Common Voices

Issue 6

Addressing the Commons

in this issue...

Cover Photo:
Leaders on the Commons at the IASC 2011 © Foundation for Ecological Security

Addressing
the Commons

Inaugural Speech

Professor Elinor Ostrom
Distinguished Professor, Indiana University, and
Nobel Prize winner for Economics in 2009

It's a great honour to be here. And I want to thank Shri Nitin Desai, and President Ruth Meinzen Dick, and Shri Jairam Ramesh, and Shri Jagdeesh Rao for organising something that is very exciting and very important for me. And it is a joy to see many colleagues that I have known through the years again, and to learn from them, and I am looking forward to questions. I will not be here for the whole meeting, but I will be here for the next two days and know that I will learn a lot.

I am going to be focusing largely on collective action theory, which I see as an underlying part of our work, so that there is a foundation to our research. Way back, long ago, Mancur Olson and Garrett Hardin did very key work on social dilemmas. Their work led to the prediction that self-organisation—at least Hardin's work—is impossible; people were trapped. The presumption is that people wouldn't cooperate because they would be trapped in a social dilemma. But somehow public officials are supposed to be able to solve the problem—they have the genes or something of the sort that is different, so they can solve it. So the literature has tended to recommend government or private ownership as a panacea. Now, this has been well accepted because it was consistent with game theory and models of the Prisoner's Dilemma. The presumption was that people will be trapped in that kind of a social dilemma. We then have had the media paying immense amount of attention to whenever something does collapse, like the sardines off the California coast. And so, the dominant policy recommendation was that we need governments to own and manage resources, or just turn them over to the private sector. We have had all sorts of these policies adopted around the world.

Now, there have been extensive field studies conducted on various villages and resources over a very long time. Many individual studies of pastoralists, of inshore fishers, of farmers organising to provide irrigation, and some of these like Robert Netting's work, are about Swiss commons that have been organised for centuries. But we had a very deep division. We had sociologists, historians, engineers, political scientists, anthropologists and other social scientists who would focus on fisheries and nothing other, or alpine meadows or whatever. And they examined these resources on a particular continent. So we had a literature that was divided by three big chasms—disciplines, resource type, and geographic region. And very little discussion and cumulation. So we were in a problem of lots of material but no cumulation. This led to establishment of a National Research Council Committee in 1980s to assess what knowledge do we have. Soon, over a thousand cases were identified that people had written about common pool resources. But because of the lack of cumulation in knowledge and sharing, authors all tended to identify different kinds of variables and processes. I think that was one of the stimuli for the establishment of IASC—to develop better theories and better frameworks to enable us to have cumulated knowledge about these many, many resource systems.

We were very fortunate that in Bloomington the Workshop in Political Theory and Policy Analysis research centre had already started to develop the Institutional Analysis and Development (IAD) framework. It has helped us very much as we tried to proceed. This is a multi-disciplinary framework

trying to look at how humans analyse a situation and act in diverse situations, at as general a level we could think about it. It contained a nested set of building blocks so that we could look at problems at various scales and look at how exogenous variables affect them. We can think about situations in the simplest possible ways of having exogenous variables like biophysical conditions, attributes of a community and the rules in use—and temporarily, they are not going to be changing, and you can assume them to be relatively stable for purposes of analysis.

These jointly help to create something we call an action situation—and we are going to dig into that in a moment—which then lead to interactions, outcomes, and the possibility of the participants evaluating, or external people evaluating, outcomes leading to changes. So over time you could have change as people interacted. This looks very simple, but having something simple that you can then unpack turns out to be a very powerful way to cumulate theory, which is what we have been doing. The internal parts of an action situation then are inside that box—the action situation—and as we developed this, we very self-consciously made sure that the internal working parts were similar to the working parts of game theory. One of the ways of operationalising the framework is game theory. Other theories are also useful. But since game theory was so dominant and so rigorous, we thought it was essential that we would be working with that. And we have done a lot of experiments and other work using the framework. So if we go to the internal structure, we can think of actors who are assigned to positions and their actions that they can take in light of the information they have, the level of control they have over outcomes or actions, their evaluations of net costs and benefits, and those cumulatively lead to potential outcomes, which can then feed back. And so this has become for us, when we do research, a structure that we can use and start unpacking each of these concepts.

