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## **From Natural Resources to Natural Assets**

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**FROM NATURAL RESOURCES TO NATURAL ASSETS\***

JAMES K. BOYCE

**ABSTRACT**

This article examines the scope for strategies to build natural assets in the hands of low-income individuals and communities. Natural assets include sources of raw materials such as forests and fisheries, and the airsheds, lands, and water bodies that provide "environmental sinks" for the disposal of wastes. These resources become assets when people have rights to access their benefits. Four strategies for natural asset-building are identified: investment to increase the total stock of natural assets; redistribution to transfer natural assets from others; internalization to increase the ability of the poor to capture benefits generated by their stewardship of natural assets; and appropriation to establish rights for the poor to open-access resources. Building on the democratic principle that all individuals have equal rights to clean air, clean water, and other common heritage resources, these strategies simultaneously can advance the goals of poverty reduction, environmental protection, and environmental justice.

Natural assets are the myriad forms of wealth created by nature. They include the land on which we live and grow our food and fiber; the water we drink and use to irrigate crops, generate electricity, and dispose of wastes; the atmosphere that envelops our planet; the fish in the ocean, the trees in the forest and all other animals and plants, wild and domesticated; ores, minerals, and fossil fuels; and the

\*This article is adapted from an introductory chapter in the forthcoming book, *Natural Assets: Democratizing Environmental Ownership*, edited by James K. Boyce and Barry Shelley, and is presented here by permission of the author.

energy of the sun that powers the biosphere. Natural assets are the wealth on which human well-being-and survival itself-ultimately depends.

Nature sustains human livelihoods in two fundamental ways: first, as the source of raw materials for the production of goods and services; and second, as the "environmental sink" for the disposal of wastes generated by our production and consumption. Both kinds of natural assets are often diminished by human activities: we have depleted nature's sources and overfilled nature's sinks. But humans can also invest so as to increase the amount of natural assets. One avenue for such investment is "ecological restoration," measures such as reforestation, the replenishment of fisheries, and the clean-up of polluted land and water that increase natural assets by repairing some of the damages inflicted by human activities in the past. Another avenue is human engagement in the web of life, the evolutionary processes that constantly shape and reshape the living world. From the standpoint of human well-being, perhaps the most important example of such engagement is the domestication of rice, wheat, maize, and other crops, beginning roughly 400 human generations ago, and the subsequent evolution of the many thousands of diverse varieties of these crops today cultivated by farmers around the world.

### **NATURAL ASSETS AND HUMAN WELL-BEING**

Although natural resources are the common heritage of humankind, access to them is filtered through human institutions. Resources become assets only when people have rights to them. As with other kinds of assets, some people typically have more natural assets than others. The resulting distributional imbalances have long been a source of social struggles, and in recent decades they have fueled popular movements and public policies advocating environmental protection and environmental justice. Environmental protection seeks to maintain the quality and quantity of natural assets for present and future generations: it promotes inter-generational equity. Environmental justice promotes equity within the current generation, by demanding that natural assets-in particular, access to clean air and water-are distributed fairly.

These environmental aspirations are sometimes held to be at odds with another central social goal: poverty reduction. It is claimed that the poor face a grim but inescapable tradeoff between higher incomes and a better environment. This article challenges this conventional wisdom, maintaining instead that strategies for building natural assets in the hands of low-income individuals and communities can simultaneously advance the goals of poverty reduction, environmental protection, and environmental justice.

Poverty is not simply a lack of income today, but a lack of assets to yield income and other benefits tomorrow. This insight is the starting point for the asset-based approach to poverty reduction. It was applied by Michael Sherraden [1] and Melvin Oliver and Thomas Shapiro [2] to financial assets and real estate. More

recently, it has been applied to "human capital," in the form of health and education, and "social capital," in the form of community organizations and the bonds of trust that underpin cooperation. Natural assets too can play an important role in poverty reduction.

Asset-based strategies for poverty reduction have two compelling advantages over conventional income-based strategies. First, income transfers offer only temporary relief from poverty: unless today's income is followed by more tomorrow, the impact of such transfers is transitory. Assets generate income now and in the future, offering a long-term escape from poverty rather than a mere reprieve. Second, assets provide a source of leverage, enabling their owners to gain indirect benefits above and beyond those inherent in the asset itself, from more favorable access to credit markets to greater social standing and power. As Oliver and Shapiro remark, "Income supplies the necessities of life, while wealth represents a kind of 'surplus' resource available for improving life chances, providing further opportunities, securing prestige, passing status along to one's family, and influencing the political process" [2, p. 32].

Natural asset-building can, and often does, go together with building other types of assets. For example, Manuel Pastor reports that toxic waste facilities in metropolitan Los Angeles are disproportionately located in those poor and predominantly minority communities that are experiencing "ethnic churning," with new minorities moving in as others move out [3]. The reason, he suggests, is that stable communities are richer in social capital-informal networks as well as formal community organizations-and hence better able to resist the siting of hazardous facilities in their midst.

Just as social capital can contribute to natural asset-building, successful efforts to build natural assets can strengthen a community's social capital. A movement to resist the imposition of toxic facilities may set the stage for other community-based campaigns, such as demands for better schools, housing, and public services. In Chelsea, Massachusetts, for example, local efforts to access and restore the riverfront have helped to spark the rise of community organizations [4].

