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International Regulation of the Ivory Trade

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ABSTRACT

The Use of International Regulation in the Management of "National" Resources: The Case of the African Elephant Ivory Trade

In most instances international conventions attempt to regulate "international resources", such as the atmosphere or the sea. Many current environmental problems, however, involve the management of "national resources"; that is, resources which fall within the exclusive jurisdiction of specific states. Current examples are the Amazonian rain forest and African Elephant ivory.

What is the role of international regulation in addressing management problems involving exclusively domestic, or national, resources? National resources raise a very different set of questions than do international resources. Most apparent is the absence of the "open access" or property rights defect which justifies the regulation of international resources. The first step in the remedying of domestic management problems is then the identification of the sources of these problems.

The second step involves the use of "joint interests" to secure mutually binding commitments for the conservation of the resource. With regard to domestic resources, the most obvious source of "joint interest" is the combined interest of all producers in the restriction of the international market supplies of the commodity.

This study was commissioned by several governmental and non-governmental conservation organisations in order to investigate the role of international cooperation in the conservation of the African Elephant. It demonstrates that, in the case of domestic elephant stocks, international regulation would probably be most effective if it were to encourage conservation through the route of the maximisation of the joint rents of all range states. Such a scheme would of necessity constrain production and produce the desired incentives within the resource-holding states. It requires only that the international community, as consumers, undertake the obligation to "enforce" the constrained production agreement in order to conserve the resource.

This theory may then be applied to other "national resources" which are the subject of international concern, such as the rain forests. This paper demonstrates how international cooperation may be successful in the construction of incentive schemes which encourage the proper management and conservation of domestic resources.

CONTENTS

INTRODUCTION

The population of the African Elephant has declined dramatically over the past two decades. The stock of elephants has fallen from over a million to around half that number during the 1980s alone.[1]

Simultaneously, the number of regulatory measures instituted for the management of the African Elephant has been dramatically increasing. Most of the range states have introduced bans on the unauthorized hunting of elephants and on the trade in ivory during this period.[2] In addition, the international trade in products of the African Elephant has been regulated by the Convention on the International Trade in Endangered Species of Wild Flora and Fauna ("CITES") since the initial meeting of the Conference of the Parties in 1976; at that time the African Elephant was included on Appendix II of the Convention, requiring a CITES permit for trade in the products of the species.[3] As the rate of decline continued, the parties introduced another regulatory regime at the Buenos Aires Conference in 1985. By Conference Resolution 5.12 the parties agreed to implement a management quota system for the control of the African Elephant.

The CITES "management quota system" put into effect by Resolution 5.12 has been in place for the calendar years 1986, 1987 and 1988. The idea of this system was the creation of an international mechanism for monitoring the legal trade in ivory. It requires each member range state to submit a quota of elephant tusks and to mark each tusk placed into the trade under that quota, and it requires each member state to trade only in ivory within the quota system.

The general purpose of this paper is, first, to analyse the capability of international regulation to assist in the management of domestic resources such as the African Elephant. That is, unlike many truly "international resources" (e.g. sea, atmosphere, etc.), the vast majority of elephants fall within the exclusive jurisdiction of a single state; thus it is a much different sort of enquiry concerning the function of international law: What precisely is the role of "international" cooperation in the regulation of a "national" resource? This paper attempts to create a general framework for the analysis of these issues.

The particular concern of this paper is the efficacy of various international regulatory regimes, both actual and potential, in the conservation of the African Elephant. Hence, the general framework that is developed is applied to the analysis of various international institutions proposed for the management of domestic elephant stocks.

Part I discusses the theory of resource management, and indicates the probable sources of current failures in the domestic management of elephant populations. Part II commences with a description of the performance of the existing international regulatory system. It then continues by elucidating the characteristics which are necessary for an international regulatory system to provide aid in the conservation of domestic resources; these characteristics are then developed in the presentation of an example of such a system, the "Ivory Currency Unit" system. Various potential regulatory regimes are then briefly discussed (e.g. bans, tariffs and taxes), and each is analysed in the context of the framework developed for the analysis of proposed international regulatory system.