> ## Since game theory was so dominant and so rigorous, we thought it was essential that we would be working with that

So when we were part of the National Research Council and we learned about all these cases, we thought this would be one way to develop a coding form and see if we could get any cumulation that comes from the analysis of these cases. But we found that even though we had a framework that gave us structure, that could be used to analyse fisheries or irrigation or forests, that because social scientists were not talking with one another, there was no common language. We screened over 450 cases, just to code 47 irrigation systems and 44 inshore fisheries. In addition, we did pre-screening for another five to six hundred cases. For these, we saw no

common variables described and didn't even do a screening for. But this meta analysis did enable us to get some very good initial information. We found that three-quarters of the farmer managed irrigation systems had high performance in terms of the crops they grew and their benefit to cost ratio, but only 42% of the government irrigation systems had high performance. So when some people have been saying that one system always succeeds and another always fails, the 'always' is something you have to be very, very careful of. There are different levels of performance, but that doesn't mean that one is always good and one is always bad.

The meta analysis also enabled us to clarify concepts. And, one of the confusions in literature that has been there for a very long time and is slowly but surely getting clarified, is the term "common property resource". It's widely used. It confused the concept of 'property' with that of a 'resource'. We have been working hard on switching to 'common pool resources' and 'common property regimes'. The problem is they both have the same initials—CPR—but there is a big difference between a property regime and a resource system. And we have also been able to work on what is meant by property rights. There was a presumption that you did not have property rights unless you could sell them—alienation. But there were many, many people who were operating with the sense that they did have property rights. And their rights were verified over time. We were able to develop a scheme of access, withdrawal, management, exclusion and alienation as five key types of rights. And some people or groups have only one or two of them, but that did not mean they had no rights. And you could assess, given the kind of system they were working on, what kind of rights made a difference.

> **The problem is they both have the same initials—CPR—but there is a big difference between a property regime and a resource system**

We also found an incredible diversity of rules. When you actually read the case studies and look at the detail, and keep track of what kind of specific rules were enforced, we found a substantial variety of rules in use related to common pool resources. We went again back to the framework to help us, slowly but surely, work out of that morass. And so we asked, what part of an action situation does a rule affect? This was our way of getting sense of what rules there are. So let us now go back again to the notion of an action situation—and what I showed you earlier as the inner parts. But we then attached to each inner part a potential kind of rule that we were seeing out there. So boundary rules affecting actors, choice rules affecting what actions they can actually act on and choose,

information rules affecting who knows what, when, where, how, aggregation in terms of how a group might affect a joint decision, pay off rules affecting the net benefits and costs, and scope rules affecting what outcomes could be affected. And this gave us an initial way of classifying the myriad rules, so that we can begin to understand the difference. And by finding the seven types we could then really get at the variety in each kind. But we found that for example, boundary rules differed when you dealt with fisheries or irrigation systems or forests instead of there being one kind of boundary rule. As you start thinking about the attributes of the resources you can understand why those who were trying to manage them had different boundary rules—they tended to allocate what technology could be used, what geographic limits, what season. In the literature, frequently the presumption was that if they didn't allocate quantity they didn't have rules. And this is particularly for fisheries, where many fishery systems have used technology as their way of making rules over who could use what, when and where. The presumption has been made that there weren't any rules related to common pool resources, and so the government had to come and make them. We could see that the evolution of rules that fitted local circumstances was very important even though outsiders did not understand these rules.

So we then started to look at the long-surviving institutions. I thought that maybe it might be feasible to find an optimal set of rules; I was trained in, a lot, in economics and that leads you to want to find the optimal way of doing something. And we coded the rules that were recorded as being used. I had stacks of case studies on my desk when I had a sabbatical in 1987. And I struggled trying to find the set of rules. I came as close to being defeated and depressed as I have in my career, because I couldn't find the specific rules that accounted for success of some of the cases. And finally, after hiking in the hills—sometimes going for a hike when you're struggling with ideas is one of the ways to cope—it finally dawned on me that there were some uniformities that underlie the successes and were absent when systems collapsed. These weren't specific rules but broader principles that characterised the ones that had survived for a long time. So I thought there were some things that we could get at in terms of broad concepts, which I then ended up calling "design principles".

And now it's very exciting, there's a new article just out by Cox, Arnold and Villamajor in *Ecology and Society*. They've reviewed ninety plus studies from around the world by scholars other than folks that were associated with the Workshop, who are looking at the applicability of design principles. And they found a very good empirical foundation for the design principles— very strong. But then they clarified that when I first defined the boundary rule I mixed up people and resource, and that sometimes they would find that because the resource was well defined but the people weren't, there were still problems. So by looking at this problem, they divided three of the principles up and tried to get at attributes of the people and the attributes to the resource both designated. So three of the design principles now have have two parts—one focusing on the users of a resource and one on the resource itself. They are thus now more precise. And I think that gives us a new foundation for moving forward. At least now we know that

there is a lot of empirical support for the usefulness of the design principles.

