

## **MARKETS, THE ENVIRONMENT AND LIBERTY: THE CASE OF ELEPHANTS AND AIR QUALITY**

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### **Introduction**

Perceptions about the benefits of environmental protection have changed dramatically over the past decade. While there is generally widespread support for environmental goals, there is concern for the high cost often associated with environmental programs. Recognition is growing of the critical role of the institutions in dealing more effectively with projects involving costs that are spread across a large number of people and benefits which are highly concentrated.<sup>1</sup> Markets promise great potential in promoting liberty, economic freedom, and prosperity. Ronald H. Coase, recipient of the 1991 Nobel prize in Economics, published a seminal article in 1960 demonstrating that, given two caveats, private markets allocate resources efficiently.<sup>2</sup> The two caveats of the Coase theorem are: (1) transactions costs are not prohibitive, and (2) property rights are assigned to all scarce resources.

In this paper, we apply the Coase theorem to two very different environmental resource issues: private property as an elephant management technique and tradable discharge permits as an air quality management approach. Elephants and air quality are obviously quite different resources. Yet the key to their protection rests upon the development of property rights and markets that efficiently allocate these scarce resources. We conclude with

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1 Meiners, R. E., and Yandle, B., (1993) Taking the Environment Seriously, Lanham, MD: Rowman and Littlefield Publishers, Inc.

2 Coase, R.H., "The Problem of Social Cost," Journal of Law and Economics 3:1-44 Oct. 1960.

recommendations for market based approaches in order to more efficiently manage the scarce resources of elephants and air quality.

### **1. Liberty and Markets: The Coase Theorem**

Economics revolves around exchange and, in order for exchange to occur, property rights must be defined for scarce resources in the economy. Private markets provide the forum through which mutually beneficial exchanges take place and, because trades are entirely voluntary, at least one party gains, and none loses. In other words, private market exchanges tend to be Pareto-superior moves for society. The Coase theorem demonstrates that, as long as property rights are assigned and transactions costs are not prohibitive, interventionist government policies cannot allocate resource more efficiently than private markets.

A critical caveat is that the ability of private markets to engage in Pareto-superior trades depends upon the rights of owners to use and exchange resources. Without private ownership, markets cannot allocate resources to their most productive uses. Air, for example, that is not owned by anyone will tend to be overused and elephants that are not property to someone will be poorly protected. As common property, both environmental resources will be depleted as dischargers overload the air with residuals and poachers obtain valuable ivory by killing elephants. When scarce resources are not owned by private individuals, both quality and quantity decline over time because there is no incentive to care for "common property resources." Called "tragedy of the commons," this abuse of common property resources occurs in an economy of markets. In the absence of private property institutions, highest bidders are not the only users of resources. Because they are not charged for its use, many individuals will compete for, and thus overuse, a "free" resource.

It is also important to recognize that ownership of particularly scarce resources is transient because bidders will purchase the right to use resources as long as private markets allow exchange and people perceive differential values. The other caveat, transactions costs, argues that, the smaller transactions costs, the greater the potential gain from trade.

## **2. Elephants as Scarce Resources**

The plight of elephants is serious in East and Central Africa where elephants are not private property. From 1979 to 1989, the population of Central African elephants declined from 497,400 to 274,800 while the population of East African elephants fell from 546,650 to 154,720. Other sources report that poachers halved the elephant population from 1.2 million in 1981 to 623,000 some eight years later.<sup>3</sup> In game parks the elephant population is estimated to have declined by 56% while outside parks the decline was 78%. The worst case projection was that elephants could be extinct in East and Central Africa as early as 1995.<sup>4</sup> In contrast, the elephant populations in the southern African countries of Zimbabwe, Botswana, Malawi, Namibia, and South Africa are increasing at a rate of 5% annually.<sup>5</sup> Zimbabwe is thought to have ten times as many elephants now as in 1900.<sup>6</sup>

The explanation for the difference in elephant prospects rests upon property rights. Elephants in Southern Africa are considered a valuable resource for tourism as well as ivory. In Zimbabwe, shops openly sell ivory and hides from elephants culled to prevent overpopulation in the country's game parks. The regulated sale of elephant products and the protection of elephants is viewed as consistent with the goal of increasing the population of the elephants.

This now widely recognized fact has failed to affect international policy for the management of elephants as endangered species. A review of recent books on the plight of the elephants documents this change of attitude:

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3 Op. cit, 344.

4 UNEP/GEMS Environment Library No. 3, *The African Elephant*, p. 32. See, also Barbier, E. B., Burgess, J.C., Swanson, T. M., and Pearce, D. W., Elephants, Economics and Ivory, Earthscan Publications, London, 1990.