Natural assets have several features that distinguish them from financial wealth and real estate. First, the benefits that flow from access to natural assets include not only income, but also crucial non-income benefits such as health and environmental quality. Poverty in these dimensions of well-being can be as serious as low incomes. Natural assets share this feature in common with other types of unconventional assets-including education and community organizations that also contribute to the non-income dimensions of well-being.

Second, the principle that every person has an equal right to natural assets has a wide appeal. Two centuries ago, the revolutionary democrat Tom Paine declared that land is "the free gift of the Creator in common to the human race," and proposed that the income from leasing it for individuals to use should be distributed equitably among all citizens [5]. In a similar vein, many people would agree with the proposition that rights to the air we breathe should be equally

distributed. To be sure, public policies in the United States and elsewhere have often skirted this issue, granting rights to natural resources and environmental services to the first party that finds a way to seize them. Yet the principle of equal rights to common-heritage resources remains a powerful ideal.

Finally, as the example of access to clean air suggests, rights to natural resources are often imprecisely defined. A great variety of ownership regimes characterize natural assets: some resources are owned by individuals or firms as private property; some are held by communities as common property; some are held by governments as public property; and some are open-access resources, owned by no one and available in theory to all, but in practice to those with the power to appropriate them. The "bundle of sticks" that constitutes the set of property rights to a given natural asset is often divided among different parties [6]. A farmer, for example, may own the surface rights to a tract of land, and a coal company may hold rights to the minerals beneath it, while the air above is an open-access resource. Many sticks in the property-rights bundle lie somewhere between the polar cases of perfectly defined rights and perfectly unrestricted open access. Do downstream water users, for example, deserve redress if the activities of an upstream landowner decrease the quantity or quality of water available to them? If the government institutes regulations to protect the watershed, does this infringe on the constitutional guarantee that private property shall not be "taken for public use, without just compensation"? The answers to such questions have changed over time, and as rights to natural resources are defined and redefined, the natural assets of the poor can expand-or shrink.

## RETHINKING THE ENVIRONMENT AND THE ECONOMY

Long before the rise of market economies, people relied on assets for their livelihoods and well-being. Even today, when markets mediate our access to many goods and services, much that is vital to a person's quality of life remains outside the sphere of market exchange. The nexus linking the various types of assets to the various dimensions of human well-being include non-market activities as well as market exchanges (see Figure 1).

### Humans versus Nature?

Environmental debates in the United States have often pitted proponents of wilderness preservation against proponents of "rational use." Preservationists typically base their case on the linkages in the top half of Figure 1. They stress the importance of natural assets, non-market activities, and the non-income dimensions of human well-being. The deep-ecology variant of the preservationist school goes further, arguing that the "rights of nature" should trump human well-being as the ethical basis for public policy [7]. Advocates of rational use

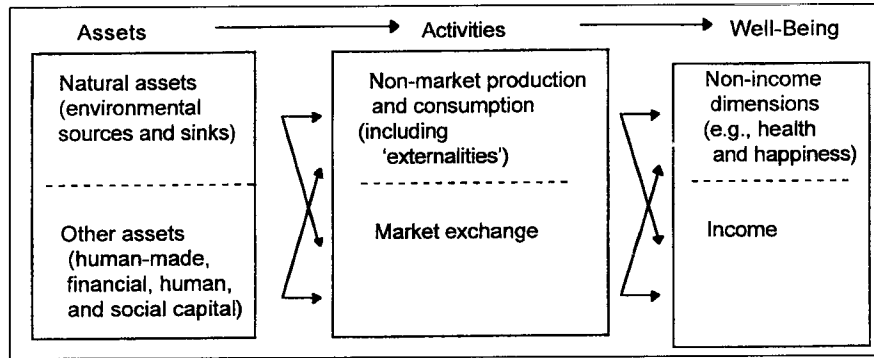


Figure 1. Assets and well-being.

typically base their case on the linkages in the bottom half of Figure 1. They are inclined to see the market as the measure of all things. The libertarian variant of the rational-use school goes further, arguing not only that free markets maximize well-being, but also that individual "freedom to choose" should be the overriding social goal [8].

Notwithstanding their profound and often acrimonious differences, both sides in this debate share certain premises. Both juxtapose nature to humans, and the environment to the economy, differing only in which side they favor and think will ultimately prevail. The preservationists believe that in the absence of strict controls, the magnitude of adverse human impacts on the environment will overwhelm nature's capacity for resource renewal and waste assimilation; the proponents of market rationality believe that human ingenuity, guided by price signals, will find a way around environmental constraints. Both sides also typically show little concern for the poor: in the preservationist paradigm, the poor are to be fenced out of nature lest they trample upon it; in the greed-as-virtue paradigm, the poor are simply consigned to their free-market fates.

This article is based on an alternative vision, in which humans are not apart from nature but a part of it. Since at least the advent of agriculture, humans have shaped and reshaped their environment. "Nature," as William Cronon remarks, "is not nearly so natural as it seems" [9, p. 25]. The environmental impacts of human activity are not invariably negative: humans certainly can degrade the environment, but they can also improve it by investing in natural capital. Furthermore, the poor-when they have access to natural resources-often play key roles in making and maintaining such investments.

