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DROUGHT EMERGENCY IN ITALY: MEASURES TO COPE WITH WATER SCARCITY IN AGRICULTURE

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The particular weather pattern currently being experienced in almost the whole of Italy, with a dry autumn-winter period and/or with short but intense torrential rains, is a

consequence of climate change and is causing many problems to agriculture. The main issues concern the management of crop growing techniques, the choice of the spring-summer crops, the reduction of the irrigation water needs, and the optimal allocation of the limited water resources available.

As regards the cultivation techniques, the strategies should be aimed primarily at: reducing and/or avoiding soil-stored water losses due to direct evaporation or transpiration; improving water productivity; and reducing the period of unfavorable weather conditions during crop growth.

In detail, minimum tillage or sod seeding techniques are suggested to reduce and/or avoid losses of water by direct evaporation from the soil; anticipating the sowing or transplanting, taking into account the climate pattern and the thermal needs of the crops, is recommended to reduce the period of high evapotranspiration deficit during the growing season; a rational supply of fertilizers, especially of those nitrogen based, is important to avoid excessive vegetation, which would lead to an increase of water losses by evapotranspiration.

To reduce crop irrigation water requirements, it is possible to maximize water productivity by means of: choice of irrigation methods characterized by high efficiency of water distribution, such as drip irrigation; optimal definition of the irrigation variables (watering volume and irrigation scheduling) as a function of soil hydrological properties, physiological and morphological crop characteristics (including root depth and density), and irrigation method used; adoption of agricultural practices that limit evapotranspiration, such as mulching and weed control; use of irrigation techniques with controlled deficit irrigation (regulated deficit irrigation - RDI, phenological deficit irrigation - PDI, partial root-zone drying - PRD).

With regard to the crop choice, if the actual pluviometric trend would persist, it could be necessary to choose crops characterized by lower water requirements and greater resistance to drought stress compared to those actually cultivated such as, for example, sorghum instead of corn in the Po river basin. In addition, where water availability for irrigation is limited, as a consequence of the small amount of water accumulated in reservoirs or the reduced groundwater recharge (in turn due to the limited rainfall and/or torrential rains), smaller areas should be allocated to spring-summer crops characterized by high irrigation water requirements, such as tomato in Apulia, whereas greater surfaces to crops characterized by low irrigation water needs, such as sunflower in Foggia (Apulia), or to fall-winter cycle crops.

About the allocation of limited water resources, at on-farm but also at district or regional level, a crucial issue is the safeguard of the water needs of the perennial crops, i.e. the tree crops, which may manifest the negative impact of water stress also in the years after the water deficiency. Therefore, where tree crops occupy large surfaces, the fulfillment of their irrigation water requirements should be a priority over that of herbaceous spring-summer crops, even deciding to reduce the irrigated surfaces or reducing the depth of water applied

per unit area Moreover, under limited water resources, the choice of the optimal cropping pattern and water allocation should take into account also economic efficiency criteria.

In any case, the awareness of the volumes of water actually supplied to crops, by means of volumetric meters, is the basis of any strategy designed to contain the water consumption and optimize water resources use.