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VARIOUS DEFINITIONS OF WATER STRESS IN BIOLOGY AND SUSTAINABLE DEVELOPMENT

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The aim of our work was to evaluate the role of different definitions of water stress (at the level of the country or in plant biology) in sustainable development.

In plant biology the measure of water stress is Relative Water Content (RWC): RWC (%)= (Fresh weight-Dry weight)/(Turgid weight-Dry weight). To determine the level of water stress at the plant level, the study used soybean plants grown in pots under controlled conditions. The experimental design included optimal water availability and complex stress (salinity plus drought). In sustainable development, water stress measures demand relative to renewable freshwater availability. According to the indicator 6.4.2. Water Stress (%)= TFWW/(TRWR-EFR)*100, TFWW – Total Freshwater Withdrawal across sectors (agriculture, industry, municipal), TRWR – Total Renewwable Freshwater Resourses (internal surface/groundwater+external flows), EFR – Environmental Flow Requirements needed to sustain aquatic ecosystems. At the level of the country also possible to use the Falkenmark Water Stress Indicator that measures renewable water available per person per year (m^3/capita/year).

The concept of water stress bridges biological or global frameworks. It is evaluated depending on whether the scale of interest is a single organism (plant biology) or an entire ecosystem/nation (sustainable development). For the soybean plant leaves in optimal conditions RWC value was 92,3±1,1% (35 days after planting, DAP), that correspond the healthy plant tissue (RWC=85-95%). Under stress conditions the RWC value was 78,3±0,8% (35 DAP) and 50,8±0,1% (72 DAP); these values correspond the moderate (RWC=85-95%) and severe stress (RWC<60-70%). In sustainable development are used other water stress definitions. For Moldova Falkenmark Water Stress Indicator ~3,000 to 3,030 m^3/capita/year. This includes external inflows from transboundary rivers like the Dniester (Nistru) and Prut. Such an interpretation

of the Falkenmark Water Stress Indicator puts Moldova well above the standard water-stress threshold. But if you look strictly at water generated *internally* within Moldova's borders (excluding transboundary inflows), the renewable availability drops, placing the country under level of absolute internal water scarcity. For Moldova the value of indicator 6.4.2. SDG in 2021-2023 was 12,41% (No Stress). The value of indicator 6.4.2. depends on the value of TFWW across sectors (agriculture, industry, municipal), mainly from agriculture, where the value of indicator 6.4.1. is two orders of magnitude smaller than in other sectors (industry, municipal).

Conclusions. Different definitions of water stress give different results. Reducing of water stress in the context of sustainable development is possible through an increase in the service sector taking into account the traditional employment structure of the population.

Keywords: water stress, plant biology, sustainable development.

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