The *acequia* communities of the Upper Rio Grande watershed, described by Devon Pena [10], provide a striking example. As long ago as the 1500s, Hispanic farmers constructed gravity-flow irrigation channels (*acequias*) in what is now northern New Mexico, transforming arid lands into a rich, biologically diverse

agricultural ecosystem. Today these *acequias* are maintained by their descendants, who thereby provide environmental services including soil conservation, water filtration and retention, the preservation of habitats for wild animals and plants, and the conservation of crop genetic diversity. Rather than short-sighted despoilers of nature, humans are the "keystone species" of this ecosystem. Human activity produced a new landscape, and continued human engagement is required to maintain it.

In terming such environmental changes "improvements," we make a value judgment founded on concern for human well-being in present and future generations. We are deeply committed to protecting the environment not because we see nature as more important than humans, or more worthy of respect, but because we understand that humans and nature are inextricably bound together.

### Winners versus Losers

The humans-versus-nature dichotomy not only ignores the potential for people to invest in natural assets. It also diverts our gaze from the contests among people who are crucial to the dynamics of pollution and resource depletion. Environmentally degrading economic activities involve winners as well as losers. The winners are those who benefit as producers or consumers by "externalizing" costs, that is, by their capacity to impose costs on others from whom they are distanced by time, place, and income. The losers are those who bear the costs of depleted resources and a polluted environment. Without the winners, environmental degradation would not occur. Without the losers, there would be no reason to worry about it from the standpoint of human well-being.

To grasp the causes of environmental degradation-and to understand why more of it occurs in some times and places than in others-we must ask why the winners are able to impose environmental costs on the losers. There are three possible reasons.

First, the losers may not yet exist: they belong to future generations who are not here to defend themselves. In these cases, the only feasible solution is to nurture an inter-generational ethic of gratitude toward those who preceded us, and responsibility towards those who will follow.

Second, the losers may exist but be unaware of their position: they lack adequate information about environmental impacts, and hence do not try to defend themselves. These cases underscore the importance of research and education on the environment in general, and of right-to-know legislation in particular.

Finally, the losers may exist and know it, but lack the power to prevent the winners from imposing costs on them. In such cases, the extent of pollution and resource depletion is shaped by the distribution of power: the greater the power of the winners vis-à-vis the losers, the greater the extent of environmental degradation. Hence a solution requires a more equitable distribution of power [11].

Empirical evidence suggests that this third explanation-based on power disparities between winners and losers-is relevant in many cases. In the United States, states with wider inequalities of power (as measured by an index derived from data on voter participation, tax fairness, Medicaid access, and the percentage of adults with a high school education) tend to have weaker environmental policies, higher environmental stress, and worse public health [12]. Internationally, countries with more equal income distribution, greater political rights and civil liberties, and higher adult literacy-indicators of a more equitable distribution of power-tend to have less air pollution, less water pollution, and wider access to clean drinking water and sanitation facilities [13].

### **Links between Asset Building and Environmental Protection**

Strategies that expand the natural asset base of the poor can further the goal of environmental protection in several ways. First, given the correlation between wealth and power, any strategy that increases the assets of the poor-natural or otherwise-will tend to improve their ability to resist having environmental costs imposed on them by others. Low-income and minority communities in the United States often face disproportionate environmental burdens [3, 14-17]. In effect, the poor subsidize corporate polluters by allowing them to avoid the costs of pollution control [18]. Strengthening the power of communities to combat these perverse subsidies is one of the ways in which natural asset building can further the goal of environmental protection.

A second link operates via the effects of asset distribution on the economic valuation of the environment. Research by economists and psychologists has shown that valuations based on people's willingness to accept compensation for environmental damages typically exceed those based on their willingness to pay to prevent the same damages. For example, when people are asked how much they would have to be paid to agree to breathe dirty air, they typically name a higher price than when they are asked how much they would be willing to pay not to breathe it. The difference rests on the implicit assignments of property rights. In the first case, the people have the right to clean air; they can impose charges on would-be polluters. In the second case, the polluters have the right to foul the air; the public must bribe them to limit pollution. The resulting valuations differ for two main reasons: First, willingness to pay is constrained by ability to pay, whereas willingness to accept payment is not. Second, ownership of a natural resource often instills a greater sense of moral responsibility to safeguard it [19, 20]. This means that the amount that a society is prepared to spend for environmental protection will hinge, in part, on the distribution of natural assets and other wealth. Even if social decisions about environmental protection were thoroughly insulated from the effects of power disparities between winners and losers-and were guided instead solely by the "efficiency" criterion of comparing



benefits to costs-building natural assets in the hands of the poor would help to protect the environment by raising the economic valuation of the benefits.

A third link arises from the impact of asset ownership on what economists term the "real cost of labor." From brownfields redevelopment and urban agriculture to sustainable forest management and the conservation of crop genetic diversity, labor is often a key input in investments in natural capital [21-24]. The supply of labor tends to be higher-or put differently, its cost tends to be lower-when people work for themselves than when they work for others. One reason is that many people prefer to be their own bosses; another is there is no need to spend money on supervision to make people work harder [25]. This labor-cost advantage helps to explain why family farming remains widespread in the United States and other industrialized countries, and why throughout the world small farms tend to yield more output per acre than large farms [26-28]. In the same vein, we can expect that more labor will be invested in restoring and building natural assets when their ownership rests in the hands of those who are providing the labor than when wage labor must be hired for this purpose.

