

Adaptation to climate change in Poland

BASED ON POLISH NATIONAL
ADAPTATION STRATEGY FOR
CLIMATE CHANGE (NAS 2020)



MINISTRY
OF THE ENVIRONMENT



CLIMATE CHANGE

Consequences of climate change, especially significant rise in temperature, intensification of extreme weather phenomena occurring over recent decades are deepening. This is the reason why they have become both common and government's interest.

Did you know ...?

- 13 out of 14 warmest years since 1850 occurred in XXI century, and each of the last three decades was warmer than the previous one.
- Satellite measurements of Baltic Sea indicate sea level rise of around 3mm/year throughout last two decades.



Recent scientific findings indicate that extreme weather phenomena caused by climate change are a great threat to economic and social development of many countries worldwide, including Poland. Therefore actions taken in Poland in the context of climate change adaptation should be done simultaneously with action taken to cut greenhouse gas emissions. Suitable mitigation actions will be an important factor that stimulates efficiency and innovativeness of Polish economy.

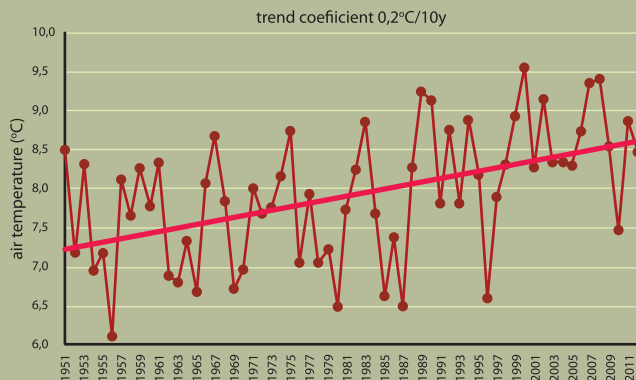
WE SHOULD ACT!

The aim of preparing **National Adaptation Strategy for Climate Change** (NAS 2020) was to provide basic conditions for stable economic and social development, considering not only risks of climate change but also how adaptation actions can positively influence environment and economic growth.

Scientists say that extreme weather events will occur more frequently, with greater intensity and on an increasing scale.

Adaptation action require significant costs. Current and expected climate changes, including scenarios of climate change in Poland till 2030, have proven that over this period major threat for economy and society will be extreme weather phenomena. These will occur more frequently, with greater intensity and on an increasing scale.

Extreme weather events:
heavy rainfalls, floods, landslides, heat waves,
droughts, hurricanes, avalanches.



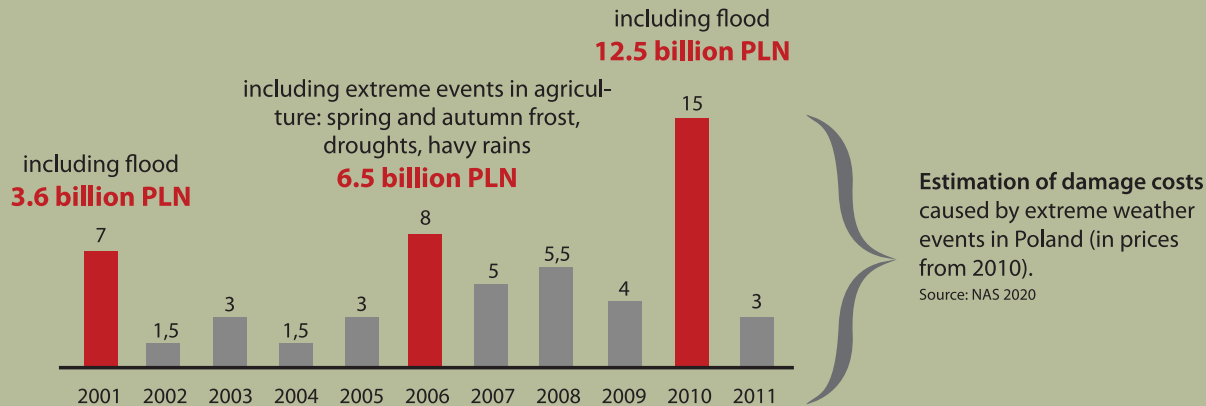
Average temperature over land in Poland (°C) in period 1951-2010 and trend.

