

# The tragedy of the commons in dynamic context - modelling, methodology and prevention

Agnieszka Wiszniewska-Matyszek

The *tragedy of the commons*—inefficiency of markets and individual rationality in the case when agents use common resources—is one of the greatest challenges of contemporaneity. This vast definition implies that it appears in a large class of problems, among other things: air and water pollution, anthropogenic climate change, depletion of high seas fisheries, groundwater pumping, depletion of high seas fisheries, microbial resistance resulting from overuse of antibiotics, return of diseases for which vaccinations exist, interference problems in radio-communication, traffic jams and satellite debris in the orbit. Most of these problems have dynamic character, so the best tool to model them is by using dynamic games.

In this project we are going to study dynamic games of the *tragedy of the commons*.

The aim of the project is twofold: both to develop the theory of dynamic games to find solutions for classes of problems which are applicable to the economic problems mentioned before and which require new mathematical tools, and to build economic models in which the *tragedy of the commons* appears, mainly global environmental problems, and applying the results of the theoretical part to find new solutions of the *tragedy of the commons* by external enforcement or self-enforcing agreements between users of the resource. In the fisheries models, spatial allocation of fish will be taken into account.

The results can also help both policy makers to design new tools in essential problems and the general public to understand the phenomena that arise.

Therefore, the implications of this research will be of substantial impact.