A final connection between asset ownership and environmental protection arises from the importance of local knowledge. The members of local communities often have specialized knowledge about the characteristics and use of natural resources [10, 24, 29]. Yet the poor often lack the rights that would enable them to put this knowledge fully to use. By bridging the gap between rights and knowledge, building natural assets in the hands of the poor again can contribute to environmental quality.

In all these respects, how we relate to each other has a profound effect on how we relate to the environment. In a society where wealth and power are concentrated in the hands of a few, the ability of the powerful to impose environmental costs on others is greater than in a society where wealth and power are distributed more democratically. Insofar as social decisions are guided by considerations of "efficiency," wide inequalities of wealth and power further undermine environmental protection by reducing the supposed economic value of its benefits to the poor majority. Insofar as the labor and knowledge of the poor are important for the maintenance and sustainable use of natural assets, strategies that expand their rights to these assets will foster environmental stewardship.

### **BUILDING NATURAL ASSETS**

There are four main routes to increase the amount and value of natural assets in the hands of the poor: 1) investment, the creation of new natural capital or the improvement of natural capital to which the poor already have access; 2) redistribution, the transfer of natural capital from others to the poor; 3) internalization, increases in the ability of the poor to capture benefits flowing from natural capital they already own; and 4) appropriation, the establishment of rights for the poor to open-access resources (see Figure 2). The first two routes, investment and

Route	Definition	Examples
<i>Investment</i>	The creation of new natural capital, or the increase of existing natural capital.	Incentives for soil conservation directed to small farmers.
<i>Redistribution</i>	The transfer of natural capital from others.	The granting of the power of eminent domain over vacant lots in inner cities to community organizations.
<i>Internalization</i>	The provision of compensation for previously uncompensated benefits to others that flow from human stewardship of natural assets.	Rewarding small farmers for their role in the conservation of crop genetic diversity, or small forest owners for their role in watershed management.
<i>Appropriation</i>	The establishment of rights to what have previously been open-access resources.	The mobilization of communities to combat industrial pollution of the air they breathe and the water they drink.

Figure 2. Routes to natural asset-building.

redistribution, are applicable to many other types of assets; the latter two routes, internalization and appropriation, are based on special features of certain natural assets.

### 1. Investment

In recent years, the dismal notion that human activity inexorably depreciates natural capital—our only choice being how rapidly to do so—has been giving way to a more positive vision, founded on the recognition that humans can invest in natural capital [30]. Such investment offers a route to expand the natural asset base of the poor. For the poor, this route is particularly relevant in cases where they already own or have access to natural assets whose quantity and quality can be increased.

An example is the case of farmlands owned by poor people. Historically, the soil and water conservation programs of the U.S. Department of Agriculture, which aim to support investments in natural capital, often have discriminated against low-income farmers in general and people of color in particular [31]. If this pattern were reversed—that is, if government support were preferentially directed to poor and minority farmers, instead of away from them—such programs could form part

of a natural asset-building strategy for the reduction of rural poverty. More generally, many of the world's poor suffer from "ecological poverty," in which their livelihoods are constrained by the impoverishment of the natural resources on which they rely; in such settings, ecological restoration can go hand-in-hand with poverty reduction [32].

Politically, investment is likely to be the least controversial route to natural asset building, since it adds to the stock of natural capital without impinging directly on the rights of others. The poor obtain assets as the total asset pie grows, but no one else loses assets they already have. In this respect, such a progressive investment strategy is akin to the "redistribution with growth" strategy advocated by reform-minded economists at the World Bank in the 1970s: the strategy assumed that redistribution of the existing national income pie was politically infeasible, and instead sought to channel increments from an expanding pie into the hands of the poor [33]. The investment route to natural asset building applies this logic to stocks of assets rather than to flows of income.

## 2. Redistribution

Redistribution is a second route to increase the stock of assets in the hands of the poor. In the case of natural capital, this route is particularly relevant to non-renewable resources such as land and minerals, the supply of which cannot be increased by investment.

Asset redistribution can be expected to be more contentious than progressive strategies for investment. But when inequalities in asset ownership are great, redistribution can offer the single most effective route to build the asset base of the poor. As Oliver and Shapiro remark:

[O]ur analysis clearly suggests the need for massive redistributive policies in order to reforge the links between achievement, reward, social equality, and democracy. These policies must take aim at the gross inequality generated by those at the very top of the wealth distribution. Policies of this type are the most difficult ones on which to gain consensus but the most important in creating a more just society [2, p. 9].

Land reform—the transfer of rights from large landowners to tenant farmers and landless laborers—is the best-known example of redistribution-led natural asset building. Land reform was a key element in the successful post-World War II economic development strategies of countries such as China, Taiwan, and Korea. The potential for redistribution is not limited, however, to the agricultural sectors of developing countries. In inner-city Boston, the Dudley Street Neighborhood Initiative won the power of eminent domain in the course of a struggle for community-based redevelopment of vacant lots [34, 35].