Source: Institute of Meteorology and Water Management - National Research Institute (IMGW-PIB)

HIGH COST OF INACTION

It is difficult to determine accurately the share of economic damages caused by climate change. Weather and climate-related disasters (such as floods or droughts) registered in Poland over the period **2001-2011** triggered the loss of **56 billion**

PLN. It is expected that if no appropriate adaptation action is taken, total losses can exceed **86 billion PLN** for the period **2011-2030**, and up to **120 billion** for the period **2021-2030**.



WHAT DOES ADAPTATION MEAN?

Adaptation means increasing society's and economy's resilience to negative impact of current and future climate change and taking advantage of opportunities that may arise.

In upcoming years one of the greatest challenges for development policy will be the achievement of economic growth within the use of environmental resources and adaptation to climate changes. Goals given in **NAS 2020** are a respond to this challenge. They will be achieved on local, regional and national level.

The following horizontal actions will help implementation of the main objective and specific objectives:

- Legislative actions
- Organizational actions
- Information actions
- Scientific research



NAS 2020

Main goal given in NAS 2020 is to ensure the conditions for sustainable development and efficient functioning of society and economy under conditions of climate change.

WATER MANAGEMENT SECTOR

Poland has relatively small water resources and low efficiency in its use. Moreover in some areas of Poland temporary difficulties in the water supply may occur. Adjusting the water sector to climate change will help maintain its functioning in the conditions of both excess and shortage of water.

Suggested in **NAS 2020** actions will strengthen the water management system in Poland: reduce negative impacts of droughts and floods, improve and maintain the good state of waters and water-dependent ecosystems (including implementing actions consisting in the protection of inland waters against the eutrophication) and improve the safety and economic efficiency of water management.



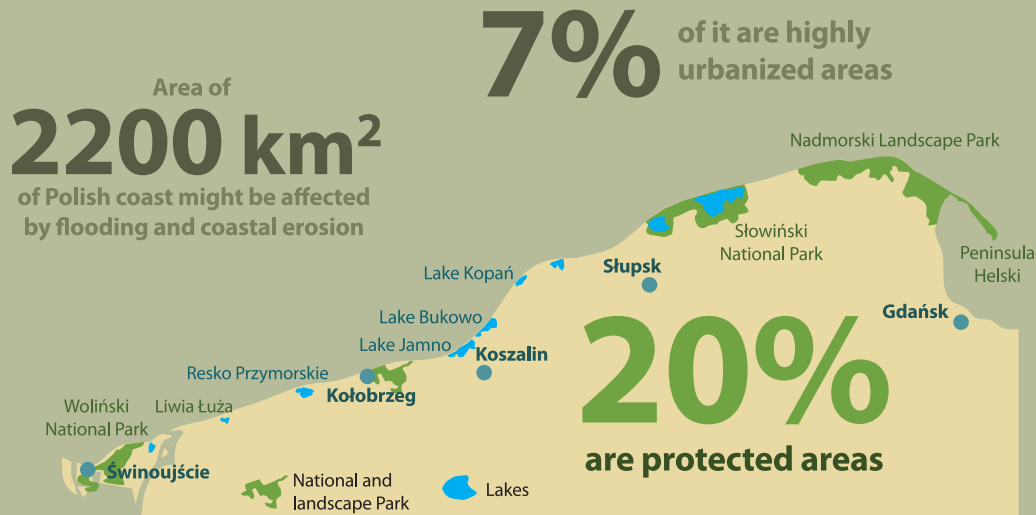
Did you know ...?

- Most vulnerable sector for water shortage is agriculture and due to projections water requirement in this sector will increase by 25-30% by the year 2050.
- Most vulnerable areas for water shortage are Mazowieckie and Świętokrzyskie voivodeship
- Damages caused by floods in 2001 and 2010 caused losses of ca.0.5% and 0.9% GDP!

COASTAL ZONE

Projected changes induced by climate change, that include: sea-level rise, associated changes in storm patterns and erosion are a threat as well to human life as to coastal ecosystems. Scenarios delivered for Poland show that between **2011-2030** the average annual level of Baltic Sea will

rise by **5 cm**. This might result in rise in number, frequency, intensity and duration of storms and coastal erosion. Actions indicated in **NAS 2020** underline need of continues monitoring of those threats in Baltic Sea region.



