Theme: Modelling

Session: ThC1 - Modelling: wider issues

Title: **Spatial Externalities and the Common Pool Resource Mechanism**

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Abstract: The optimal management of many common pool resources (CPRs) requires the establishment of optimal aggregate extraction rates as well as the spatial distribution of those extraction rates. The importance of these two components is readily evident in fisheries management where the spatial behavior of other agents often affects another agent's return in a different location, thereby inducing a spatial externality. This research experimentally investigates the behavior of agents within such an environment to determine how the structure of the spatial externality influences subject, as well as group, behavior in a spatially linked common pool resource.

This research expands the traditional common pool resource (CPR) game popularized by the work of Walker et al. (1990) to incorporate spatial structure with two spatially linked common pool resources. Subjects participated in a 5-player common pool resource game, under three alternative spatial structures (non-spatial, bidirectional and unidirectional linkages), within the experiment. Results indicate that behavior in the unidirectional common pool resource game yielded the highest average net yields as a percentage of the social optimum return, whereas those in the bidirectional and non-spatial game yielded comparable returns. However, the investment patterns in the unidirectional game were not proportionally linked to the spatial structure present. Investments in the sink CPR were proportionally lower than those in the source, relative to the social optimum. This highlights the importance of understanding the spatial structure present within our natural resources.