5 Simmons, R. and Krueter, U., "Herd Mentality: Banning Ivory Sales Is No Way to Save the Elephant", Policy Review, Fall 1989, p. 46.

6 The African Elephant, UNEP/GEMS Environment Library No. 3, page 12.

...to the park managers, the slaughter of "surplus" elephants (called "culling") is believed to be a logical form of game management, and when a cull occurs both the resident and the immigrant elephants are shot by the hundreds if not thousands. This happens at a time when elephants are said to be endangered. Why are they shot? Their wildlife managers make three assumptions: first, that animal populations require human control (so the "right" biomass is usually determined by the highest-ranking game warden on the scene and therefore varies over time as well as by area); second, that the planet is our farm, and if wild animals are to be tolerated they must give us a commodity -- as pigs must yield ham, so elephants must yield ivory ...; third, that elephants in large numbers eat too many trees, while park managers would prefer that they ate grasses and bushes.<sup>7</sup>

Communities that pay the price of living with wildlife [should] also reap its financial rewards... Unless you give wildlife economic value, convincing locals [that providing for] it is the best use of their land, wild animals will not survive." Put simply, the villagers have found how to earn money, not from hides and tusks, but from outlanders hungry for the sight of real wild animals." (Morals, p. 338)

"European and American hunters have been forking over as much as \$40,000 for the privilege of shooting, say, an elephant or some other species, such as wildebeest, an impala or a warthog." (Morals, p. 338)

Many years ago, Zimbabwe's government found that the most effective way to protect elephants is through property rights, regulated hunting using permits, and the sale of elephant products. Property rights to elephants are held by some two dozen peasant villages which earn \$5 million per year from the sale of elephant hunting rights on their communal lands to safari operations. Because elephants provide

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<sup>7</sup> Thomas, Elizabeth Marshall, "Of Ivory and the Survival of Elephants," New York Book Review, 24 March 1994, p.3.

revenue, the natives have the incentive to prevent overpopulation and poaching. Zimbabwe's elephant population has increased to 77,000 from the 32,000 in 1960.<sup>8</sup>

In Zimbabwe and other parts of southern Africa the ownership of wildlife was turned over to local villages. Suddenly, what had been a liability [destructive free roaming elephants] became a valuable asset. For example, the first year (1991) the region of Tyunga put its region's hunting rights up for bid, the franchise to safari operators generated \$ 63,600 in extra revenue. By 1992, the revenue reached \$ 350,000.

The southern African approach, known as "conservation through utilization," "sustainable yield," "rational utilization," and "conservation through commercialization" is based on property rights in elephants. It is the old story: people take better care of their own property than they do of property that does not belong to them. This approach allows safari hunting and tourism on private, state, and communal lands as well as the sale of ivory and hides. It is based on the logic recognized by numerous commentators, but few professional preservationists, that "the communities that pay the price of living with wildlife [should] also reap its financial rewards."<sup>9</sup> Zimbabwe has an effective anti-poaching program with expenditures of over \$600 per square mile to protect wildlife. It also has a minimum prison term of five years for those convicted of the illegal killing of elephants. The penalty is often more severe: Zimbabwean game scouts have killed a number of raiding Zambian poachers. The applicability of the concept of property rights to air quality is discussed in the following section.

### **3. Air as a Scarce Resource**

In the same way that elephants are endangered from abuse to the commons in East and Central Africa and plentiful in Southern Africa, the common air mass used for disposal of gaseous residuals is limited and hence a scarce resource. Managed as private property, the price would rise as it becomes more scarce. Like the management of elephants as a common property resource, the protection of the

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<sup>8</sup> Morals, R. C., "Save the Elephants," Forbes, September 14, 1992, p. 344.

<sup>9</sup> Morals, p. 338.

"commonly" held air mass from damaging residuals is undertaken by "command and control" regulations for specific pieces of equipment.

U.S. firms spend large amounts of money on pollution-control abatement and equipment.<sup>10</sup> In 1988, these expenditures were estimated to be \$86 billion and are now over \$120 billion.<sup>11</sup> Some firms even stand to gain handsomely from Clean Air Act restrictions.<sup>12</sup> Regulation reduces the incentives for entrepreneurs to find better ways to manage residuals because regulations require a specific type of pollution-abatement equipment even though there may exist other types of equipment or inputs that are cheaper or more effective. Once a particular type of equipment is written into the Code of Federal Regulations firms have little incentive to search for better ways to comply with meet EPA. As a consequence, such regulation may be a significant deterrent to economic growth.