In the "bundle of sticks" that constitutes the rights to a property, redistribution can involve specific sticks rather than the whole bundle. Land reforms, for example, can give tenants "occupancy rights"—the right to till the land, without

threat of eviction, in return for a legally specified share of the crop-rather than full title to the land. In brownfields redevelopment, local communities similarly have won certain rights-such as the right to participate in land-use decisions, or to share in employment opportunities-without taking outright ownership of redeveloped land [21]. In forestry stewardship, there is also the potential for redistributing employment to reduce poverty in communities dependent on publicly owned forests [23]. In effect, the right to employment can serve as a vehicle for access to income from natural assets.

### 3. Internalization

When the poor own natural assets that generate benefits to others, for which they currently receive no reward, internalization offers another route to asset-building. For example, the crop genetic diversity that is sustained by small farmers around the world is the ultimate foundation for food security worldwide, providing the raw material for adaptations to new pests, plant diseases, and climate change. Yet the farmers who perform this vital service receive no compensation for doing so. In the language of economics, they generate "positive externalities" for others. Policies to reward farmers for this service-that is, to internalize some of the benefits that flow from their management of natural assets-could help both to reduce poverty and to safeguard invaluable biological resources [24].

Similarly, farmers and forest landowners in watersheds that serve metropolitan areas provide an ecological service in regulating the quantity and quality of water that flows from their land. In effect, they are engaged in two forms of production: the production of crops, livestock, and timber, for which they are compensated by the market; and the production of water, for which they are not compensated. In some cases, the value of the latter exceeds that of the former. Devon Pena reports, for example, that the ecological services provided by the "anthropogenic wetlands" of acequia farmers in the Upper Rio Grande bioregion are worth more than the value of their agricultural produce [10]. Connie Best reports that the value of carbon sequestration services provided by forests can exceed their value for timber [29]. Again, mechanisms to reward cash-poor farmers and forest owners for providing these ecological services could help to reduce poverty and create incentives to keep providing them.

In pursuing internalization strategies, several key issues arise: Who will finance the compensation payments? How will compensation be delivered, with what mix of individual and community rewards? To what extent should compensation mechanisms preferentially target the poor, rather than simply rewarding all providers of ecological services regardless of their wealth or income? Finally, insofar as the internalization of benefits increases the market value of the natural assets, how can the poor defend these assets from others who might seek to wrest control of them? If these issues are properly resolved, internalization can be a promising route for natural asset building, since the assets in question are already in the hands

of the poor, and a compelling case can be made for internalizing environmental externalities on efficiency grounds.

#### **4. Appropriation**

Appropriation, the final route to natural asset building, pertains specifically to "open-access" resources. These resources are nobody's property, and so they are vulnerable to overuse in what Garrett Hardin termed the "tragedy of the commons" [36]. The paradigmatic case is that of an open-entry grazing commons, where each livestock owner gets the full benefit of grazing his animals, while bearing only a small fraction of the cost of thereby reducing the forage available to all. In the absence of either government regulation or privatization, overgrazing is the predictable result. Research by scholars such as Elinor Ostrom [37] has drawn attention to a third possible solution, based on the difference between an open-access commons and property owned in common: throughout the world, we find common-property regimes with informal but effective rules that have supported the sustained joint use of natural resources such as grazing lands, forests, and fisheries. Instead of the "tragedy of the commons," therefore, it is more precise to speak of the "tragedy of open access."

In practice, open access often leads to not one tragedy but two: the abuse of natural resources, and their appropriation by the powerful at the expense of others. In theory, open-access resources are freely available to all, yet in practice open access can be quite inequitable: in the scramble for "free" natural resources, some people are more equal than others. In open-access fisheries, for example, the advantage goes to those who can field the most efficient-or ruthless-extractive fishing technologies. In the case of environmental sinks, everyone may have the same right to pollute the airsheds, lands, and water bodies into which we discard wastes, but not all have equal means to do so. The law that prescribes the same penalty for anyone who steals a loaf of bread-no matter whether the thief is a starving mother or a millionaire-is a hollow form of equality. So too is the fact that a poor family living near a chemical factory has the same right to pollute the air as the factory's owners.

The democratic appropriation of rights to open-access natural resources could address both tragedies. For example, Peter Barnes and Marc Breslow have proposed to establish a "sky trust" funded by fees on carbon emissions, with the revenues disbursed equally to every woman, man, and child in the United States [38]. The environmental goal is to reduce the burning of fossil fuels and the threat of global warming by charging rent for skyborne carbon storage, at present an open-access resource. Lower-income households, who generally consume less of everything, including fossil fuels, would pay less into the fund than upper-income households, but all would receive the same payout per person. The majority of U.S. households would receive more in dividends than they would pay in higher fuel prices. With the fees calibrated to cut carbon emissions enough to meet the

targets in the Kyoto global climate accord, the net effect of the sky trust would be to increase the net incomes of the poorest 10 percent of families by about five percent, while reducing those of the richest 10 percent by slightly less than one percent. A recent Congressional Budget Office study compares the effects of this proposal to the alternative of using the proceeds from a carbon tax to finance a cut in corporate income taxes [39].

