Considering Scale in Resource Definition Constituting the Commons Martha E. Geores Department of Geography University of Maryland College Park, MD 20742-8225, USA

Abstract

Resources are defined, regulated, and consumed at scales ranging from the scale of a single individual to the global scale. Forests have long been recognized as common-pool resources that exist within the context of different scales. This paper examines the importance of understanding the role of scale in the definition of forests as resources. It begins with a discussion of structuration as the theoretical foundation for resource definition. Next, the dual role of scale in influencing and being influenced by the definition of resources is discussed, and finally, these principles are applied to forests.

Introduction

Satellites give us the capability to observe the world on a global scale as they orbit the earth transmitting images to ground receiving stations. They give us a way of visualizing the concept of global. This characterization of information as being global scale changes the way we view our world, and all of its component systems. Earth observing systems have led to many breakthroughs in understanding local, regional, and global biophysical patterns. The social uses for remotely sensed data have not developed as quickly as the biophysical ones. However, just having global scale data available changes the way that natural resource issues are viewed.

One of the primary uses of satellite imagery is to observe and study vegetation patterns. One of the reasons it is important to monitor vegetation is that changes in both the biophysical and social systems leave their mark on vegetation patterns. Scientists skilled at remote sensing can tell the type of vegetation by the reflectances on the images with a fair degree of accuracy. Another reason is that it is important to know where forests are and what their extent is because of their value as a carbon sink which is a global function. The global function of forests leads to routine definition of forests resources at a global scale, at the same time that these same forests are being defined at much finer scales by communities which use them. Sometimes there is a conflict over the definitions between local groups wanting to use the forest in one way and international groups wanting to use it in another way.

One of the difficult aspects of defining resources is that it is a process that transcends the boundaries of physical and social sciences. There are different ways to bridge the discipline gap. Ecological economics is a field born out of the struggle for understanding the interface between ecological systems and economics (Costanza et als 1999, Ostrom, et als 1999). Ecological economics, and much of the recent common pool resource work, stress functionality, and use economic value as the common denominator for discussing interactions between biophysical and social systems. This paper proposes another way of looking at the interface between these systems through the process of resource definition theoretically informed by structuration. The next section discusses structuration and its applicability to the resource definition process. This section is followed by an examination of the issue of scale, and then, application of these concepts to the forest definition process.

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Structuration

Structuration is a social theory developed by sociologist Anthony Giddens in the 1970s which offers a theory of society encompassing both structuralism and humanism. Structuralism was based on the premise that societal structures, such as the economic structure determined the shape of society, while humanism attributed social structure to individual decisions. Social theorists tended to fall into one camp or the other. Giddens thought that neither school of thought adequately explained society and proposed the theory of structuration.

In structuration theory there is a duality of structure and agency. Structures enable behavior, but behavior influences and modifies structure in a recursive manner. The same is also true for agents – agents act, but their actions reflect back on them and change their behavior. Therefore, in using structuration, one does not have a goal of identifying the structures involved, but rather studying society in action. Giddens divides resources into two categories – allocative resources and authoritative resources. In a broad sense allocative resources are property resources while authoritative resources are power resources. Again, there is not always a clear line between allocative and authoritative resources. Identifying them as one or the other is less important than observing the social action taking place.

Giddens' concept of locale, as the place where action occurs, is akin to the meaning of place in geographic terms. Locale includes not only location, but the social and physical context associated with a place. Locale cannot be defined by one time or spatial scale because a multitude of interactions take place within it. It is important to understand allocative and authoritative resources in relationship to locale.

Rules which govern conduct are labeled semantic and moral. Semantic rules are written statutes, or regulations such as international treaties, state laws, or local zoning codes. Moral rules are norms which govern and legitimate conduct. They are most often part of the cultural fabric and may not be written down, making them difficult to include in resource management plans at all but the finest geographic scales.

