



CLIMATE CHANGE AND FISHERIES



IS THE CLIMATE CHANGING IN UKRAINE?

- From 1880 to 2012, the temperature rise on the planet was 0.85 °C. In Ukraine, warming occurs a bit faster – at the end of 2017, the average annual temperature rose by 1.1 °C.
- After ratification by Ukraine of the Paris Agreement in 2016, we agreed to contribute to the global response to the threat of climate change and to limit the temperature rise to 1.5 °C from the pre-industrial level.
- In all regions of Ukraine, the number of days with high daily air temperatures (above +30 °C) has doubled. Such "heat waves" can cause premature maturation of spring crops and reduce their yield.
- In Ukraine today has increased the duration of active vegetation on average by 10 days. By 2030 it is probable to continue the period of growth and development of heat-loving crops for another 10 days.
- Polissia and forest-steppe zones are warming faster than the steppe regions. The climatic conditions of the southern steppe will have modern features of dry subtropics.
- The temperature in winter increased by 1.5–2 °C, and the depth of freezing of the soil decreased to 20–70 cm, which is a favorable factor for the soil's absorption of winter rainfall and the formation of sufficient soil moisture in the spring.
- The risks of freezing and death of crops from the prolonged occurrence of rubbing ice crust in Ukraine are preserved.
- There is a clear tendency to reduce precipitation in the winter by 3–17 percent, and in summer and spring, it is almost unchanged.
- Increasing arid areas and increasing the frequency of drought. The number of summer and autumn droughts by 2030 may increase by 15–30 percent.
- There are dry winds in the northern and eastern regions of Ukraine, which is an atypical phenomenon for our region.
- There is a drop of hail in the uncharacteristic of this phenomenon, the spring and autumn months, which provokes freezing of crops.

**FISHERIES AND AQUACULTURE
ARE SUFFERING FROM CLIMATE
CHANGE AND THEREFORE
MUST ADAPT TO IT**



1 What are the potential threats of climate change for fisheries and aquaculture?

- Due to the changes in the catch structure, the proportion of Prussian carp (*Carassius gibelio*) and other less valuable fish has already increased. Meanwhile the proportion of predatory fish decreases due to the unsatisfactory reproduction conditions.
- Growth of the share of less valuable invasive species (for example, the pumpkinseed (*Lepomis gibbosus*) and the stone moroko (*Pseudorasbora parva*) and the disappearance of certain rheophile and cold-loving species such as burbot (*Lota lota*), or common barbel (*Barbus barbus*).
- Increasing numbers of cases of fish suffocation.
- Improvement of the reproduction of heat-loving species such as wels catfish (*Silurus glanis*) and deterioration for cold-loving species such as brown trout (*Salmo trutta*), thymallus, salmon and partly sturgeon).
- Problems with quantity and quality of water.
- Extension of the growing season.
- Cases of invasion and the number of species with parasitic diseases (*Nematodes* from Mexico, *Lernaeosis* and *Chthyophthirius Multifiliis*) and bacterial diseases (*Vibrio*flora, *Aeromonas Hydrophila*, *Pseudomonas* and *Enterobacteriaceae*) increased.

2 What measures will promote the reduction of greenhouse gas emissions in fisheries and aquaculture?

- Reducing the use of fossil fuels (coal, gas, diesel), the development of renewable energy sources (biofuels, solar and wind energy), energy efficient and resource-saving technologies (water recirculation, deep-freezing) in all value-added chains.

3 What will help to adapt fisheries and aquaculture to climate change?

- Improvement of monitoring of ichthyofauna in all fisheries sub-sectors.
- Improvement of the use and monitoring of water resources (including small rivers). Strengthening resilience of fisheries to natural disasters.
- Insurance development and preferential loans for aquaculture.
- Study, monitoring, development and implementation of plans for treatment and prevention of fish diseases.
- Redirection of fishing and breeding to species that demonstrate the propensity to expand the range, improve the condition of populations, or whose stocks are in a satisfactory state.
- Annual restocking in reservoirs of national importance (reservoirs of the Dnipro, lagoons and estuaries) (herbivorous and predatory aboriginal fish species, including mullets, flounders, sturgeons as well).
- Improvement of the rules of operation of large and small reservoirs (including ponds), in particular during the spring (reproductive) period.
- Introduction of the leading ecological practices in the management of invasive species (including ballast water).
- Introduction of water-saving technologies: creation of full or partial RAS (recycling aquaculture system), water reuse technologies.
- Increasing of fish resistance by improving the conditions for fish farming (full feeding, grid shading).