THE COMMONS: DEFINING, CLASSIFYING, AND REPRESENTING DILEMMAS

One of the problems with the current mainstream commons dilemma research is its lack of attention to definitional and representational issues. The dominant paradigm in this research is unable to clearly distinguish among several kinds of dilemmas, or even unambiguously define when actors in a commons become interdependent, let alone representing or measuring the nature and degree of interdependency.

Let us therefore begin with the variables of interest in a commons, and proceed from there to an effective framework for characterizing and representing dilemmas. Let i index actors and j index 'turns' (time). Let R_j be the resource remaining on the jth turn, p_{ij} be the amount the ith actor takes on the jth turn, r_j the replenishment amount on the jth turn, $p_{.j}$ the total amount removed by all actors on the jth turn, and d_j the net change $(r_j - p_{.j})$. To eliminate any ambiguity concerning the turn on which net change is taken into account, let $d_j = R_j - R_{j-1}$ by definition.

A commons cannot result in a dilemma unless actors' freedom to consume is threatened or the resource itself is in danger of running out. In order to specify what these conditions mean we require at least two more concepts: Lower and upper bounds on individual consumption rates. The lower bound, l_i, on the ith actor's consumption rate is the minimum amount required by that actor to 'survive' on each turn (let's assume that this remains constant from turn to turn). If it is 0, then the actor has the option of not consuming at all. The upper bound, u_i, is the maximum amount the actor can consume on one turn. Perhaps the simplest analogy for illustrating these two concepts is a bank, in which the minimum daily withdrawal is whatever money the individual requires for survival while the maximum withdrawal is either that person's total savings or some upper bound imposed by the bank itself.

Now, let L be the minimum total resource consumption on one turn, and U be the maximum possible total resource consumption on one turn. Then we may immediately distinguish among three kinds of dilemmas at the group level:

(1) A Constraint Dilemma occurs on the jth turn when U is close to R_j+r_j. The crossover point is clearly where $U = R_j+r_j$.

(2) A Restraint Dilemma occurs whenever $L < R_j+r_j < U$, since under this condition not all actors can maximize their consumption rates at once and therefore at least some of them must exercise restraint. It is here that actors become interdependent and a true commons dilemma develops.

(3) A Survival Dilemma occurs when R_j+r_j gets close to L, which is the crossover point.

(4) Death of the commons is imminent when R_j+r_j falls below L, the minimum survival requirement for the collectivity of actors.

It is easy to represent these crossover points and regions on a single real number-line, and it would be interesting to assess the impact of this information as feedback on actors' choices.

We may also make some corresponding distinctions among different kinds of commons environments in terms of their potential for developing into dilemmas:

(1) A Dilemma-free commons is one whose replenishment rate equals or exceeds its maximum possible consumption rate, i.e., for which $r_j > U$.

(2) A Dying commons is one whose replenishment rate is exceeded by its minimum possible consumption rate, i.e., for which $r_j < L$.

(3) A Dilemma-potential commons is one for which $L < r_j < U$.

Finally, we may move to the individual actor's level, and characterize various dilemmas the actor may face. Given unequal lower and upper bounds on consumption, even collective interdependency may constrain some actors more than others or threaten the survival of some before it does others:

(1) A Constrained actor is one who cannot maximally consume, i.e.,for whom $R_j+r_j-L < u_i-l_i$.

(2) A Threatened actor is one for whom $R_j+r_j-(L-l_i)$ is close to l_i.

Any actor for whom (1) or (2) holds is 'dictatorial' with respect to the commons, since she or he has the potential to decimate the commons on a single turn. We may distinguish among four kinds of dictatorship:

(3) A Potentially Constraining actor is one for whom maximal consumption would result in a Restraint Dilemma on the next turn.

(4) A Necessarily Constraining actor is one for whom minimal consumption results in a Restraint Dilemma on the next turn.

(5) A Potentially Deadly actor is one for whom maximal consumption would result in a Survival Dilemma or Death of the commons on the next turn.

(6) A Necessarily Deadly actor is one for whom minimal consumption would result in a Survival Dilemma or Death of the commons on the next turn.