Giddens did not explicitly include consideration of the biophysical environment in his discourse on structuration. However, Steiner and Nauser (1993) integrate it into structuration in their discussion of human ecology, defined as the study of humans in their environment. It is not difficult to think of natural resources as allocative resources, and the plans by which they are managed as authoritative resources. Scale is an important consideration for both allocative and authoritative resources.

Another aspect of social science study brought up by Giddens is the concept of time-space distanciation. This concept recognizes that social actions occur in different places at the same time and are related to each other. This concept expands the notion of social space. The time scale for social actions is also not static because the past and the future are ever present in all social actions. This flexibility of dealing with time and space allows a full exploration of the biophysical and social interactions.

Scale

Scale has become an increasingly important consideration in natural resources study as social and biophysical scientists have realized the interconnectedness of earth processes. It is an inherently geographic concept. Scale is the means by which geographers set parameters for analysis of human and biophysical systems. Scales go from very fine levels, such as households or fields, to very coarse, global scales. Resources are defined within the context in which they are found, and scale helps define the scope of that context.

Turner et als (1990:15-16) address the concept of global scale in the context of global environmental change. They identify two types of global environmental change: systematic and cumulative. In systematic global change, "global" refers to the spatial scale of operating or functioning of a system. This includes actions such as emissions of greenhouse gases or ozone depleting gases where the global atmospheric system is changed. Cumulative global change refers to a global impact of worldwide distribution of change and an impact through the magnitude of the change. Included in this category are groundwater pollution, species extinction, deforestation, soil depletion.

Scale makes a difference in the study of phenomena. Walsh et als (1999:27-28) identified three kinds of scale dependence: "1) representations of spatial patterns may be different when observed at different scales; 2) certain patterns and processes may not be observable at a particular scale or resolution; and 3) methods used to observe causal relationships between variables are affected by the scale of observation." These dependencies have been noted in common pool resource work as well (see Ostrom et als, 1999:284; Wilson et als 199:243).

The political ramifications of scale are perhaps the best-recognized aspects of scale. The definition of scale used in political geography "refers to the nested hierarchy

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of bounded spaces of differing size, such as the local regional, national and global (Delaney and Leitner, 1997:93). Geographic scale is a social construct, which is often taken to follow jurisdictional lines. When resources, especially common pool resources, transcend international jurisdictional boundaries there is a disjuncture, which causes conflict over management (Barkin and Shambaugh, 1996). When the extent of the resources do not match the scale of observation or regulation, political disputes arise.

Traditionally scholars have spoken of levels of scale as local, regional, national, (or national, regional), global, often explicitly calling them "nested scales". This concept of a hierarchy of scales impedes research into natural resource definition. Just as relationships between structures and agents are recursive, so are actions at any particular scale. No actions occur in a vacuum, influences impinge on actions from finer and coarser scales. It is necessary to recognize that multi-scalar interactions are happening all of the time.

Labeling a scale "regional" is another source of confusion. In geography there is a subfield devoted to the study of regions, and the process of defining a region is a complex one. For instance, regions have been seen as social organisms by some scholars (Archer 1993). Others maintain that regions are formed around issues or interests and do not have clearly demarcated boundaries (Gilbert 1988). All of this is to say that "regional" as an adjective modifying scale is an empty term. The mantra of local, regional, global scale does not describe a commonly understood linear, hierarchical relationship. Time scale as well is not a linear matter because of the influence the past and future have on the present. A loosening of the meaning of time scale will assist in establishing the context within which social and biophysical interaction takes place. It also helps us to grasp the importance of time-space distanciation, where present, local events are influenced by and are influencing actions at other locales.