There are a number of assumptions and premises, derived from the field of economics, which motivate the major conclusions of this study. This paper falls within the realm of comparative institutional analysis; it attempts to assess the relative costliness of the various forms of regulation.

The general assumption underlying the analysis is "motivation by self-interest": no individual (or state) takes action unless there is the prospect for individual gain, and no individual (or state) alters its course along the path of self-interest unless the regulatory system is amended to alter the course of the path itself. This means that changes in the law have effect only to the extent that individual incentives are affected thereby; general injunctions to take action against self-interest, without more, have none of the desired effects. These are strong assumptions in two ways: they allow for the construction of an enforcable system of regulation, but they disallow consideration of most methods of conservation which would rely to some extent on human benevolence.

A sadly necessary corollary to this first point is that the sole route to species preservation is the generation of a stream of revenue from their usage. From the perspective of an economist, there can exist no true "wildlife" in the sense of absolute independence from human management. So long as resources are scarce, wildlife must generate a stream of revenue to humans in order to compensate for their use of those resources. In that case the objective of the conservationist must be the development of streams of revenue from uses other than "absolute domestication"; otherwise, the choice shall always remain "domestication or eradication". That is, this approach points to the generation of revenues from less domineering relations than absolute domestication, e.g. revenues from tourism, as the best possible outcome for species accustomed to existence as "wildlife".

Another limitation of this paper is its focus on the rents and revenues generated by a single facet of the species: ivory. This is not the result of an assumption that this is the single most important facet of the species; there are other facets which may generate even more revenue than this one: tourism, habitat creation, existence, etc. This narrow focus is attributable to the necessity of modifying the institutions which currently control the supply of and demand for ivory; the present institutions are generating an unsustainable harvest of the elephant stocks in order to tap this single facet. This focus on a single facet is also logically correct as the flows from the numerous facets of the species are largely cumulative, and each may be individually harnessed. This study, on the harnessing of the "ivory facet" of the species, is conducted as an illustration of the appropriate institution-building process, which must ultimately be applied to the other facets as well in order to encourage maximum stocks of the elephant.

Thus, the general argument of this paper is that institutions must be developed which channel human values (attributable to each of the various facets of a species) into funding for the management of the stocks of the species. There are two major points which derive from this principle.

First, high level demand for a species or its products is not a contributing element to resource exhaustion in this light. Demand, in the first instance, creates value which is available for use to conserve and sustain the species. It is institutional failure which, for the most part, must underlie species extinction in the face of substantial demand pressures; institutions which fail to channel high level demand into resource management cause species extinction.

Second, the role of international cooperation in this scenario is the preservation of demand in combination with the reform of institutions so as to constructively channel its force. The basic import of this paper is the issue of how international cooperation can be utilised in the effort to address what are basically internal (domestic) defects.

Therefore, this paper attempts to combine the tools of economic analysis with the objectives of the conservationist. The specific object of this approach is the construction of a regulatory regime capable of addressing the primarily domestic problems of the management of the African Elephant. The general objective is the creation of a framework for analysing the role of international cooperation in the management of resources which are primarily "national" in nature.

I. THEORY OF THE MANAGEMENT OF NATIONAL RESOURCES

An initial assumption of this study is that the African Elephant is primarily, if not wholly, a "national resource" in the sense that it is relatively apparent which state has jurisdiction on the issues of property rights in the animal. This is to be distinguished from such "international resources" as: the atmosphere, the Whales, Space, the Sea, etc.

In either instance, a very different set of questions must be addressed in regard to the role of international cooperation. In the case of an international resource the important issues involve the creation and implementation of some manner of international institution which is able to assert exclusive jurisdiction over the international resource. The problems with these resources are usually thought to be linked to the nonexistence of such an entity.

Since this institution already exists, in a non-international form, in the case of the national resource, this cannot be the source of difficulties with regard to such a resource. As institutions already exist to claim exclusive jurisdiction, there must be some other defects which give rise to obvious internal mismanagement.

What then is the role for international cooperation in the case of the national resource? First, assisting with the identification of institutional defects which contribute to the mismanagement of the resource. Second, identifying the basis upon which joint action is capable of remedying these defects. Part I of this paper addresses the former issue, and Part II the latter.