We have also done a lot of empirical studies in the lab; I don't think I'll spend a lot of time on that today. But laboratory experiments are very, very important ways to take the kinds of variables in an action situation, or the rules around it, and precisely formulate them and then create an experiment where you could then change one variable at a time. When you're doing field research, you don't have that luxury. And chemistry, biology, etc., have all moved ahead because of both field research and laboratory research. So, we created an initial situation, where 7 people were making decisions about withdrawing assets from a common pool. When there was no communication and the participants were absolutely anonymous, the participants over-harvested. They over-harvested dramatically—way beyond the prediction made by Nash. So, what is important is that some people think that Hardin is useless. And I think it's important to recognise that he pointed out a very important problem. Where he made an error was his presumption that the people involved couldn't change their rules and the structure of the situations they faced. But, absolutely anonymous, no communication, no history, people do over-harvest in a common pool resource. On the other hand, when we introduced the capacity to talk (and in game theory that's considered to be 'cheap talk' and its predicted to make no difference) and it makes an immense difference. Simply immense. The participants don't get all the way to solving it perfectly. The difference in reducing harvesting rates and moving towards better outcome is immensely different. Then if they design their own sanctioning system and take their rules that they design for a sanctioning system, they can get very close to optimal. And again, one of the advantages of experiment is you know what's optimal. And out there, in the field, we frequently don't know that. So while doing the experiments, they backed up what we found in the field—that users are not helpless.

Absolutely anonymous, no communication, no history, people do over-harvest in a common pool resource

Then we have done an immense amount of field research, I can't go into all of that, [but] we have compared 226 irrigation systems that are built by farmers with those designed by engineers with a lot of external money, and their systems are very fancy and very well designed in regard to engineering standards. These agency-managed systems work well initially. Farmer-managed systems, by many engineering standards, are primitive and in terms of construction—no cement, no permanent structures in the beginning—but we did a statistical analysis that farmers using farmer-managed systems were able to grow more crops, run the system more

efficiently and get more water to the tail end. One of the real problems of water systems is that head enders are very, very strongly tempted to take water, and again getting water all the way to the tail end is a big problem—so [it] counters the argument that people will not self-organise, [but] yes they do.

We have been looking at forests around the world. We have colleagues who are here for several days ahead of the meeting—every two year meeting—of the International Forestry Resources and Institutions research programme. This is a research programme and we have a common set of research instruments adopted across thirteen countries. We measure very carefully, a random sample of plots, getting dbh and basal area and other forest measures, as well as getting into the community, finding out how people are organising, if they have a governance council, who's on it, how do they work, etc. And we have been finding a number of things, but I'll highlight only the major ones to talk about this morning.

In the sustainable forests that we have found around the world—where forests are either constant or growing rather than decreasing—we are finding that that the users themselves tend to be active monitors in the level of harvesting or how the forest is being used. And it turns out that users themselves doing some of the monitoring of forests is a more

important variable than the formal type of governance—like government / private / community governance. And there are synergies between some of the outcomes. So Arun Agrawal and Ashwini Chhatre have published a very important article in *PNAS* looking at "if you want to do carbon sequestration, does that mean that you can't improve livelihoods?". And they are finding some synergy between livelihoods for local people and carbon, and finding that larger forests (it turns out) are more effective in enhancing both carbon and livelihoods. But, in addition, even though they might be large, when the local people living in or around a forest have some rule-making autonomy and incentives to monitor, forests systems are improving.

Well now, where is collective action theory today? We've been showing that the theory that we've started with in the '70s is not on target. So, we are now working with a behavioural theory of individual choice, where we can think of individuals as being boundedly-rational but they have a capacity to learn through experience. People sometimes start with heuristics and update those over time as they are learning which ways of operating are more successful over time. And people learn norms. And they potentially value the benefits that others receive as well as what they receive. So this is where we can start. But then we also find that when people trust others, it's very central to their being cooperative and engaging in collective action. Further, trust among participants is affected by context. In a recent book, with Amy Poteete and Marco Janssen, we discuss the micro situational as well as the broader context of social dilemmas as that affects trust and cooperation (*Working Together: Collective Action, the Commons, and Multiple Methods in Practice*, 2010, Princeton University Press). You can think of humans as learning and norm-adopting individuals who select where they're going to engage or act for some things. For other things they don't have the capacity to select, they have to be there. The context—both the micro and the broader—affect their patterns of relationships. If they start an action situation and have some initial levels of trust, they can move to higher levels of cooperation that increases the benefits, gives feedback, and that can grow. On the other hand, there's feedback, and if the levels of trust begin to go down, then the levels of cooperation go down, and then benefits go down. So you can have a kind of feedback loop that either reinforces cooperation or reinforces defection, and we have to start thinking through these micro-situational and broader variables very carefully. So, we've gone back and done a very good analysis of what are some of the things that we're finding from across a large number of experiments and in the field.

