Ecoaction, WWF-Ukraine, and the Ukrainian Nature Conservation Group: Joint Position on Irrigation in Ukraine

Situation Overview

At the global level, for the past three years, the inability to overcome climate crisis and extreme weather events have been the two largest future risks.[1]

According to the Intergovernmental Panel on Climate Change (IPCC), between 1880 and 2012, the global average temperature on the planet grew by 1.1°C. According to the Ukrainian Hydrometeorological Center, the average annual temperature in Ukraine in 1991–2017 increased by 2.7°C compared to the average temperature in 1961–1990. Scientists forecast that by 2030 the total soil moisture may decrease by 15–20% compared to the current rate, and by 20–30% in the steppe zone.[2] The discharge of such rivers as the Southern Bug will fall to 45% by 2050.[3]

In addition to natural water scarcity, Ukraine faces significant depletion of water resources, which is assessed as the one "approaching physical water scarcity in the near future" (see Figure 1).

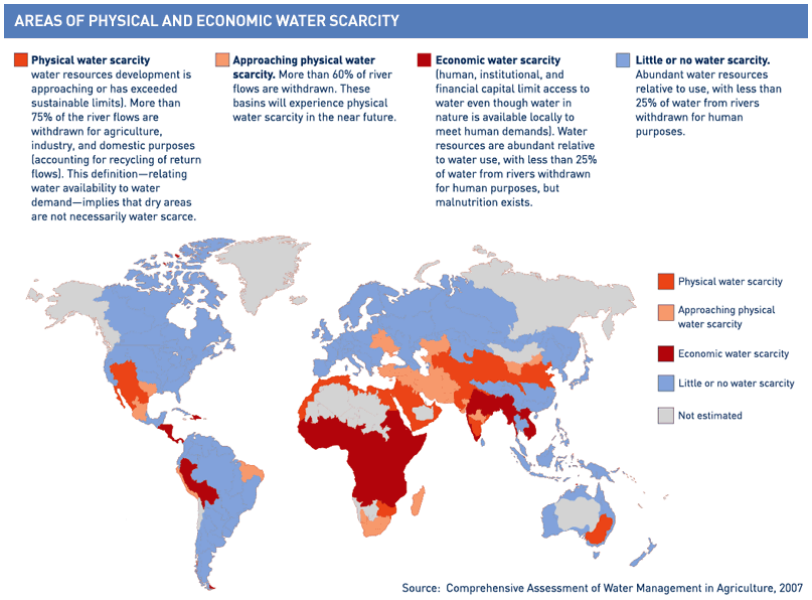

Figure 1. Map of countries with physical and economic water scarcity, 2007[4]

[1] The Global Risks Report 2021, World Economic Forum, https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf

[2] Strategy for Adaptation to Climate Change in Agriculture, Forestry and Fisheries until 2030, 2019, https://www.uahhg.org.ua/wp-content/uploads/2019/08/Стратегія-адаптації-до-зміни-клімату-сільського-лісового-та-рибного-господарств-України-до-2030-року_29.05.19.pdf

[3] Is Water Scarcity Likely in Ukraine? https://ecoaction.org.ua/chy-mozhlyvyj-defitsyt-vody-v-ua.html

[4] Comprehensive Assessment of Water Management in Agriculture, 2007, https://www.iwmi.cgiar.org/assessment/files_new/synthesis/Summary_SynthesisBook.pdf

Ukraine also faces an increase in abnormal weather phenomena — hails, squalls, tornadoes, and dust storms in areas for which they used to be atypical and occurred every 50–100 years. The number and severity of natural disasters — floods, hurricanes, storms, droughts, and fires — are growing. According to the State Emergency Service of Ukraine report,[5] during 2020 there was an increase in emergencies' scale and an over sixfold increase in the cost of damage caused by emergencies (compared to 2019) due to forest fires, floods, and droughts.[6]

Droughts are observed even in the northern and western regions of Ukraine, which are considered areas of sufficient moisture supply. In 2020, droughts caused a loss of 2.6% to 10.2% of all winter crops.[7] Scientists claim that if the trend continues, Ukraine may lose its climate diversity. There will only be one arid climate zone, similar to the current steppe zone, and, without irrigation, it will be impossible to grow crops in the south of the country.

Herewith, the agricultural sector is a powerful source of greenhouse gas emissions accelerating temperature growth on the planet. In 2019, agriculture accounted for 13% of all greenhouse gas emissions in Ukraine[8] and demonstrated the fastest emissions growth compared to other sectors: +30% in 2009–2019, and it may increase by more than 60% by 2030 provided that the current trend continues.[9] Thus, growing emissions from agricultural production exacerbate climate change, and climate change exacerbates water scarcity.

