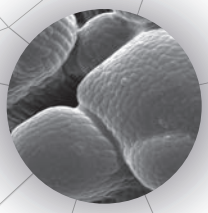
les dossiers
d'AGROPOLIS
INTERNATIONAL

Expertise of the scientific community in the Occitanie area (France)

COMPLEX SYSTEMS

From biology to landscapes



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Model of a fisheries system combining the resource and fishing dynamics

Fisheries are complex systems that combine many interacting elements. As such they can be observed from different standpoints, and described according to a framework that combines some of these elements. Statistically, an operation is described on the basis of a summary of available data, including as much information as possible, and with reference to the initial questions, and sometimes to the questions raised after the data analysis. Regarding small-scale fishing in Senegal, these questions raised concern variability in the impact of fishing actions according to fishermen's decisions. Such variability is problematic if the initial question concerns the impact of a fisheries operation on a resource with a view to its 'rational' management. This impact variability results in a poor correlation between the fish abundance and fishing yields and in low quality of the number of fishing actions in terms of the impact control variable. However, this variability can be a source of sustainability for fishermen who, depending on the accessibility of fish populations, can at any given time opt for an effective fishing method from among those available to them. This choice option must then be incorporated in the representation framework according to a model that reconciles the dynamics of a multispecies resource with those of operations conducted by fishing units using several methods. The model parameters are estimated on the basis of values that lead to the reconstitution of data on fishing activities and yields as close as possible to the values resulting from surveys. It is then possible to answer, in the form of parameter estimation functions, questions involving fishermen's decisions in relation to multicriteria objectives regarding the state of the resource, economic returns and the social context.

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◀ ***Fishing off the coast of Senegal during a deep longline experiment.*** *Here the fishermen decided to set out handlines before using the longlines in boxes with the hooks arranged along the rim of the box (foreground). © Conrath/Laloë, 1987*

Innovative approaches and tools for assessing health surveillance systems

Agriculture and livestock production are crucial for the food security and survival of communities, especially the poorest. Early detection of animal diseases through efficient surveillance systems is vital to prevent their emergence or re-emergence. The effectiveness of these systems is still limited in the poorest countries, despite the efforts of the international community. There are also shortcomings in industrialized countries due to difficulties in communication and collaboration between stakeholders at local and national levels. This impedes the reporting of health-related events by farmers while also having a bearing on surveillance system operations. Given the complexity of the stakeholders' surveillance systems and decision-making processes, these factors must be assessed by integrative and interdisciplinary approaches that combine epidemiology, sociology, economics and political science. Until recently, these elements were not taken into account in the assessment and optimization of surveillance systems.

The ASTRE joint research unit (UMR) develops and applies methods and tools for integrated evaluation of surveillance systems, combining participatory epidemiology, modelling and econometric techniques. These approaches focus on health surveillance system processes (organization of stakeholder networks and decision making) and also on the implications of health information transmission with a view to gaining insight into the technical performance, acceptability and confidence levels, as well as the monetary and non-monetary benefits. These factors are essential for pinpointing suitable actions that could improve system performance and ensure sustainability through a collective change process. Such approaches have been applied in Southeast Asia as well as in Europe where there is a growing demand for health strategy decision support tools. These tools generate local information to boost awareness and enhance the framing of national health strategies, thus fostering dialogue between policy makers and system stakeholders.

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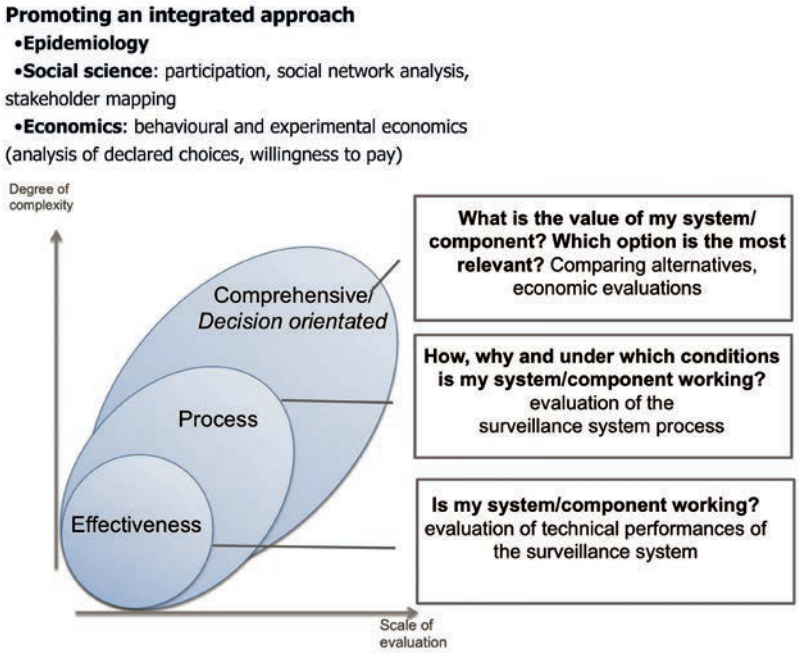

▶ ***Different levels of health surveillance system evaluation.*** *There are different types of health surveillance system evaluation, while integrative evaluation includes process and technical performance evaluation. Different technical, functional and socioeconomic issues can be addressed by each evaluation type and level. © M. Peyre/ASTRE*