The process of resource definition is sensitive to scale for many reasons. These include the nature and extent of the resource, and its potential uses and users. Scale is a consideration in who defines (using authoritative resources) the resource (an allocative resource). One of the ways that scale is a factor is in conceptualizing the resource. In order to talk about global resources there has to be some way to conceptualize "global". <u>Forests</u>

A forest is a difficult resource to define. It is a multi-faceted resource, composed of other resources which contribute to its definition. Applying structuration to the process of forest definition reveals some of the complexity. At first glance it would appear that a forest is clearly an allocative resource, it is a material entity composed of, or at least including, trees. Questions soon arise over whether a plantation of teak, or coffee, or palm oil is a forest. How many hectares does it have to be, or how many kinds of trees does it need in it to be called a forest. Who is doing the defining? Does a timber company have a different definition of a forest than a person with a summer residence in the mountains, or someone who uses the "forest" for fuelwood? This author maintains that forest is a cultural term, dependent on its social context for its meaning.

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Invoking cultural meanings and social context triggers not only questions of resource definition, but also questions of scale. Since the social context is going to vary with the scale of analysis it is important to define the different scales and observe their interactions. For instance, if a community has defined a specific area as a forest, then it will have both semantic and moral rules (authoritative resources) to govern it on the community scale. Households have their own authoritative resources which coincide with the community rules, but may not. Within the household, individuals have their own rules, which again may differ from the coarser scale authoritative resources. It also may be that the community is within a state jurisdiction which has its own authoritative resources. There are instances where the mere definition of a forest will result in state takeover of the area because all forests are state owned. What structuration brings to this situation is a way to separate the definition and management processes operating at multiple scales; to step back and analyze the complex interrelationships.

Leaving the question of authoritative resources for the moment, consider the scales at which forests are defined and the complexity of those decisions. Individuals define forests at the micro-scale. A particular forest may have meaning for a person because she lives on it and encounters it everyday. However, this same person may be a member of a community which owns this, or another forest. She may also be a citizen of a country which has some form of national forests or protected areas and thereby gain a sense of entitlement to those forests. If she picks mushrooms or other nontimber forest products, she may feel a regional interest in the area where those resources are found. She is also a citizen of the world, with a vested interest in having clean air to breathe,

giving her a sense of entitlement in the world's tropical forests. This is just one person; we have not considered her interactions with others.

Time/space distanciation plays a major role in this person's view of forests. She has actual contact in the present time with only a small piece of forest where she lives, and yet she feels a vested interest in forests that are great distances from her. The histories and future of those forests are important to her. She cannot exercise authoritative resources over all of the forests by herself. She depends on governments, non-governmental organizations, co-owners of property, among others, to exercise authority at different scales. She tries to impose her definition of forests on others by interacting with those who have authoritative resources and convincing them to champion her cause. Each group with authoritative resources over forests is in a recursive relationship with other similar groups, and so the forests are constantly changing.

One way of characterizing this time/space distanciation is through the concept of a viewshed. Viewshed is a term used in habitat management, which means the spatial zone visible across a landscape from a point location, such as an eagle's nest (Camp et al, 1997). Viewshed is also a term used in remote sensing for the spatial zone visible from the satellite, which usually coincides with the swath of coverage. Our viewshed has changed with technology. We can now see the extent of forests without being there, and this combined with a better understanding of the global processes leads to a feeling of entitlement to authoritative resources over the forests, particularly the tropical forests.

Conclusion

The social theory of structuration presents a way to analyze resource definition and management situations. The idea of nested scales needs to be replaced by a recognition of the recursivity of the concept of scale in any given application. There are a multitude of pressures from finer and more coarse scales at work in any resource situation. Often the clashes over resources can be traced to different definitions of resources with roots in different scales. Scale is not a discrete concept. It is both the cause and the result of interactions across scales.

Forests are particularly prone to scale issues because of their global as well as local functions, and therefore varying resource definitions. The technological advances that have enabled us to understand global processes have also led to the exercise of broader authoritative resources over forests. Power struggles exist on at least as many scale as resource definitions exist.

By using the concepts of allocative and authoritative resources, and the principle of recursive relationships, the theoretical underpinnings surrounding common pool resource management can be explicated. Economics has provided a good link with ecology to study resource management, but social theory could also prove useful.

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