The agro-industrial complex is the most vulnerable to climate change sector of Ukraine's economy, primarily due to water scarcity. Therefore, there are projects to restore and develop the irrigation system, especially in southern Ukraine facing the most noticeable droughts and high temperatures. Nevertheless, it is worrying that alternative ways to develop agricultural production in southern Ukraine are not considered.

Why is Large-scale Irrigation at Any Cost a Bad Solution?

Intensive irrigation cannot be the only possible solution to the challenge of water scarcity for agricultural needs in the medium and long run, because:

1. Most river basins of Ukraine will face discharge reduction[10]:
    - In the Dnieper basin, water runoff is expected to decrease by an average of -20% (and up to -24% in summer), although a slight increase in runoff is possible from January to March;
    - In the Dniester basin, a catastrophic decrease in runoff is expected at the end of the century — by 36–38% in some months;

[5] Major Operation Results Report of the State Emergency Service of Ukraine in 2020, https://www.dsns.gov.ua/files/2021/1/26/%D0%BF%D1%83%D0%B1%D0%BB%D1%96%D1%87%D0%BD%D0%B8%D0%B9%20%D0%B7%D0%B2%D1%96%D1%82%20%D0%93%D0%BE%D0%BB%D0%BE%D0%B2%D0%B8%202020%20%D0%BE%D1%81%D1%82%D0%B0%D1%82%D0%BE%D1%87%D0%BD%D0%B8%D0%B9%202.pdf

[6] Analysis of the Draft State Budget 2022 and Ecoaction position, 2021, https://ecoaction.org.ua/wp-content/uploads/2021/09/analiz_ta_pozytsia_derzhbiudzhet_2022_ekodiya.pdf

[7] Draught-Related Losses of Winter Crops based on Satellite Data Estimates, https://www.epravda.com.ua/rus/columns/2020/05/26/660970/

[8] Ukraine's Greenhouse Gas Inventory 1990-2019, https://unfccc.int/documents/273676

[9] Technology Needs Assessment Report Mitigation, https://tech-action.unepdtu.org/wp-content/uploads/sites/2/2019/08/tna-01-mitigation-ua-final-190731.pdf

[10] Is Water Scarcity Likely in Ukraine? https://ecoaction.org.ua/chy-mozhlyvyj-defitsyt-vody-v-ua.html

- In the basin of the Southern Bug, the average annual runoff is expected to significantly fall at the end of the century — by up to 30%, and in some months — by up to 45%;
- However, for the Siverskyi Donets basin, under the severe scenario, a slight increase in runoff is expected until 2100 — by 6.4%, and even by up to 10% in July–August.

2. Decrease in the water level will lead to an increase in its pollution since pollutants concentration will increase respectively, even with a constant load from intensive agriculture or industrial activities.[11]

3. Intensive irrigation increases the risks of secondary soil salinization and loss of soil quality due to the lack of systematic monitoring of soil conditions at the state level. Currently, the State Water Resources Agency is responsible for irrigated soils monitoring, but monitoring data are not available online, only upon request to the agency. Therefore, without understanding of the real condition of soils, it is extremely risky to start a large-scale irrigation project given the existing cases of secondary soil salinization (for example, after irrigation introduction in northern Crimea[12]).

4. More than a third of the water supplied to irrigation systems is lost due to the low technical level and wear and tear of hydraulic structures.[13] Using existing systems in such condition is unacceptable.

How Should Water Intake for Irrigation be Arranged?

In order to prevent an increase in water scarcity, water abstraction for irrigation from water supply sources (natural and artificial reservoirs) should be carried out exclusively:

- **from surface water sources.** Groundwater/artesian water sources are a strategic reserve that could be used to meet the population's drinking needs (in case of urgent need). Besides, groundwater generally has much higher overall hardness/ mineralization rates than surface water; thus, groundwater use involves a higher risk of soil salinization;
- **based on hydrological models and detailed water management balances** developed by scientific institutions and organizations taking into account the hydrological regime peculiarities of both the reservoir and the basin to which it belongs;
- with issuance of special water use permits based on water balances, **designed for a maximum runoff filling of 50%**;

[11] Why Ukraine Faces the Risk of Water Resources Scarcity and How Can It Be Mitigated? https://www.pravda.com.ua/columns/2021/07/12/7300206/

[12] Kostyushin, V. A. et al. (2019). Irrigational Agriculture and Conservation of Biodiversity in Dzhankoi District of the Autonomous Republic of Crimea. https://www.researchgate.net/publication/331688521_Irrigacionnoe_zemledelie_i_problemy_sohranenia_biologiceskogo_raznoobrazia_Dzankojskogo_rajona_Avtonomnoj_respubliki_Krym

[13] Water Strategy of Ukraine until 2025 (scientific bases), 2015, http://iwpim.com.ua/wp-content/uploads/2015/10/11_03_2015.pdf

- **with an effective mechanism for making quick changes** to special water use **permits** in case of discharge reduction;
- and **with effective control** of violations and inevitability of penalties regarding special water use, monitoring of irrigated soils quality, combating desertification, etc.;
- **with clear and publicly open accounting** of the volume of water taken and returned by agricultural enterprises. We must have reliable information about the condition of water returned to the environment.

