTURE

- **Vegetation clearing and interference with watershed patterns** may affect land on an airport by resulting in soil erosion;
- **The siting of some airports may require the modification of the shorelines of rivers, lakes and the sea.** In planning such airports, careful consideration should be given to possible environmental problems associated with water currents, silt deposits, impacts on marine or fresh water life and marine or stream erosion.



## ENVIRONMENTAL ISSUES ARISING FROM CONSTRUCTION AND EXPANSION OF AIRPORTS OR ASSOCIATED INFRASTRUCTURE

- **The utilization of land for airport purposes can cause disturbances to flora and fauna:** airport development work frequently entails clearing and cutting back of trees and other vegetation, changes to the topography of the area, and interference with watershed patterns. Thus airports may destroy the natural habitat and feeding grounds of wildlife and may deplete certain flora that are vital to the ecological balance of the area.
- **There are also potential impacts on human populations :** airport construction may destroy sources of food, water or firewood, or may cause agricultural land loss, a major concern in certain areas of the world.



## **ENVIRONMENTAL ISSUES ARISING FROM CONSTRUCTION AND EXPANSION OF AIRPORTS OR ASSOCIATED INFRASTRUCTURE**

- An important consideration related to airport operational safety is the prevalence and habits of birds in the area and the associated risk of aircraft bird strikes.
- Bird hazards at proposed new airports can be minimized by careful selection of the site to avoid established bird migration routes and areas naturally attractive to birds and by using the land surrounding the airport for purposes which will not attract concentrations of birds to the area



## WATER AND SOIL POLLUTION IN THE VICINITY OF AIRPORTS

- Water pollution can result from direct or indirect discharge of substances into the aquatic environment, leading to alterations in the properties of the natural ecosystems and water chemistry.
- Surface water is most often affected, as pollutants run off the airport pavements and enter into the streams, rivers, lakes, etc. However, subsurface water may also become contaminated when leaks or spills of fluids seep through the soil into the groundwater.



## WATER AND SOIL POLLUTION IN THE VICINITY OF AIRPORTS

Water quality is impacted in three primary ways:

- Toxic effect: Even a small amount of certain contaminants can be toxic to plants and animals as it can cause either short- or long-term (acute or chronic toxicity) consequences;
- Eutrophication: Excessive levels of nutrients can result in prolific algae and plant growth which, in turn, can choke up water bodies, causing long-term degradation in water quality; and
- Oxygen depletion: The release of certain chemicals in water bodies can lead to the consumption of large quantities of oxygen, causing the water to become oxygen-deficient which is detrimental to aquatic life.



## WATER AND SOIL POLLUTION IN THE VICINITY OF AIRPORTS

Water contaminants at airports and their sources include:

- glycol, from de-icing/anti-icing of aircraft;
- pavement de-icers, from de-icing/anti-icing of runways, aprons, and taxiways;
- fuel, from spills during refuelling and leaks from pipes or tanks;
- fire suppressant chemicals and foams dispersed in firefighting exercises;
- dust, dirt and hydrocarbons from paved surfaces; and
- herbicides and pesticides.



## WASTE AT AIRPORTS

- **Daily activities at airports are sources of airport industrial waste:**
  - movement of aircraft and ground vehicles,
  - fuelling operations,
  - aircraft maintenance and repair work (including painting and metalwork),
  - engine test cell operations, and
  - ground vehicle maintenance

**The disposal of environmentally harmful materials used in aircraft servicing and maintenance (e.g. oils, cleaning fluids and paints) and of waste from the airport and incoming aircraft should be managed effectively.**



## ENVIRONMENTAL EMERGENCIES ARISING FROM ACCIDENTS/INCIDENTS INVOLVING DANGEROUS GOODS AND HAZARDOUS MATERIALS

- The types of environmental emergencies at airports include, but are not limited to:
  - fuel and chemical spills and
  - incidents involving dangerous goods or hazardous materials that may affect the environment.
- To ensure that responses to environmental emergencies are implemented quickly, it is important to establish an environmental emergency plan.
- The objective of the environmental emergency plan is to provide a complete and immediate response to an environmental emergency.



# THE NEED OF ENVIRONMENTAL MANAGEMENT

The compatibility of an airport with its environs is an ideal that can only be achieved by :

- proper planning of the airport,
- management of pollution-generating sources, and
- land-use planning of the area surrounding the airport.

**The aim is to provide the best possible conditions for the needs of the airport, the community in the surrounding area and the ecology of the environment.**



# THE NEED OF ENVIRONMENTAL MANAGEMENT

Pollution occurring in and around the airport can have an effect on human health and the ecology of a broad area surrounding an airport.

Efforts should be made towards :

- pollution prevention and
- impact management

**Environmental management provides a means of either decreasing pollution at the source or reducing the potential for negative environmental impacts.**



# THE NEED OF ENVIRONMENTAL MANAGEMENT

**Environmental management controls may include :**

- air and water quality guidelines,
- aircraft engine or ground-sourced noise limits,
- Waste management plans,
- environmental emergency plans,
- and environmental management plans.



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