Studies conducted by the Congressional Research Service of the Library of Congress show that the transactions costs of SO<sub>2</sub> management using emissions trading would be substantially lower when compared to the current system based on command and control.<sup>13</sup> The 1990 Clean Air Act, for example, has been estimated to

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10 For a discussion of the efficiency arguments for property rights in air quality management, see e.g., Lee, R. D. and Misiulek, W. S., "Substituting Pollution Taxation for General Taxation: Some Implications for Efficiency in Pollution Taxation," Journal of Environmental Economics and Management, 13, 338 - 347 (1986).

11 Table 386, "Pollution Abatement and Control Expenditures" p.213; Statistical Abstract of the United States 1991.

12 Gutfeld, R., "Pure Plays: For Each Dollar Spent on Clean Air Someone Stands to make a Buck," The Wall Street Journal, 29 October 1990. A-1.

13 Figures 1 and 2, Parker, L. B., "Implementing SO<sub>2</sub> Allowance Trading: Implications of Transaction Costs and Taxes," Congressional Research Service, The Library of Congress, U. S. Congress, 12 March, 1993, p.2, 2.

create an additional burden on businesses of \$25 billion a year.<sup>14</sup> Estimates of the annualized costs for 1993 - 2010 range from \$922 billion to \$1,537 billion.

Marketable pollution permits encourage innovation by allowing firms to decide how they want to meet their required emission reduction. As a result the integrity of the law is maintained while the least cost solution is obtained for the region because firms with high control costs will purchase "reductions" from firms with lower control costs. Although the current EPA emission trading program is not the "ideal" system envisioned by economists, it is consistent with the Coase theorem. Firms have a limited property right to sell their excess emission reductions defined as reductions achieved beyond regulatory requirements.

The 1990 Clean Air Act established a market-based program managing SO<sub>2</sub> emissions from major coal-fired power plants in order to meet a annual reduction of 10 million tons from 19 million tons to 9 million tons by 2000. This approach allows each power station to determine the most cost-effective means of achieving the emission limitation, e.g, installing equipment, changing inputs, or purchasing emission reductions from other sources.<sup>15</sup>

An advantage to this policy is that it creates an incentive for firms to profit from the sale of their permits when they reduce emissions below regulatory requirements. By not specifying how pollution control is to be achieved and by allowing firms to decide how much pollution they find profitable to reduce, this plan encourages firms to manage residuals at least cost to them and to the region. Market-based

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14 Bob Davis, "Bush Plans to Unveil a 90-Day Moratorium on New Regulations," The Wall Street Journal Jan. 20, 1992. A1.

15 The Environmental Protection Agency will issue enough permits that, by the year 2000, all power stations will have received their allotment of pollution permits that may either be used or sold to other power plants. Each permit allows the discharge of one ton annually and the number of permits received is based on how much they currently pollute. Some firms will find it advantageous to reduce their emissions and sell some of their permits, others may find it cheaper to purchase other's permits rather than purchase new equipment. Because there are large differences in technology, plant age and fuel use among power plants, there will be both buyers and sellers of pollution permits.

approaches for air quality management increase liberty, economic freedom, and prosperity. Similar benefits have been shown for managing elephants as private property.

#### **4. Why Not Markets?**

Despite the success in Southern Africa in elephant management and the potential for reducing the cost of air quality management, property rights approaches remain on the fringes of acceptability. Such approaches have failed to command the moral high ground in the policy debate involving environmental quality issues because many people do not believe that people should profit from doing the right thing. But prohibiting trade in ivory yields only high rhetoric; it does not increase the number of elephants.

The debate over market based policies may be characterized as a split between two extremes: 1) professional preservationists who oppose the use of resources such as elephants and clean air and 2) the , who favor allocation of resources on the basis of their market-determined values, advocate hunting and trade in elephant ivory and support tradable pollution permits. The preservationists' symbols of the decaying elephant carcass or the smoke stack evoke the argument that all hunters are poachers and industrial firms are greedy polluters. They criticize commercial conservationists on moral terms; hunting and industrial production are a threat to the moral order and are carried out by "bad people" -- for example, profiteers, hunters, poachers and despoilers. As a symbol of their outrage, professional preservationists make a public spectacle over the destroying of contraband. Over the past 5 years, Taiwan has destroyed thousands of kilograms of contraband ivory, ivory products, bear paws, leopard skins, rhinoceros and antelope horns, and lion skins. The destruction of ivory was symbolic of Taiwan's dedication to saving the African elephant by ending trade in ivory.<sup>16</sup>

