Information Challenges in Contract Design for Biodiversity Conservation

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Abstract

This paper surveys information challenges in contract design for biodiversity conservation. Information is one of the most serious constraints in environmental regulations. The efficiency of many regulatory tools, especially environmental contracts, that are used to internalize the environmental externalities critically depends on the amount of information regulator has. When serious information asymmetry between a regulator (the principal) and an agent presents (in the form of a private information parameter to the agent), the design of efficient environmental policy is hampered.

Under current Biodiversity conservation rules, information is a prerequisite to regulation. Moreover, given the crucial role of information, information per se can well be a goal of regulation in dynamic settings. However the available information is extremely limited and government's information collection efforts remain controversial. We do not know how many species the world holds, even to an order of magnitude, much less the range and habitat each species inhabits, and the threshold level of species number to maintain species. Farmers to be regulated are diverse and heterogenetic in farm production, production technology, conservation skills, and attitude toward risks. Furthermore, the regulator generally is unable to observe and monitor farmers' conservation effort. The regulator, even in a position to detect biodiversity loss /specie endanger in a certain location, usually is unable to directly observe individual contribution or to infer them from extent of biodiversity loss in total. In addition, natural stochastic influence also contributes to the information problem. The disappearance of certain birds in one area might well be a result of weather change rather than the actual logging activities taken in that area.

In presence of these information gaps, conservation proponents favour greater efforts to collect information about the status of species, including location and health of population and habit. By contrast, property rights advocates vociferously attack any move to expand government information collection efforts, such as the short-lived National Biological Survey. Therefore, property owners and regulators have sharply divergent view of the desirability of increased information about species status and distribution.

This paper discusses various sources of information gaps in Biodiversity conservation and related information collection efforts in both research and practice. A simple principal and agent model is developed to provide an integrated framework to illustrate these information challenges.