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CRIB NOTES

Building on Ostrom's "The Rudiments of a Theory of the Origins, Survival, and Performance of Common-property Institutions"¹

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Introduction

As our scientific theories mature, the models and frameworks we employ approach greater clarity. With this piece, I present a graphic model of Ostrom's (1992) *The Rudiments of a Theory of the Origins, Survival, and Performance of Common-Property Institutions* in order to clarify the nature of its theoretical components and depict in visual form how those components interact. While Ostrom's work continues to inspire a great deal of theoretical and empirical research, the 1992 piece is the most comprehensive, yet succinct presentation of factors influencing collective action.

Ostrom's (1992) theory was based on a number of case studies, and it parsed the management of common property into three states—1) institutional origins, 2) survival, and 3) performance—and sketched out qualitative cost-benefit models for each of these states. The framework sketched out in the 1992 chapter first laid out the conditions under which "appropriator organizations" would arise; specifically, resource characteristics, demand vs. supply, and characteristics of individuals forming the organization. Appropriator organizations are more likely to survive under yet other conditions, relating largely to rule enforcement, legitimacy supported by other institutions, and non-rapid change. Ultimately, an organization's performance depends on efficiency (sustainability and a positive benefit:cost ratio) and equity (match between users and organization members, positive benefit:cost ratio in operation of the organization, and knowledge acquired about resource and users).

There is intuitive and practical appeal to separating out three states in the management of common property resources. An organization must begin. It then must survive. And survival usually is not sufficient—some balance between equity and efficiency is required for long-term performance. In order to begin to understand the relative importance of various factors, I have merged all three states in Figure 1 by combining the factors from each of Ostrom's states that are repeated in the other states, yet still maintaining connections between different factors.

My motivation for combining these states into one phase is that as researchers we each tend to deal with our own little pieces of the common property management puzzle and often lose site of the larger picture. This essay is intended as a relatively holistic reference, from which aspects can be extracted and more fully developed while remaining aware of the connections with other parts of the theory. For example, a study on trust among the users of a common property resource must fit into a framework that considers the user group institution's own effect, or even the government's effect, on building trust. By presenting a graphic model as a baseline for charting Ostrom's multi-tier theory, I hope to make theory of collective action more accessible for evaluation. By using graphical conventions, we are forced to have new conversations about the nature of the factors involved and the relations between them. The graphical conventions allow us to place the factors into a variety of compartments that represent

¹ Particular thanks to Elinor Ostrom for comments on an earlier draft of this manuscript. Any errors are the responsibility of the author.