Changes to be Made in Agriculture in Ukraine

To overcome the challenges of water scarcity while still ensuring food security in Ukraine, and given the need to reduce the negative impact on the environment and greenhouse gas emissions from land use, we believe it is necessary to systematically implement these changes in agriculture:

- **reduction of arable land**
  - withdrawing 15% of arable land from cultivation by 2030[14] (given that degraded and unproductive soils occupy 1/5 of arable land in Ukraine);
  - priority to the development of grazing livestock involving lands of extensive use (pastures) resistant to climate aridization. The goal is to increase the area of pastures and hayfields to 15.8% of the country's area by 2030;[15]
- **nature-oriented solutions in the landscape**
  - introduction of nature-oriented solutions for water retention that are alternative to irrigation, including:
    - conservation and restoration of windbreaks,
    - conservation and restoration of wetlands,
    - restoration of straightened rivers' meanders,
- **best tillage practices**
  - supporting and ensuring that 10% of the total agricultural land area is under the minimum tillage technology by 2030;[16]
  - supporting and ensuring that 10% of the total agricultural land area is under organic agriculture by 2030;[17]
- **modern irrigation technologies**

[14] Roadmap Climate Goals for Ukraine 2030, https://en.ecoaction.org.ua/wp-content/uploads/2020/04/roadmap2030-ecoaction-booklet-full-eng.pdf
[15] Roadmap Climate Goals for Ukraine 2030, https://en.ecoaction.org.ua/wp-content/uploads/2020/04/roadmap2030-ecoaction-booklet-full-eng.pdf
[16] Roadmap Climate Goals for Ukraine 2030, https://en.ecoaction.org.ua/wp-content/uploads/2020/04/roadmap2030-ecoaction-booklet-full-eng.pdf
[17] Roadmap Climate Goals for Ukraine 2030, https://en.ecoaction.org.ua/wp-content/uploads/2020/04/roadmap2030-ecoaction-booklet-full-eng.pdf

- introduction of climate-smart irrigation technologies, recommended as No. 1 in Ukraine according to the TNA study[18] — air-injection,[19] as well as Deficit irrigation, Supplemental irrigation, and water harvesting technologies[20] with proper management/disposal of pipes when their lifespan ends;
- using measuring equipment to control the amount of water taken (more crop per drop);
- development and implementation of technologies for treated wastewater reuse with proper monitoring of water and soil quality. This will provide multi-sectoral benefits: in terms of development of water preparation and treatment in communities and, simultaneously, providing water with sufficient nutrients for irrigation (resulting in savings on fertilizers);
- using renewable energy sources for irrigation systems' operation;

- **the best agricultural crops**
  - using drought-resistant but productive varieties of agricultural crops that are suitable for growing in the new climatic conditions of southern Ukraine and are not invasive for the region;
  - priority to food crops[21] rather than export perennial energy crops, which tend to consume more water than food crops;
  - growing agricultural crops mainly for export is not a just solution regarding Ukraine's food and environmental security.

Financial Incentives Mechanisms for Irrigation Projects

Since the government and agribusiness are ready to develop irrigation only under the state and international financial support, it is necessary to establish clear principles of such support.

These principles should include:

- Financial support for irrigation projects from public funds or international financial institutions should be provided solely to support farmers who need irrigation and whose activities are socially significant in the region.
- There should be no support for vertically integrated agricultural companies.
- Agricultural enterprises must pay a just price for the water used for field irrigation; the price must be calculated by the responsible authority. The minimum price of a cubic meter of water must be at least 7 USD.[22] Pricing should take into account measures to minimize environmental damage.

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[18] Technology Needs Assessment Report Adaptation, https://tech-action.unepdtu.org/wp-content/uploads/sites/2/2019/09/final-ukraine-tna-adaptation-report.pdf
[19] Air Injection, http://climatesmartirrigation.com/technology/technology/air-injection
[20] Good Agricultural Practice in Irrigation Management. Technical Guide, 2020, https://www.fibl.org/fileadmin/documents/shop/2522-irrigation.pdf
[21] Good Agricultural Practice in Irrigation Management. Technical Guide, 2020, https://www.fibl.org/fileadmin/documents/shop/2522-irrigation.pdf
[22] UN Water. Ukraine, https://www.sdg6data.org/country-or-area/Ukraine

Thus, it is impossible to satisfy farmers' need of water in the south of Ukraine solely through large-scale irrigation. A set of systemic measures aimed at transformation of agriculture and rural areas in southern Ukraine is needed.