

# Building and sharing knowledge about resilience factors to tackle antimicrobial resistance in One Health systems



**AMR as a social-ecological system:** AMR is a complex global challenge with strong interdependence between its components (humans, animals, plants, wider social and natural environment). AMR is compounded by social factors (e.g. food demand, prescription habits) and dynamics (e.g. world connectivity, poor socio-economic development). As a sustainability challenge, AMR requires a social-ecological approach based on the role of humans in nature.

**Social-ecological Resilience** is the capacity of a system to absorb disturbance, to adapt to changing environmental conditions, and to fundamentally reorganize while undergoing change (transformation). Initially used in natural sciences and engineering, Resilience has been used in other disciplines such as ecology, urban planning, medicine/public health, economics, and international relations.

**AMR Intervene** is a framework for the description of interventions to tackle AMR based on resilience principles

Open access online database

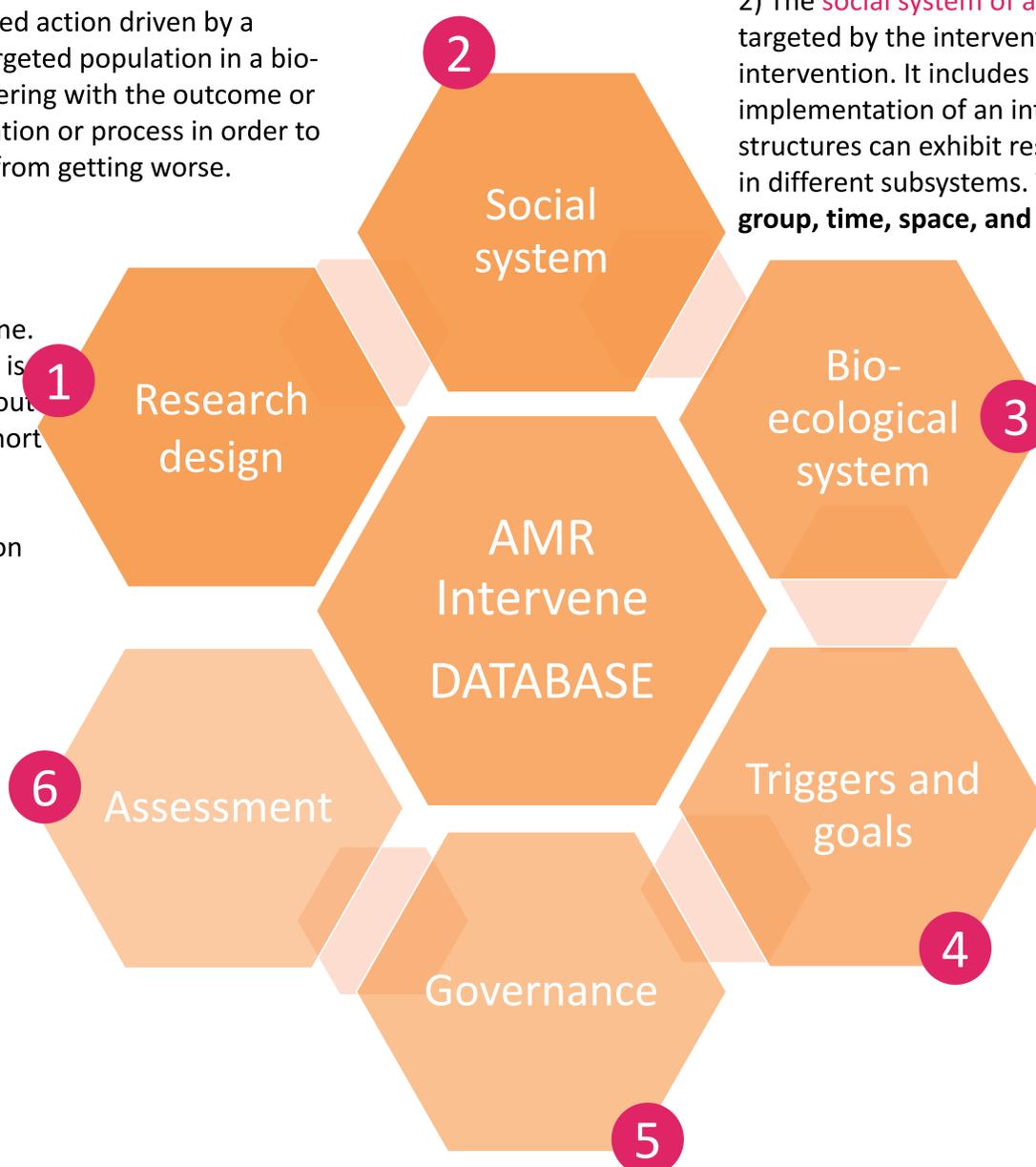
<https://amr-resilience.gtglab.net/database/>

And analyses to identify resilience factors of the interventions to follow.

**Intervention** = coordinated action driven by a social group among a targeted population in a bio-ecological context interfering with the outcome or course of a difficult situation or process in order to improve it or prevent it from getting worse.

1) Interventions are collected from scientific publication available online. First part of the database is to collect information about the publication details, short information about the intervention, and data quality for the intervention assessment

6) The framework is organised in three parts for the description of the assessment of the intervention: influencing variables, **key results of the intervention, and the factors influencing its success or failure.**



2) The **social system of an intervention** encompasses the people targeted by the intervention as well as the one implementing the intervention. It includes the social networks and cultural aspects of the implementation of an intervention. Several ecological and social structures can exhibit resilience to AMR and resilience can be measured in different subsystems. This block has six parts: **sector, settings, social group, time, space, and political space**

3) AMR refers to a **broad biological phenomenon**; being able to measure resilience requires a granular understanding of components and connectivity of the biological system. The block “bio-ecological system” is divided in four parts: **microorganism(s) targeted by the intervention, resistance(s) of the microorganism(s), host population or substrate, and ecology of transmission.** These cover the main SES elements of AMR where diversity needs to be considered in order to understand the resilience of interventions.

4) Also, it is important to capture the drivers and goals of the intervention. Diversity and redundancy of microorganisms (and their intrinsic susceptibility to multiple antimicrobials agent) which help them to resist shock and disturbances **require diversity of approaches to tackle AMR.** Many interventions ultimately aim to reduce the problem of AMR on human societies, but they act on different levels of the long causal chain of AMR from drivers to outcomes. To describe interventions in their diversity, the framework focuses on **triggers, goals and challenges of the interventions.**

5) The governance includes the **actors, structure and policy leverage, and funding** of an intervention. The social characteristics of the intervention including those related to the governance of the interventions are critical to tackle AMR. The participation of a variety of stakeholders (e.g., government department, non-governmental organization, community organization) with variable but often overlapping domains of authority provide for a diversity of responses and thereby facilitates the maintenance of ecosystem services in the face of economic or political upheaval. Also, any intervention requires means (e.g. financial, human, knowledge). An estimation of the amount of resources committed to the interventions is important.

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