A. Theory of National Resource Management

There are two fundamental concepts required in discussing the law and economics of resource management: "ownership" and "investment". Within these two rubric lie most of the important issues regarding the incentives for proper resource management.

The "ownership" of a resource has several facets, which may be divided amongst many individuals. One important facet is the capacity to harvest the resource, together with the ability to exclude others from doing the same; where this capacity is possessed by some "owners" and not others, these persons will be referred to as having "control" over the resource. A second facet, a prerequisite to ownership, is the ability to capture the flow of the resource's "rents": the value of the resource which is attributable solely to the scarcity of the resource (rather than the labour or capital used in its harvesting, shipment or processing).

The rents from a resource depend on the range of uses for that resource, and the degree of substitutability which exists for each; for the African Elephant, as a "keystone species", the sources of its value may be ascribed principally to the following elements:

a) ivory;
b) other produce (hide, meat);
c) specific tourism (attributable solely to elephants);
d) other species' tourism value (due to elephants' role in habitat creation); and
e) existence (demonstrable willingness to pay for knowledge of species' existence and well-being).

On account of the public's willingness to pay for these elements (and due to its unwillingness to accept substitutes), a certain flow of revenue is generated by the resource and distributed to various individuals. The management of the resource is profoundly affected by the creation and direction of this revenue flow.

"Investment" in resource management refers to the decision to abstain from current consumption of the resource in order to generate a flow from the resource in the future. Most of the issues of species over-exploitation may be phrased in terms of insufficient investment; the issue then becomes: Why does the harvester choose to accept a reduced yield today if retention of the animal would result in a better yield tomorrow?

The answer to this question lies in the analysis of the harvester's incentives to engage in "asset conversion". [Dasgupta & Heal (1979)]. The resource harvester's decision problem is to choose between retaining the resource in its current (biological) form or to convert it into the form of another asset, say cash, and thereby earn a rate of return on that asset, the interest rate. Retention of the resource in its current form is "investment in elephants" and conversion represents "investment in the money market". An economist would expect that, in a well-structured resource ownership regime, the stock of resource would be maintained that produced a flow of revenue equivalent to the flow of revenue that would result if that stock were converted. This is the point at which the marginal cost of investment in elephant populations is equal to the marginal benefit of that investment; hence, this is the stock which would be maintained by a harvester (again, assuming a well-structured ownership regime) acting in his own self-interest.

Different resources have different ownership structures. Some of them are very clearly and concretely "owned" by a single entity, who has the sole capacity to harvest and the ability to capture the entirety of the revenue flow from the resource; for

example, a "domesticated species" is basically a resource in which such an ownership structure inheres. On the other hand, other types of resources are not so easily harnessed by a single entity (e.g. the ability to exclude may be costly), and the revenue flow from the resource might be distributed over a large number of different entities, a sea-going species would be an example. These institutional differences must then be taken into consideration in the harvester's decisionmaking process; if one asset has a rate of return flowing from one set of institutions and another asset derives from another set, then the relative impact of these institutions must be considered in addition to the relative rates of return.

Harvester's Determination of Stock of Resource

Institutional Considerations Affecting Decision:

1) relative risk of future ownership status;
2) relative cost of securing investment;
3) relative proportion of revenue flows appropriated; and
4) rate of exchange for asset conversion.

If the institutional considerations largely favour one asset over another, then the harvester will continue to convert between the two assets long after the rates of return would have been otherwise equalised. This is why it appears anomolous to the outside observor that harvesting is continuing; the harvested resource clearly appears to be the more valuable, unless the institutional factors affecting the decisionmaking environment are taken into consideration. A brief discussion of each of these factors is provided below, before a more detailed analysis which follows in the next section.

The "risk of future ownership status" refers to the uncertainty of tenure regarding a particular resource; that is, the title or position which gives access to a flow of revenue from an asset varies with the form of the asset and with the jurisdiction in which the asset is held. [Solow, R. (1977)]. Where rates of return are otherwise equal, assets which have low risks with regard to future ownership are preferred. For example, states which nationalised foreign operations often sufferred from underinvestment thereafter; this is because, given similar investment opportunities (i.e. rates of return), investors avoided the nationalising regime due to the uncertainty of future tenure.