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16 "Ivory, Horn, Animal Skins Burned: ROC Praised for Wildlife Conservation," The Free China Journal, 4 February 1991, Vol. VIII, No. 10. Note also that in July of 1989, Kenya's President Daniel Arap Moi set fire to 12-tons of elephant tusks confiscated from poachers. Valued at nearly \$3 million, the contraband was symbolic of the argument that poachers are the cause of the dramatic reduction in the Kenyan elephants. Notice, however, that a common interest will often exist for seemingly



In 1993 the Chicago Mercantile Exchange set the stage for emission rights as a commodity.<sup>17</sup> Yet little has happened because of the micro-management of EPA over the process of quantifying, certifying, and banking the emission reduction credits. While this holds promise, the reality is one of limited success. The revised but limited EPA trading rules pursuant to the 1990 Amendments to the Clean Air Act continue to constrain interfirm trades. These restrictions cause firms to extend the lives of old, more heavily polluting capital stock and delay the introduction of new, more cleanly operating plants.<sup>18</sup> While this "retirement delay" effect retards innovation directly by keeping existing equipment in operation, EPA regulations also discourage innovation by preventing firms from introducing lower cost, innovative pollution control equipment or processes.

One outcome of prohibitions on hunting and trade in elephant products is high-priced ivory (favored by the poachers) and well-financed preservationists (as the protector of the endangered species).<sup>19</sup> However, the fate of the elephants is the continued decline

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dissimilar political interest groups when special interest benefits may be generated.

17 "Efficient-Markets Pollution," The Wall Street Journal, 2 March 1992. A-12.

18 See Brady, G. L. and Maloney, M. T., "Capital Turnover and Marketable Pollution Rights," Journal of Law and Economics, 31 (April 1988): 203-26.

19 A segmented market [illegal and legal] has occurred in a number of goods, most notably alcohol, giving rise to a phenomenon dubbed the "bootleggers and the Baptists." Bootleggers and Baptists have historically supported a form of social regulation that closes corner liquor stores on Sunday. The bootleggers want to eliminate direct competition; the Baptists also want to reduce indirect competition and diminish the consumption of alcoholic beverages. This case involving alcohol illustrates how the regulation of legal sales produces a price differential between legal and illegal prices. The stricter the regulation, the greater the differential between the two sets of prices. One might speculate that the interested parties advocating the ban on hunting and trade could be the contraband dealers (gaining through increased value of ivory) and the preservationists (gaining through increased contributions). A coalition of environmental and high sulfur coal producers was documented in the decision requiring full scrubbing of all coal regardless of sulfur content. See Yandle

in the elephant population in countries which do not use property rights as a management strategy. In their pursuit of an "official ideology," the preservationists see that it is the duty of "good people" to bring them to justice. Marketed as agents of social redemption, preservationists are apocalyptic about what will happen if they are not heeded and naive about what will happen if they are successful. Preservationists identify the "natural moral order" with an ideal condition of primitive, pre-industrial [i.e., non-polluting] human activities. Viewing the environment as a zero sum game and seeing no tradeoffs, die-hard preservationists reject the legitimacy of a political bargaining process that allows the environmental quality to appear tradeable.

Unfortunately, the facts about increasing elephant populations are not widely known. The declining population in Kenya continues to receive the bulk of media attention. Establishing an "official ideology" is difficult when science does not support the proposed view. Proponents of making a non-scientific view the "official ideology" have options. They may undertake scientific investigations to support the non-hunting position. It is difficult to argue that the property rights approach has not been successful in southern Africa. A second approach by proponents of an "official ideology" involved emotional appeals to the public to support the non-scientific view. Professional preservationists have done well in this regard because it is perception not reality that drives the political process. Fears motivate voters far more effectively than facts. Furthermore, there is the natural tendency for sensational news to dominate the media concerned with ratings. A third approach used by the proponents of an "official ideology" is to discredit supporters of the opposing view, i.e., property rights.

## **5. Policy Recommendations**

The Coase theorem indicates a role for government in the creation and preservation of well-defined property rights. The key is to have rules that allow the private market to allocate scarce resources. Governments do not have a process for taking future benefit into account; only private owners of resources do. Government officials with property entrusted to their care tend to act in a shortsighted

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(1989) and Ackerman and Hassler (1981).

manner because they cannot benefit directly from decisions or sacrifices they make today. This shortsightedness explains why misguided government policies have exacerbated environmental problems in the developing world.

Property rights hold great potential for improving the environment at least cost and encouraging innovation that provides the fuel for prosperity, expands economic freedom, and increases personal liberty. Although air quality has improved since the passage of the Clean Air Act since 1970, one can argue that the improvement would have been greater and cheaper if a property rights approach had been used.

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