Community struggles against toxic pollution offer another example of natural asset-building via the appropriation route: communities are claiming rights to protect airsheds and water bodies that have been treated in the past as open-access environmental sinks. Indeed, the right to live in a clean and healthy environmental right increasingly affirmed in state constitutions and judicial decisions throughout the world [40, 41]-implies a radically egalitarian distribution of rights to this subset of natural assets. Insofar as communities are able to secure these rights, they strengthen their bargaining positions with would-be polluters. The benefits from this type of community-based natural asset-building include better health, improved environmental quality, and higher property values.

In theory, communities could also gain income as compensation for any pollution they are willing to accept within the bounds set by environmental regulations. Such compensation-an application of the "polluter pays principle"-would not imply that regulatory agencies should adopt more relaxed pollution standards. Rather, it is based on the principle that as owners of their environment, communities have a right to compensation for pollution within the legal limits.

The four routes to natural asset-building identified above often overlap in practice. Forest stewardship, for example, can combine the internalization of benefits generated by forest ecosystems with new investment in watershed management. Brownfields redevelopment can combine the appropriation of the right to a clean environment, the redistribution of property rights from absentee landowners to community-based organizations, and investments in cleanup and new development. Alone or in combination, these routes can expand the natural asset base of the poor, increasing their access to the income and non-income benefits that flow from natural resources.

### **DEMOCRATIZING ENVIRONMENTAL OWNERSHIP**

Natural asset-building strategies must be situated against the background of a society's political economy and its ideas of normative justice. In the United States, a long tradition in political thought holds that property rights and democracy go hand-in-hand. Democracy protects the citizens against usurpation of their property rights by a political elite; widely dispersed property ownership protects democracy against subordination to an economic elite. This relationship rests on an egalitarian foundation: all citizens have the right to vote, and all have the right to own property. For democracy to flourish, citizens must not only hold these rights in

theory but also exercise them in practice. When wealth is instead concentrated in the hands of a few, the mutually supportive relationship between property rights and democracy is replaced by one of tension, as the rich seek to translate economic muscle into political control, and the poor seek to use their political majority for economic gain.

In the late 18th century, the link between land and liberty was evident to the American revolutionaries. With the subsequent growth of the U.S. economy and the rise of the manufacturing and service sectors, the Jeffersonian vision of independent landowning farmers as the cornerstone of American democracy has faded. Yet the close relation between wealth and power—and hence between the distribution of assets and the viability of democracy—remains as relevant today as it was during the founding of the Republic. And today, no less than in our agrarian past, natural resources and environmental sinks continue to undergird the U.S. economy and those of other industrialized countries. It is hard to pin numbers on benefits that bypass the market, but Robert Costanza and colleagues have estimated the annual value of ecosystem services worldwide to be \$33 trillion nearly double the value of the total world GNP [42].

Tom Paine's egalitarian claim that land is a gift in common to the human race applies equally well to other natural resources. By fostering a more equitable distribution of this inheritance, building natural assets in the hands of the poor can strengthen the foundations of a democratic society.

## States and Markets

The degree to which a society can be called democratic or oligarchic is not a matter of whether it accords a larger role in economic affairs to the market or the state. States and markets function democratically when power and wealth, respectively, are widely diffused, and oligarchically when they are highly concentrated.

Real-world societies lie on continuums in terms of both their degree of democracy and their institutional mix of the state and the market (see Figure 3). For the last two centuries, the contending ideologies of right and left have often sought to collapse these two dimensions into a single axis: the right has identified democracy with the market and oligarchy with the state, while the left has made the opposite equation. Whichever way the axes are rotated, however, neither the market nor the state has proven to be a trustworthy shortcut to democracy.

For example, many economists advocate tradable emission permits—pollution allowances that can be sold if a company doesn't need all it owns—as a market-based alternative to "command-and-control" pollution regulations. Such permits represent a movement along the state-market continuum in the market direction. In the 1990 Clean Air Act amendments, Congress introduced tradable permits for emissions of sulfur dioxide (SO<sub>2</sub>), a health hazard and a major source of acid rain. Aiming to cut total SO<sub>2</sub> emissions to less than half their 1980 level by the year