Priority action of NAS 2020

Taking into account in the investment plans the current and potential sea level rise and flood risk in the coastal zone.

HEALTH

Climate changes affect whole population. Groups particularly vulnerable to various health hazards are elderly, young children, disabled and sick people.

Projected estimations show that climate change can lead to increase in skin cancer diseases and higher mortality rate due to cardiovascular and respiratory diseases. Climate can also affect vector-borne diseases by shortening the life-cycles of vectors, thereby potentially leading to larger vector populations and higher transmission risks. Encephalitis (TBE) and Lyme borreliosis are the two most important tick-borne diseases transmitted primarily by the same vector. Climatic suitability is essential for the spread of 'exotic' diseases that are not currently established in continental Europe.



Densely populated urban areas are highly sensitive to negative impact of climate change. Therefore **education** in the area of adaptation and **implementation of health programmes** is very important.

URBAN AREAS AND SPATIAL DEVELOPMENT

Nowadays it is local and regional government's greatest challenge to adjust Poland to new climate conditions and phenomena that come along. Activities related to spatial policy take into consideration the consequences of climate change.

Direct threats to cities are: the intensification of urban heat island, heavy rainfalls causing flooding, and droughts conducive to water deficit in cities. Strong winds are lower risk which due to high ground roughness lose their strength.



CONSTRUCTION

In the construction sector, it will be necessary to take into account a potential impact of extreme events caused by climate change especially storm winds and heavy precipitation. Influence of precipitation is important in terms of efficiency of the sewerage network and location of the buildings especially in the area exposed to the floods or landslides.

Priority action of NAS 2020

Preparing set of rules for the development of areas exposed to the flood risk and for the protected areas, urban green spaces, coast and standards for the construction process of the public utility buildings.

TRANSPORT SERVICES

Due to spatial nature of the transport sector it is particularly sensitive to strong winds, heavy rain, flooding and landslides, higher precipitation, storms, low and high temperatures and lack of visibility.

NAS 2020 indicated actions that lead to creating guidelines and standards for transport infrastructure (both for design and construction). Importance is also indicated in effective monitoring of infrastructure's sensitivity to climate change and providing fluidity of transport in a crisis situation.



Taking climate conditions into account in the process of design and construction of the transport infrastructure.

Priority action of NAS 2020

Climate change influence on transport sector

Means of transport



Climate elements



rain



wind



high temperature



rain



high temperature



Low temperature, ice-cover



wind



fog



low water, drought



high water



wind



Low temperature, ice-cover



fog



wind

ENERGY

Basic adaptation activities in the energy sector relate primarily to issues of extreme events. Polish power system is dominated by overhead transmission lines, which unlike cable networks are highly vulnerable to failures caused by strong winds and excessive icing. The occurrence of extreme weather events like hurricanes, tornados, intense storms etc. can lead to increased risk of damage to transmission and distribution lines, and cause restrictions in the delivery of electricity.

The power system will have to be adjusted to fluctuation in demand for both electricity and heat. This adjustment includes implementation of sustainable low carbon energy sources, and increase in use of renewable energy sources: solar, wind, biomass and hydro-power.

Did you know ...?

- 70% of total water consumption in Poland is used for cooling in the power production.

Increased risk of failure of transmission lines due to strong winds (data for years 1998-2010)¹



National electricity system

- lines 750 kV
- lines ±450 kV
- lines 400 kV
- lines 220 kV
- lines 110 kV
- - - under construction

○ - white squall

○ - tornados

¹ Source: Institute of Meteorology and Water Management - National Research Institute (IMGW-PIB)

Priority action of NAS 2020

Preparation of the energy system for changing weather conditions with taking into account the winter and summer peak in energy demand.

BIODIVERSITY AND ECOSYSTEMS

Climate change impacts the surface of specie's habitat area, reproductive cycles, vegetation period and interactions with environment.

The expected climate warming will cause migration of species (including invasive species) and disappearance of species that are not adapted to high temperature and droughts in summer but better tolerate freezing temperatures. From the point of view of habitat protection it is most important to maintain and restore wetlands.



