

Natural resource management in socially complex societies: An experimental study

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ABSTRACT

Local commons problems in natural resource management in the third world are often characterized by the presence of appropriation externalities. The experimental economics literature has focused predominantly on peer regulation as a means to force resource users to internalize these appropriation externalities. Here, peer regulation is typically modelled as the imposition of costly punishment by individual resource users on those users who extract from the resource under consideration more than an accepted norm. However, in reality the costs of punishment are often not direct (e.g. time spent in the punishment activity), but indirect (e.g. of opportunity costs of foregone cooperation with the group for the defector). Individuals may decide not to engage in (mutually beneficial) cooperation with the norm violators in other economic (or social) domains of life. One example in point is agriculture, where cooperation with respect to either labor-intensive activities such as harvesting, or the use of equipment (as sharing gives rise to economies of scale), is mutually beneficial.

Taking into account (i) that societies are complex and hence that cooperation occurs in more situations than just resource management, and (ii) cooperation in all domains is mutually beneficial, we study experimentally to what extent multiple levels of cooperation indeed facilitate achieving socially optimal levels of resource extraction. On the one hand, higher returns to other cooperative activities provide a more powerful instrument to sanction non-cooperative behaviour in resource use. On the other hand, higher returns to these activities imply that sustaining cooperation in that domain of life is valuable, and community members may decide not to take the risk of jeopardizing that cooperation by using it as a sanctioning device. We test experimentally the relevance of these two mechanisms. We implement treatments with high or low opportunity costs for a free-rider in the resource extraction, and vary the information the resource users have at disposal. These treatment variables allow us to disentangle various elements of the indirect informal enforcement mechanism in the natural resource management.