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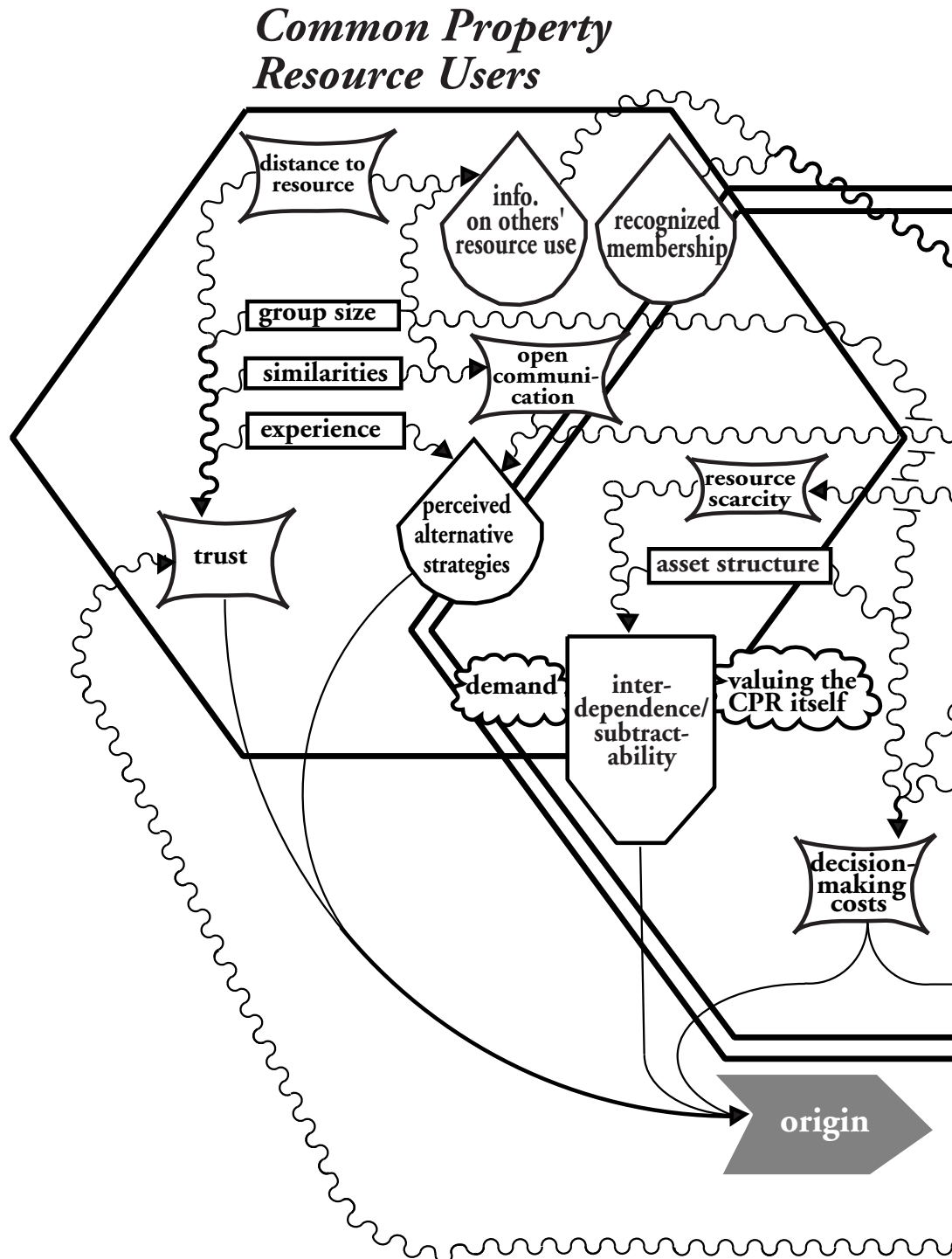
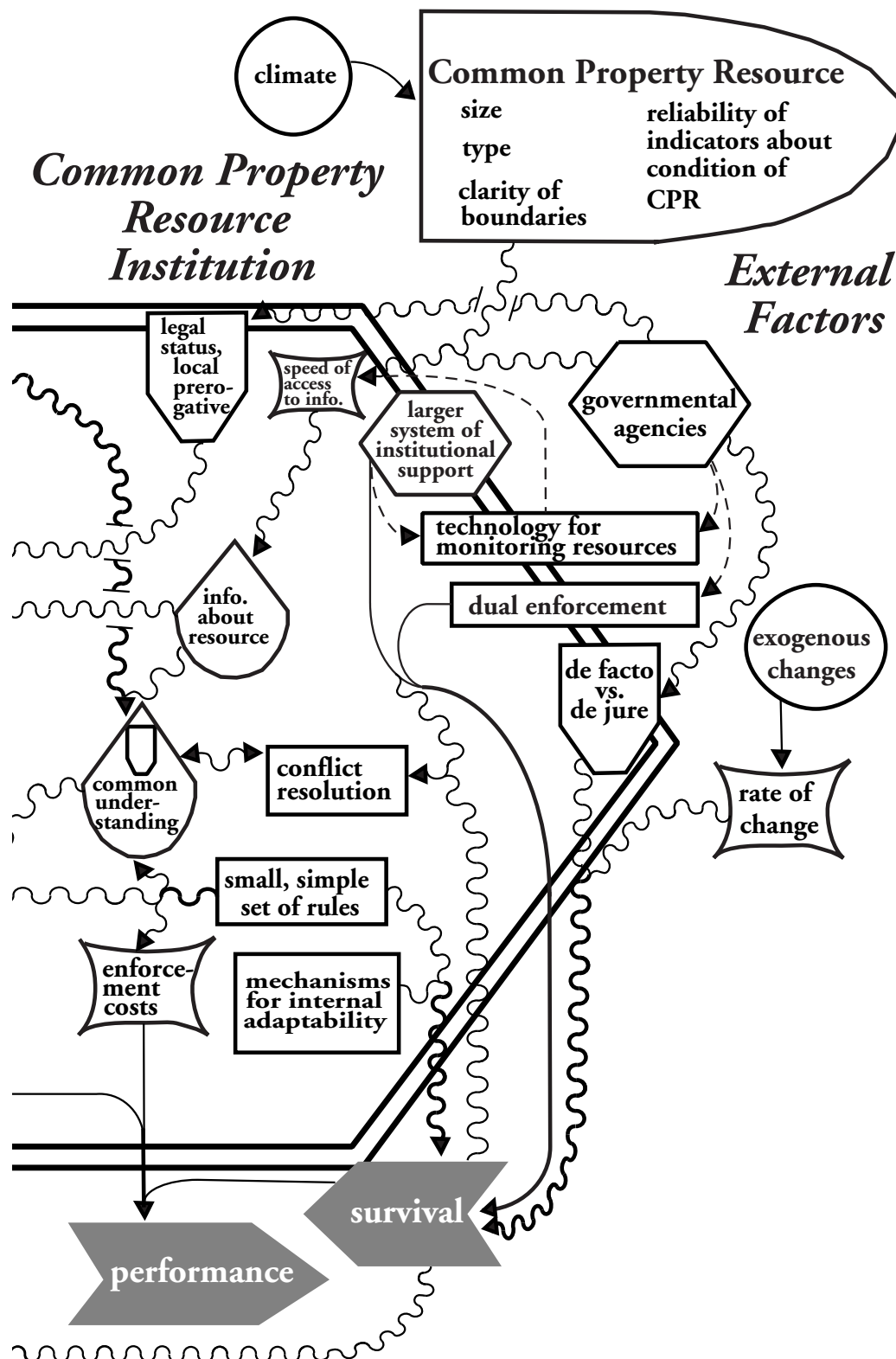