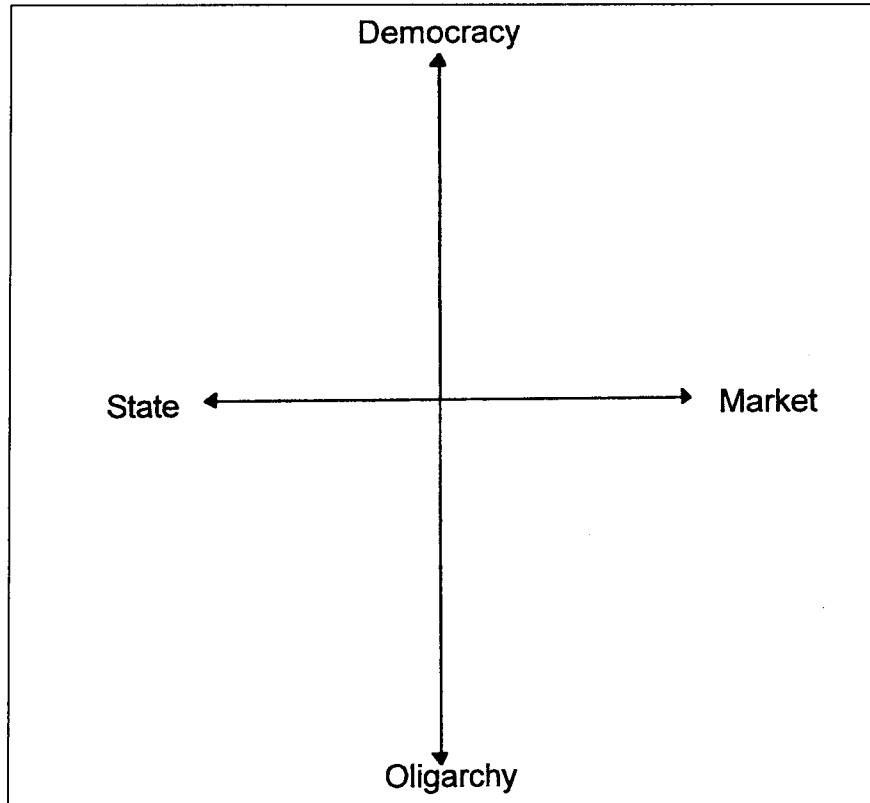


Figure 3. Two continuums: democracy-oligarchy and market-state.

2000, the government issued a limited number of permits for emissions by electric power plants, and allowed them to be traded among the utilities; in 1999, the going market price was roughly \$125 per ton of SO<sub>2</sub> emissions [43]. Firms that can cut emissions cheaply (relative to the price of permits) do so, while other firms buy permits. This flexibility, compared to the conventional one-rule-fits-all approach to pollution regulation, is supposed to achieve the overall pollution-reduction goal at the least total cost.

Permit-trading schemes have certain drawbacks compared to conventional regulations: the administrative costs of monitoring compliance may be higher when firms are free to choose different levels of pollution control and different technologies for this purpose; and the clustering of permits in particular geographical areas can create pollution "hot spots" even as national or regional emission targets are met. The balance between the pro's and con's of each policy will vary from case to case.



Is one alternative intrinsically more "democratic" than the other? Some advocates of "free-market environmentalism," axiomatically identifying markets with democracy, make this claim. Yet the degree to which a permit-trading scheme can be called democratic depends crucially on how it is implemented: how the pollution reduction goals are determined, and how permits are distributed. If the public is well-informed about the extent and impacts of pollution and participates in defining pollution reduction targets, and if safeguards are put in place to prevent the emergence of hot spots where residents are exposed to excessive pollution, a permit-trading scheme is more democratic than if these conditions do not hold. If the permits are auctioned off every year, and the resulting revenue equally shared among the citizenry, as in the "sky trust" proposed by Barnes and Breslow, the scheme is more democratic than if the permits are handed out for free to polluters-in effect, ratifying their prior appropriation of environmental sinks-as happened in the case of SO<sub>2</sub> permits. Similarly, the degree to which conventional pollution regulations can be considered democratic depends on the extent of public engagement in decision-making and on how the resulting costs and benefits are shared.

Just as tradable emission permits or "green taxes" can give firms an incentive to limit pollution, compensation payments or "green subsidies" can provide owners of natural resources with an incentive to manage them so as to provide ecosystem services such as watershed management, biodiversity conservation, and carbon sequestration. In the parlance of economists, the former instruments serve to internalize "external costs" (or "negative externalities"); the latter serve to internalize "external benefits" (or "positive externalities"). In both cases, the state creates these instruments to redress the failure of the market to provide adequate incentives for environmental protection.

Yet government failure can be just as serious as market failure: there is no automatic guarantee that the state will "do the right thing," accurately calibrating its interventions to redress market failures and advance the public good. Whereas the market responds to the price signals that emerge from a given distribution of wealth and income, the state responds to the political signals that emerge from a given distribution of power. Hence it is no accident that public monies ostensibly meant to serve the national interest in timber production and forest management have flowed disproportionately to wealthy forest owners [44].

Democratic accountability, founded on an equitable distribution of wealth and power, is the best way to make sure that government interventions benefit the public rather than a powerful few, and correct market failures rather than exacerbating them. The results will be as imperfect as democracy itself, but better than the practical alternatives. As Winston Churchill famously remarked, "Democracy is the worst form of government except all those other forms that have been tried." In framing environmental policies, the key challenge is not to strike the right balance between states and markets-important as that may be-but rather to

ensure that the policy mix is chosen democratically, with an equal voice for all whose lives are affected.

### Sanctified and Instrumental Property Rights

Throughout U.S. history, property rights have undergone reallocation and redefinition. Gerald Friedman has traced the longstanding conflict in American jurisprudence between "sanctified" and "instrumental" conceptions of property rights [45]. In the sanctified view, property rights can and should be clearly defined and perfectly secure; indeed, this is perceived as an overarching social end-in-itself. In the instrumental view, property rights are a means toward more fundamental ends, such as efficiency, growth, and justice (or injustice, as in the case of property restrictions designed to enforce race discrimination). Both schools of thought recognize, of course, that property rights are socially constructed—creations of human law, not divine ordination—but proponents of the sanctified view tend to regard this as a once-and-for-all *fait accompli*, while proponents of the instrumental view tend to see it as an open-ended process, responding to ongoing changes in values, technology, and institutions.