The "cost of securing an investment" in a natural resource is a direct consequence of the capability to exclude others from the resource. Where this is by its nature inordinately costly, the resource is termed "open access". [Dasgupta (1982)]. The elephant is not an open access resource by natural decree, by comparison with the ocean's resources for instance; that is, it

is by nature far more costly to attempt to exclude other harvesters from a stock of fish than it would be a stock of elephants. Resources may be deemed open access by either natural or legal decree. For example, in the U.S., inland water resources fall under a spectrum of differing ownership regimes, ranging from absolute open access to absolute private ownership as well as various forms of shared ownership. These different regimes contribute substantially to cost differentials in the use and exclusion from use of the resource.

Another result of such diffuse ownership regimes is the dispersion of the resource's benefits across a wider range of individuals. The harvester's rate of return is then derived from the portion of rents expected to be received by the harvester from future revenue flows (as a proportion of the portion of the rents received by him for immediate conversion). Again, as there may be many others with "ownership" status besides the harvester, it is possible that the rents from the resource may be spread over a large number of individuals.

The rate of exchange is determined, in part, by the rate of harvesting. As the price of the resource will decline with the quantities produced in any given period, the conversion of the resource in any given period must take into account the effect on the price of all other units to be converted by the individual harvester.

Poor management of a resource results when the above institutional factors are so biased against a given resource that massive harvesting (little investment) occurs, even though it may appear to most observors that the rate of return from the converted asset far exceeds that of its alternatives.

It is to these factors that this analysis now turns, in its examination of the defects in the regulatory regime affecting the African Elephant.

B. Institutional Defects and the African Elephant

With this general background in the principles of resource management, it is now possible to discuss the institutional difficulties which afflict the management of the African Elephant in particular. The four types of defects which may be afflicting the management of the elephant populations are:

1) Noncompetitive rate of return ("optimal extinction");
2) Separation of ownership and control;
3) Ambivalent ownership;
4) Technological lags and Insecurity of Tenure.

A brief recounting of the trends in the elephant harvest will be indicative of the nature of the management problems in this industry. The African Elephant population is currently distributed across approximately 34 range states, although this range is being continually restricted.[4] Of these states, only about 13 have significant populations remaining (i.e. more than ten thousand elephants). The population is now much more heavily skewed towards the forest and park environments than was previously the case.[5] As has been shown by numerous population studies, the number of elephants has been declining rapidly over the past two decades.

It is now clear that the age structure of the current population has been dangerously distorted by harvesting. The average tusk size in the annual harvest has decreased from about 8 to about 3 kilograms in the past decade.[6] A 3 kilogram tusk represents a juvenile male elephant (before breeding age), or (worse still) a young but mature female elephant.[7] Hence, the reproductive capacity of the stock has been sorely affected by the truncation of the upper ages of the population.

This distribution has resulted from brute reaction to the incentives in the ivory trade. The size of tusks (of course) increases with age, and the value of ivory is an increasing function of its size (because of the wider range of uses for the larger pieces, since smaller pieces cannot be aggregated into a single piece for working). The ivory harvest, responding to these incentives, has worked its way down along the population pyramid ignoring its impact on the future flow of ivory.

In short, both the scale of the harvest and the form which the harvest has taken indicate that mass conversion of the resource is taking place. There is little evidence of investment in this resource; it appears that its "controllers" are acting to convert it into a different form of asset as quickly as is possible given current technologies.

The investment which does occur takes the form of "national parks": places where the state patrols, encounters and punishes harvesters with some frequency, varying with the particular state and park.[7] The investments which have been undertaken have met with modest success overall, indicating that the scale of investment is not in proportion to its necessity in most instances.[8] For example, the Lusaka workshop (1988) estimated that Zambia would require an 8000 per cent increase in staff in order to adequately patrol its currently designated protected areas.

In terms of either abstention from harvest or tangible investments in elephant conservation, it is clear that there is very little investment in this resource. The issue remains: Why does this species receive so little investment?