Figure 1. A graphical model of Ostrom's (1992) origins, survival, and performance of common-property institutions.



empirical entities (e.g., matter, energy, information, individuals, and institutions), as well as allow us to more clearly specify what types of flows occur between these entities. This is useful for better understanding the complexities of common-property institutions.

Explication of the Graphical Model (Figure 1)

I attempt throughout Figure 1 to maintain the causal relationships posited by Ostrom (1992). Explication of the model is not intended to reiterate in text that which can be seen in the figure, but to offer some insights into potential challenges and interesting questions that arose as a result of my own empirical and theoretical research on collective action problems. However, some explanation of Figure 1 (and caveats) is required.

Figure 1 is not an explicit cost-benefit analysis, although decision-making costs and enforcement costs are part of the model. The final outputs of the system are "origin," "survival," and "performance," and are each located in an interaction enclosure symbol (which allows two or more paths to connect and produce something new). What is important to point out here is that these indeed are Ostrom's three original stages, and that by changing the importance of the connections between input components we can potentially understand a great variety of specific milieus in which origin, survival or performance succeed and/or fail.

The graphical language relies on symbols from both H.T. Odum (e.g., 1983) and the Human Ecosystems Group at the University of Georgia (e.g., Georgia Journal of Ecological Anthropology 1998). Odum was concerned with structure, entities and the connections between them. Here size of the components and the thickness of lines depict their relative importance, and attempt is made to locate components in groups based on the similarity between components or on the amount/kinds of interaction. See Figure 2 for a key to the symbolic language used in the model. Please take a moment to read Figure 1.

The biggest challenge in graphically depicting Ostrom's (1992) chapter is deciding the nature of each of the components. It is important to specify

whether components are physical items, sources of energy or information, institutional structures, storages of matter or information, behaviors, individual beliefs, etc. Since Ostrom (1992) provides the causal linkages and the names of components, one of the purposes of the present exercise is to examine the functional similarities and differences between components. For example, should the enclosure symbol labeled "common understanding" (of resource withdrawal) be a 'switch', a 'comparator', an 'institutional structure', or 'information storage'? "Common understanding" is not a structure (signified in the model by a rectangle), but perhaps it serves as information storage (a half-circle topped by a vertex) that can be called upon intermittently; one which slowly develops over time. It could also be considered as a 'comparator' (rectangle with two chopped off corners) that takes in information and compares it to what is already known in order to determine whether common understanding is possible or not. I placed the comparator within the storage symbol, since both characteristics seemed necessary. "Common understanding" then feeds into a switch, which is the level of costs in decision-making. These designations as graphically distinct components prompt us to think even more carefully about which empirical observations we should focus on when constructing and testing this particular theoretical framework. Other symbols in this graphic might also be made into composite functions, thus improving the clarity of the framework.

The large enclosure symbol called "common property resource users" is distinct from, but overlaps with, the large enclosure symbol "common property resource institution." This is because there is often a mismatch between users and owners and, in such a case, individuals are partly outside of the resource management system. Thus, I chose to separate the individual resource users from institutions in this depiction, in order to recognize that institutions often have goals that do not equal the desires of individual users.