The mainstream view of property rights in the United States has been firmly instrumental, as Friedman documents. Early in the 19th century, for example, the courts redefined property rights to remove impediments to both private entrepreneurship and public infrastructure. In 1877, in the case *Munn v. Illinois*, the Supreme Court declared that "a government may regulate the conduct of its citizens toward each other, and, when necessary for the public good, the manner in which each shall use his own property." In the latter half of the 20th century, Congress and the states further redefined property rights to protect the environment and occupational health and safety.

In recent decades, under the banner of "free-market environmentalism," some authors have argued not only for greater reliance on market-based instruments for environmental protection, but also for a radical shift toward the sanctified view of property rights [46]. They portray any government regulations that constrain what firms or individuals can do with property as "takings," for which property owners ought to be compensated by the government. In this view, property rights are defined such that landowners are deemed to hold all rights not explicitly withheld by prior law or explicitly held by others. In this model, there are no ambiguities as to the prerogatives of ownership: unless already specified otherwise, all sticks in the property-rights bundle belong to those who hold the biggest stick, the title. Even though the right to drain and build on a wetland is not explicitly granted by prior law, for instance, any government action that blocks such development is construed as taking that right from the landowner—a default solution that dismisses the rights of everyone else. This line of reasoning conveniently ignores the extent to which the private property for which the law is so solicitous was itself created by the usurpation of other property rights, notably those of Native

Americans [47]. It also ignores the extent to which current private property values are augmented by "givings" resulting from government action, such as proximity to publicly funded infrastructure.

Economist Daniel Bromley terms the extreme pursuit of takings compensation a "demand to be paid for no longer being allowed to undertake activities now declared to be illegal," and compares it to extortion [48]. Laws generally do infringe on people's ability to do whatever they wish—otherwise they would be unnecessary—and in some cases, this infringement reduces the value of a property below what it would otherwise be. The claim that any such impacts represent takings presumes not only that property rights have been perfectly specified, but also that the law too has been perfectly specified, at least insofar as it affects property values. Hence there is no scope for new laws or regulations unless they are accompanied by side-payments to those whose property values would be adversely affected, in effect turning legislation into a market exchange.

In practice, however, property rights are neither fully specified nor immutable: as societies change over time, so do the ways they define and allocate property. Bromley remarks:

[T]o have a right is to have the ability to require some authority system to act in your behalf—that is, to act so as to protect your particular interest against the interests of others. In the starkest possible terms, what I own is a function of what the other members of the polity say I own—not what I say I own [48, p. 653; emphasis in the original.]

What others say that a person owns can, and does, change through time. Until the U.S. Civil War, for example, many states explicitly recognized property rights in humans as slaves; as Friedman observes, the abolition of slavery represented a huge (and uncompensated) redefinition of property rights, brought about by changes in values and in balances of power.

The plasticity of property rights, and their role as an instrument in pursuit of a society's broader goals, has far-reaching implications for natural asset-building strategies. First and foremost, it suggests that there is considerable scope for building natural assets via the routes of redistribution, internalization, and appropriation—all of which involve the reconfiguration of property rights—as well as via investment.

Second, once we reject the sanctified view of property rights and the presumptive allocation of all unspecified rights to landowners, there is no compelling reason why proponents of market-based approaches to environmental protection should object to allocations of property rights that favor the poor. If, as free-market environmentalists often assert, well-defined property rights foster efficient outcomes regardless of how the rights are distributed, why not allocate emerging rights in natural assets—including rights to environmental sinks—equally among all citizens? If poverty reduction and the equitable distribution of wealth and power figure among a society's objectives, then there are strong grounds to prefer

an egalitarian allocation rather than the assignment of these rights to those already best-endowed with assets. In addition, as discussed above, there are good environmental reasons to favor an equitable distribution of rights to natural assets.

A final implication is that successful efforts to build natural assets in the hands of the poor inevitably bring the risk that more powerful parties will attempt to wrest control of those assets by legal, illegal, or quasi-legal means. There is a danger, in other words, that the poor will no longer be too poor to rob, but that they will remain too weak politically to defend themselves from the would-be robbers. It would be a sad irony if investments in ecological restoration by small farmers or woodlot owners, or the internalization of benefits from the ecological services they provide, were to prompt others to deprive them of their land. That risk does not diminish the case for natural asset-building strategies, but it means that efforts to build assets in the hands of the poor must be accompanied by efforts to strengthen their capacity to defend their assets. Struggles to democratize environmental ownership will require parallel struggles to democratize the political framework, including efforts to organize communities, protect human rights, and improve access to legal assistance. Natural asset-building strategies neglect these elements of social and political capital at their peril-or, more precisely, at the peril of those they aim to assist.

Building natural assets can advance the goals of poverty reduction, environmental protection, and environmental justice. Yet the very features of natural assets that make successes possible-the ongoing reconfiguration of property rights to natural resources, and the human capacity to increase or decrease our stock of natural assets-carry the possibility of failure, too. In the 21st century, many critical issues of environmental ownership will be resolved for better or worse. The challenge we face is to resolve them for the better.

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