When people can communicate, when reputations of others are known, when there is high marginal return so that if you work hard you get more out, where people can enter or exit and have some choice over this, when they can have a longer time horizon, when they agree on a sanctioning mechanism—these are all factors that tend to enhance the likelihood of people finding cooperation solutions. That doesn't mean you have to have them all—but if you have a mixture and combination of them, it is much more likely that cooperation will get stronger and stronger. Here is one of the future areas of research that we need to be cumulating—right now a lot of this is coming out of different studies. And in future if we can be getting more studies that ensure we're measuring all of this, we will cumulate still further.

You can think of humans as learning and norm-adopting individuals who select where they're going to engage or act for some things

We're now working on a social ecological systems framework over a long period of time building on the IAD and a paper I did in *PNAS* in 2007 and a *Science* article in 2009—trying to think of what are the factors of a resource system and a governance system, etc., that affect who will organise, what kind of infrastructure they build, how robust are they to external disturbances looking at sustainability of water, forests, fisheries. If we take a look at the highest system we can be thinking about a resource system and resource units embedded in a social, economic and political setting as well as the related economics of the ecosystems interacting with governance systems and actors. So, here we create that action situation that I showed you earlier from an IAD perspective, where we can then think about the situations that people are facing. But situations of the real world, as opposed to the lab, have all of these coming in at them that will affect the micro-structure and outcomes. So, I won't bore you with all of this, but I just wanted to talk about looking at various levels. It helps you with a framework that enables one to unpack those concepts, so that you have concepts within concepts. This goes back to Herb Simon's work—and there are many variables involved. And part of the problem that we have in doing field research is that there are so many variables, but we don't have a common language. And so partly what we are trying to do is develop a common language across the ecological and the social. And I'm warning you that this next figure makes some people very upset, but I'm going to unpack the major first level—and this is just the first level of unpacking. And for each of the initial systems like the resource system or resource units or actors, there are some 8, 9, 10 sub-parts and for each of these there are subtypes and sub-subtypes. So, we can get down to four levels fairly easily. But we're slowly but surely developing definitions and looking at who's tested what combinations. So, it's how these things combine that affects action situations and the pattern of interactions and the outcomes. The interactions like how much are they harvesting, what kind of information are they sharing, what kind of conflict is there, what kind of lobbying activities, etc. and these interact over time to create efficient or inefficient systems, equitable systems, accountable, sustainable. These are the outcomes which we are all interested in. And, SES framework is not something that is going to be useful tomorrow, but there are some of our scholars who are starting self-consciously to define these nested concepts for forestry,

for pasture, for coastal systems, etc., and giving us a common language so we can then be examining specific cases, testing the usefulness of the framework, and developing theory related to it. The framework is not a theory.

This is a common language that we can use in developing theory and testing it. So we can then look at different questions. On the slide you'll notice that there are variables that have stars, like number of actors, leadership/entrepreneurship, norms, social capital, etc.—they have stars. And in an article in *Science* in 2009, I used those and developed a formal mathematical model of self-organisation. We have used the variables in the field and to look at empirical results of who actually is going to self-organise. So, the first step of being able to solve collective action is beginning to do some self-organisation. What we need to be thinking about is that resources, that we find out there to be in good condition, usually have users that have long term interests, who invest in monitoring, and build trust.

And, successful systems are embedded in polycentric systems (now that's a term that has not been in the dominant language for analysing resource governance). We need to be thinking about how long can somebody look to the future. Is it worthwhile? Do I trust the others? Should I put in hard work? Should I monitor? So, I hope—and what is very exciting is that the number of policy makers who are here—that we'll be able to discuss over the next couple of days the ways that some of these theoretical ideas can be operationalised in the field. And, if we can be recommending government protected areas sometimes, community forests sometimes, complex systems sometimes. But we shouldn't be recommending these as the way to solve everything. We need to recognise—just like you don't want to have the way to have breakfast every single morning, that you have breakfast exactly the same every day! We need to recognise that it's not just [for] food that we need diversity, we need the diversity of institutions. Further, we must learn how to deal with complexity. We have been rejecting it—we need to learn to understand it, and harness it. And of course, I keep coming back, we should stop recommending panaceas.

Let me thank you then for listening. I don't think we have time today for questions, I'll be glad to take them. And I think we are going to have a great meeting, so I am looking forward to the panels and all the discussion that we will be having. Thank you very much.

The video recording of the inaugural ceremony can be found at http://commons. fes. org. in/?page_id=278