As can be seen in the upper right hand part of the drawing, being linked to a larger system can provide informational and motivational resources, including technical training and assistance with

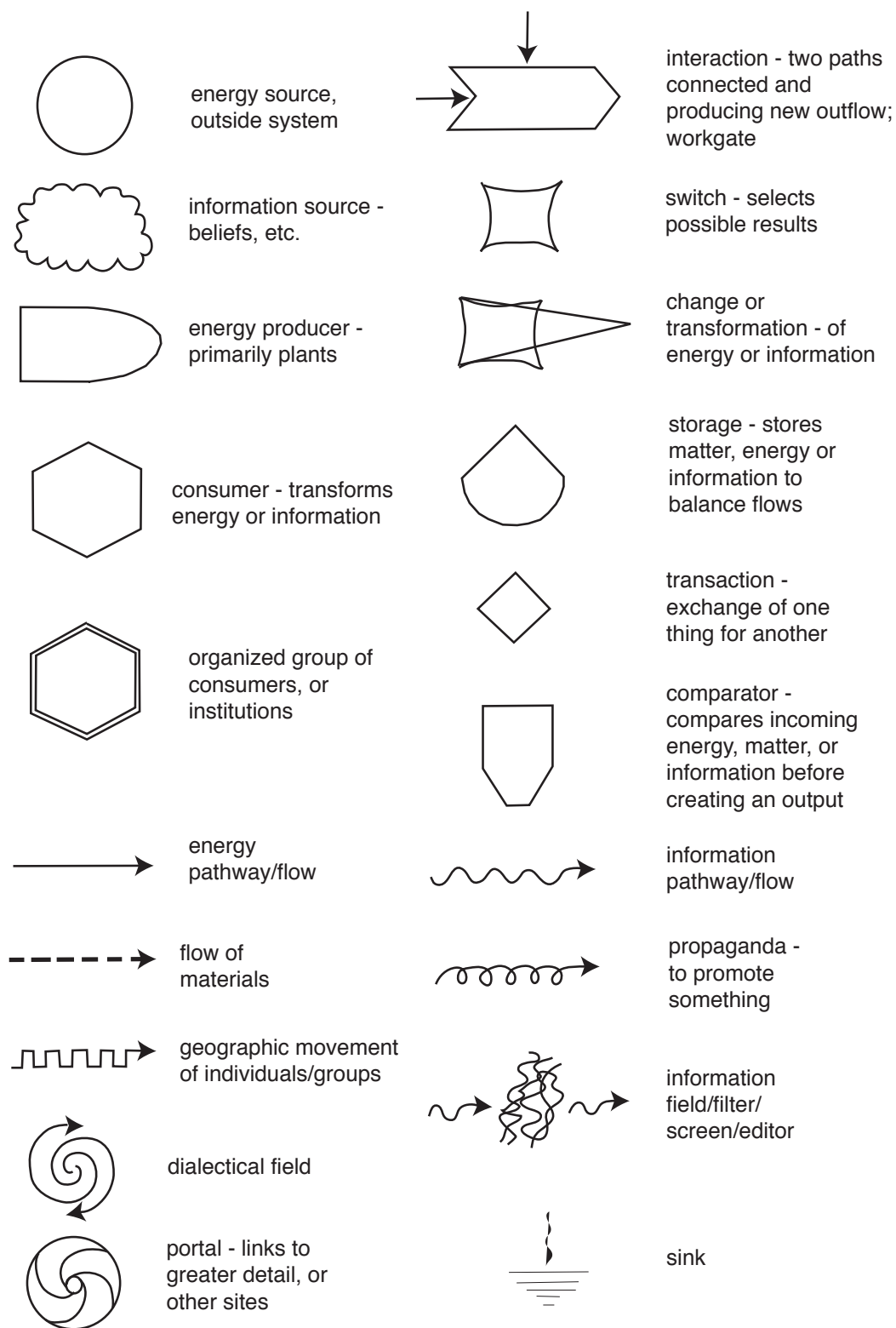


Figure 2. Key to human ecosystems models. From *Georgia Journal of Ecological Anthropology* (1998 vol. 2, p. 5). Based on H. T. Odum (1983, *Systems Ecology*, New York: John Wiley and Sons) and conventions established by the Information Ecology Group, Department of Anthropology, University of Georgia.

conflict management and compliance problems. Legally, it can assure local freedom to develop initiatives, assure certainty of ownership status, and provide appropriate legal recourse.

Points of Interest

Three 'panels' are immediately discernible. On the left hand side is a group of 'users', in which trust and interdependence serve as two of the focal processes. This group overlaps to some extent with the common property management institution. The relationship between the individual users and the group's overall characteristics provides the main influence on origin. The center panel is concerned with the practicalities of institutional needs that influence performance, which is essentially the balance between equitable distribution of costs/benefits and the efficiency of use of the common property resource. To a lesser degree, components of the center panel also influence the origin of a common property institution. This is an interesting feedback process—the center panel depicts what exists once an institution exists, but some of those components are necessary to get an institution together. On the right is a panel concerned with external factors, including government, a potentially federated system of organizational support, and external stimuli that together provide the bulk of the influence for survival, but also indirectly feed through the center and left-side panels to influence origin and performance.