1. The Optimal Extinction Dilemma and Inelastic Demand

One possible answer is that the African Elephant is an uncompetitive resource on the international market. This is the so-called "optimal extinction" dilemma. This would be the case if the stock of the resource, when properly managed, failed to generate an aggregated return which was competitive with other assets. The African Elephant, with its slow natural growth rate, seems to fit this scenario rather well at first glance.[9] A well-managed population is probably incapable of yielding more than a 10% annual flow of ivory from a given stock, whereas many assets on the international market are able to better that yield.[10]

Further analysis puts this initial hypothesis into question. It is apparent, from the demand studies incorporated within this report, that the nature of the demand for ivory is largely "inelastic", at least in the current range of quantities produced. This means that consumers feel that they have no real substitutes for ivory, at its current price and for its present uses. If the price of the good increases, they will generally purchase the same amount of the commodity by simply allocating a larger share of their budgets to ivory purchases. This means that price increases will usually increase the total revenues received by the producer(s) of an inelastically demanded product. The good news for the African Elephant is that the means of inducing such price increases is the reduction of supply; hence, the finding of inelastic demand indicates that the slaughter of fewer elephants will result in greater revenues flowing to Africa from their products.

The caveat to this generally happy finding is that no product is demanded inelastically over all prices. As its price rises, more consumers are willing to admit the possibility of accepting substitutes previously deemed inferior until the point of unitary elasticity is reached (i.e. the point where a price increase has no effect on total revenues, as the proportion of consumers leaving the market just balances with the proportion increasing their expenditures on ivory). After this point, it is even possible that demand will become "elastic".

With regard to ivory, it is clear that the demand elasticity is very significantly inelastic in Japan, the largest single consumer of worked ivory.[11] As Japan's consumers are already involved almost wholly in the higher priced ivory, it appears that this inelasticity might apply over a wide range of prices. If, for example, the demand for raw ivory in Japan did not approach unitary elasticy until it reached prices of, say $1000/kg., then the revenues from the ivory trade could remain at about $50 million on a harvest of only about 50 tonnes.[12] (Japan is particularly relevant in this scenario as it is likely to be the only significant market to be supplied at these prices.) This

characteristic of inelasticity is amply illustrated by reference to the experience of the ivory trade between 1979 and 1986; as tonnage in the international trade (generally) declined, total revenues from the trade (generally) increased.

Inelasticity in Demand for Ivory

	Tonnes[13]	Total Revenues[14]
1979	734	$ 40 million
1980	708	39 million
1981	774	34 million
1982	663	33 million
1983	811	46 million
1984	575	42 million
1985	540	39 million
1986	547	50 million

In essence, this analysis means that the level of harvesting which has occurred in the past two decades has "flooded the market" with ivory. Each piece of raw ivory that is produced reduces the price of all ivory in the market; each harvester has this "external effect" on all other harvesters. As individual harvesters have failed to take this effect into account, the market has been flooded with ivory which has had no beneficial effect on aggregate revenues for the group as a whole. Each harvester is scrambling to acquire an individually greater share of a constant-sized pie. The market is flooded in the sense that additional ivory is pouring into the market without resulting in any increase in revenues to the industry in the aggregate.

Therefore, with regard to an inelastically demanded resource, the optimal extinction dilemma is less likely. This is because immediate conversion of the whole stock of the asset (in order to receive the return on another asset) is of no real benefit if the same amount of aggregate revenue is received from conversion of, say, one-tenth of the stock. The possibility of future revenue flows is foresaken with no benefit received in return.[15] Immediate conversion, with the external effect on the price of all ivory taken into account, makes no sense over the range of prices that the good is demanded inelastically.

The pressure of demand for ivory products in Japan should provide the basis for the preservation of, and investment in, the stock of the African Elephant, under the assumption of wide-ranging price inelasticity. Not only does this demand produce a stream of revenue for investment in the resource, but the nature of the demand is such that it does not provide incentives for over-exploitation of the resource. The incentives for the exploitation of a demand-inelastic resource are, rather, in the direction of encouraging the restriction of production in order

to inflate prices and revenues. For example, the demand elasticity of petroleum products for motor vehicles has been estimated to be in the neighbourhood of .50 (as contrasted with the demand elasticity for ivory in Japan of .50 to .70); hence, the incentives existed to create a resource cartel and restrict the sale of raw petroleum by the allocation of quotas, the so-called OPEC cartel.[16]

It does not appear that the natural rate of growth alone explains the current campaign of mass harvesting. As previously mentioned, the natural habitat is not a natural source of investment prohibition either; that is, unlike fisheries, the African Elephant appears to be amenable to some cost-effective management strategies. In short, it is unlikely that "natural" factors are substantially determinative of the pattern of underinvestment and overexploitation rife within the industry.

