THE CLIMATE RESILIENCE CLUSTER

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Water in Systems Thinking

Water is a fundamental element of life, directly and indirectly defining social resilience, through practically innumerous cause-effect loops. Lying at the basis of ecosystems, it carries the services characteristics, i.e. provisioning, regulating, cultural, and supporting. Water is at the core of life - we drink it, we use it for producing food, for supporting sanitation, for producing energy, for promoting cultural and aesthetic needs of societies, it is required for preserving biodiversity. It is a biological element, a habitat, a means of transport, a climate regulator, an economic growth enabler, even a deity in some cultures.

These multiple dimensions of water have placed it as a major node of several systems thinking approaches that aim at sustainability. Integrative approaches showcase a trend to evolve from closed to more open systems. This trend occurs as a result of the imperative need to increase efficiency in the three sustainability pillars: environmental, social, and economic.

At first, Integrated Water Resources Management schemes were introduced to consider and balance conflicting water uses regarding their available and required quantities and qualities at River Basin District level. As a next step towards holism, the Nexus concept placed water as one of its three central components, with energy and food, initially focusing on food security and sustainability. Interlinkages between the three components have been identified, analyzed, and quantified at bio-physical, socio-economic, and policy-governance layers.

Later, the WEF nexus scheme extended to include more components, such as ecosystems, biodiversity, soil, land uses, climate, and health. The UN SDGs system might be perceived as the ultimate Nexus scheme, a complex web of nodes connected through multiple synergies and trade-offs, one affecting the other. It is proven that creating a positive shift in one of the SDGs, the achievement of almost all of them is facilitated.

Current systems thinking approaches take a step further, integrating the participation aspect. Such approaches involve concepts, such as citizen science, participatory modelling, co-designing, and co-creation. The common basis for these concepts is the dynamics inserted by stakeholders in the analysis, planning, and decision phases.

Bottom-up approaches offer the benefits of revealing hidden causalities, cascading effects, and systemic solutions, on one hand, and increasing social engagement, capacity building, and the uptake of solutions, on the other hand.

Participation, most importantly, is a regulating fundamental function in democracies, where problems are raised by citizens, disagreements are discussed openly, and solutions are defined after common agreement.

Living Labs are a real-life experimentation set that enables participation at full-scale. ARSINOE's nine living labs provide a fertile setting for participation in system analysis and systemic solutions for increasing resilience against climate change. For example, the Athens living lab on heatwaves has surprisingly unveiled an extensive risk system of multiple cascading hazards that involves extreme heat, air quality, noise, biodiversity, energy and water consumption, health, well-being, violence, tourism, and culture among others. Water has been indicated at multiple levels as a key in the solutions to be discussed: water in blue infrastructure, in circular economy, for irrigation of urban green, in public taps, etc.

Whether Living Labs may constitute the modern plazas for the smooth operation of democracies, it is most likely that water will be one of the buzzwords in public dialogue.

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