FORESTS

One of the factors that differentiate occurrence of forests in Poland is (among with geological features) climate which is strongly connected to certain species' living conditions. Therefore, it is to be expected that type of forests and species composition will change as a result of climate change. It will be important to implement sustainable forest management under conditions of climate change as well as to prepare forest ecosystems for increased severity of extreme weather events such as droughts, heat waves, rainfalls, strong winds.

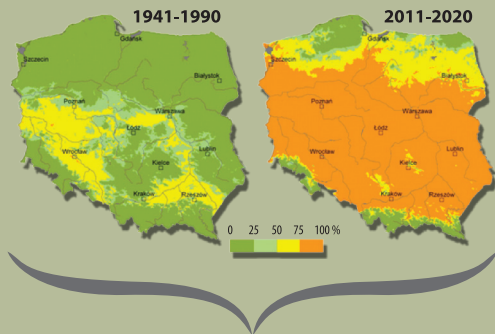
AGRICULTURE

There are two factors that particularly influence agriculture sector: temperature and precipitation. Climate forecasts indicate that due to increase in air temperature in Poland growing season will extend and it will be possible to grow warm season plants. On the other hand an increase in temperature will create favorable conditions for new diseases or plant pests. Projected climate changes especially increase in severity and

frequency of droughts, will cause a water shortage in sector of agriculture.

It is of particular importance to monitor climate change when it comes to agricultural production. The results of monitoring should be a part of information activities supporting the development of agricultural production and the use of modern agro-technical methods.

Monitoring of extreme events in rural areas is a key importance for the population, infrastructure and farms, and should be included in local alert system.



Probability of corn FAO 290 grain filling in Poland.
(Kozyra, Górski, 2004)

Did you know ...?

- Increase in temperature by 1°C will shorten grain filling of wheat by one week, and of corn by two weeks.

(Source: Górski T., 2006)

MOUNTAIN AREAS

The increase in temperature has negative impact on annual water budget. Reduced rivers and streams flows will cause water shortages in down-stream areas. The increased water temperature will cause eutrophication in lakes and flood prevention reservoirs.

The change of water conditions and more frequent rainfalls cause rapid outflows in streams and erosion. Landslides connected with downpours are especially dangerous. They tend to occur more frequent in mountainous areas and foothills.



Did you know ...?

- Mountain ecosystem is a sector most vulnerable to climate change
- As a result of climate change mountain ecosystems can lose up to 60% of its biodiversity.

IMPLEMENTATION

Implementation of adaptation actions is a process that requires involvement of many actors and institutions on a national, regional and local level. Essential role in this process will be lead by:

- **central administration** - appropriate ministers will be responsible for taking actions indicated in NAS 2020 and in other strategic documents, as well as in the operational and legislative documents. The competence of relevant ministers will also include indication of sources of financing for actions, with particular consideration given to the EU funds in the new financial perspective 2014-2020;
- **voivodeship authorities** - their responsibility will be to designate, taking into account general directions indicated in NAS 2020, lines of adaptation at the regional level (voivodeship);
- **local authorities** - a particular role in the implementation of NAS 2020 will be played by cities where the adverse effects of climate change are accumulated. They will be responsible for programming development activities, e.g. local adaptation strategies (especially cities with 100 000 or more citizens);
- **entrepreneurs and business operators** - should take into account risks from climate change, as part of strategic and financial planning in enterprises. Climate change and need for adaptation may become a factor that stimulates the development of new technologies. That can happen among others by expanding cooperation with research institutes.



Report NAS 2020 drawn up by the Ministry of the Environment and was based on the results of research project KLIMADA lead in the years 2011-2013 by the Institute of Environmental Protection – National Research Institute. Document indicates the objectives and directions of adaptation action in the most vulnerable sectors and areas in the period up to 2020: water management, agriculture, forestry, biodiversity and protected areas, health, energy, building industry, transport, mountain areas, coastal zone, spatial development and developed urban areas. The vulnerability of these sectors was identified on the basis of climate change scenarios developed for NAS 2020. Document is a part of European Union policy framework that aims to make Europe more climate-resilient.