Figure 1 began as an exercise for me to apply my research on the formation of new social networks and cooperative endeavors to theory on common property. My efforts focused on better understanding the effect of group heterogeneity on cooperation (Jones 2002). Note that, although several characteristics of group dynamics are included in Figure 1 (e.g., group size, similarities, time together, asset structure, trust), the ways that these aspects of social networks affect each other might need to be more fully developed. This is especially the case for the concept of trust.

Research on social relations often emphasizes trust or concepts that have been linked to trust from an emic or etic perspective. Most definitions of trust, based on cross-cultural data, rely most heavily on reliability and judiciousness. Trust, however, is probably best seen as being comprised of several processes. First, trust often appears to have something to do with in-group/out-group behavior. A lack of "cultural antagonisms" can certainly be important in fostering trust (e.g., Ostrom 1992:302-303). Ostrom (1992) also notes that mutual trust develops through engagement in mutually beneficial transactions over time. Another aspect of trust relates to the ability to watch others' activities or to receive information about them through gossip. Yet other aspects rely on power/economic status and what people can be expected to do based on the productive and political resources available to them. This could mean that the trust 'switch' may require several different kinds of triggers, or that it is not enough to talk about trust in the "traditional" sense.³

Another update or refinement of the theory as presented in Figure 1 is one in which Ostrom suggests that the "small, simple set of rules" in the central panel really relies quite often on the context, such that this institutional structure might better be called the "smallest and simplest set of rules relevant to the variety in the environment" (2002, personal communication).

After examining all the components in the model, a productive question is to ask why some of them are *not* connected by information, energy, or matter flows. This is an important question that provokes new directions for inquiry. For example, why is the storage function of "information on others' resource use" not linked to the comparator enclosure symbol called "interdependence/subtractability?" It is plausible that an individual does not need to watch their compatriots or hear about their activities in order to know that they are interdependent with others. How true might this assertion be? What is the literature on this subject? Further research on

³ This is not to say, however, that any or all of these processes are always conscious calculations by individuals.

the topic may be needed. Many interesting research projects can result from posing such questions while interacting with holistic models.

Many possible outputs are in fact missing from Figure 1. The three outputs depicted are origin, survival and performance. Survival is not really an explicit goal/desired output of most institutions—but both origin and performance are. These outputs are not linked to any other system nor provide any feedback to other parts of the model. The exception is that survival feeds back into trust and performance. Ostrom's (1992) intent was to begin to explain the origins, survival and performance of common property resource institutions, not show how all the components connect to each other; however, a model accounting for change over time must have feedback loops. For example, my experience is that success often breeds success. The statement, "Success breeds success in common-property institutions" nonetheless remains a very vague notion which would have to be elaborated to portray the kinds of components and relationships responsible for such a phenomenon.

Conclusion

Representing Ostrom's (1992) theoretical framework graphically allows us to clearly see the end states (outputs) and their causes in collective action, while at the same time noting the relative influence of indirect forces. For example, "distance to resource" has an effect on both origin and performance, but this effect is not direct. Rather, it is indirect since it passes first through trust or through "info on others' resource use," then through "common understanding," and "decision-making costs." Depending on the frequency with which some of these interactions occur, regardless of the intensity of any single interaction, it is possible that the existence of some small processes are responsible for the maintenance of the system and even more so, at times, than are larger, more obvious components. The power of indirect effects produced by smaller components of a system has been noted by many ecologists. For example, Patten (1998) notes how the unique properties of ecosystems derive largely from the

indirect pathways that tie together biological agents. Most pathways are small, organized within physical environments, but often not directly connected to one another.

By collapsing Ostrom's three phases into one graphic representation, it becomes clearer why behaviors may self-propagate, and which factors are most important in any given self-propagation. It also should be noted that some factors are important early on, but can continue to provide inputs into the system. Our analyses of common property resource institutions should take advantage of these insights.

Of course, new research provides new components and additional relationships for this or any other framework. But suggesting new components or new connections between components in Figure 1 eventually brings up the question "Is this model meaningful, since everything looks like it can be connected to everything?" This is a 'can't-see-the-trees-for-the-forest' question, the converse of losing sight of the big picture. Thus, Figure 1 should serve as a baseline and as a place from which to draw new questions or refocus old ones. The goal need not be to connect everything to everything, but to suggest heuristically how the aspects we are concerned with relate to the more general problem at hand.

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