In addition, high-level demand for a resource's produce does not, by itself, indicate that investment and management should be distorted. In fact, it is the species for which society finds no use that are truly threatened in the long run; human self-interest dictates that investment in these species is zero. Although familiarity makes particular note of those species which are extinguished through use, it is my hypothesis that the vast majority of the species disappearing each year are ones that have not (yet) benefitted mankind. For the untapped species, although not exterminated by direct human usage, there is no incentive to provide any level of resources or habitat for its own use. Therefore, usefulness is the one saving grace of all species in the long run, and the demand for its products is the best indicator of that usefulness.

The "natural" characteristics of the elephant do not dictate over-exploitation. The existence of "high level demand" does not, by itself, generate that outcome. Yet by all accounts the elephant population is sufferring greatly from exactly this situation. If this is the case, then the issue becomes: What "institutional" factors are contributing to this outcome?

2. Separation of Ownership and Control

The person making the harvesting decision with regard to a particular elephant, i.e. the person then in "control" of that elephant, is the one person whose decisionmaking process matters in regard to the management of that elephant. Despite all of the best efforts to construct well-informed wildlife management plans, the failure to link these plans to the decision-making in the field renders them nugatory.

It is the "owner" of the resource who has the incentive to create management/investment plans; that is, the individuals

receiving the revenue flow from the resource are the ones who must balance the relative advantages of current versus future revenue flows. There are two fundamental problems in the regulation of the African Elephant with regard to the issue of ownership and control.

First, ownership of the elephant is very diffusely and diversely distributed in most African states. The flows of revenue from the sale of ivory are distributed amongst an odd assortment of local poachers, foreign poachers, foreign traders, local chieftains, domestic government officials, foreign government officials and the domestic treasury. Since ownership is not concentrated in any one individual's hands, only a portion of the potential flow of revenues is considered by each "owner" thereby distorting the investment decision. More importantly, the vast diversity of the ownership body renders it nearly impossible for them to recognize their joint interest and to organize for collective action with regards to the resource. Hence, the ownership structure, in terms of the flow of rents, is so cumbersome as to render response to the existing incentives to conserve and to manage completely infeasible.[17]

Second, the ownership is clearly separated from the control of the resource. Control of the resource lies with the individual harvesting it, by definition, whereas ownership lies with those reaping the rents of the resource. The following tabulation indicates the extent to which revenues from ivory have been flowing to those harvesting the ivory.

Revenues Flowing to Harvesters in Africa
And Comparison with Raw Ivory Value in Japan (1985)

Chad[18]	CAR[19]	Cameroon[20]	Zaire[21]	Zimbabwe[22]	Japan[23]
$ 7/kg.	$6-8/kg.	$ 15/kg.	$ 7/kg.	$ 63-76/kg.	$85-99/kg.

Although perhaps a bit on the high side, Zimbabwean sale revenues are a good indicator of the value of the fully aggregated rents from the ivory.[24] They also indicate the small proportion of the rents which are appropriated by the harvesters in most of the other range states.

As an illustration, assume that Zimbabwean harvesters receive a competitive wage which is compensable from the proceeds of the harvest at the rate of about $5/kg. from all tusks harvested. Then this would indicate that the state is receiving another $60/kg. in "rents" from the resource. The first point to

note is that this renders each Zimbabwean elephant, with an average ivory load of about 8 kg., worth around $500 of "protection". That is, as opposed to allowing a poacher to take the elephant (and consequently the $500), it pays to invest in the protection of the animal to some amount less than the $500. For example, if a 10 per cent flow of revenue is possible from a well-managed stock of elephants, this means that each elephant in a this population would generate about $50 per annum value to its owners. This is a significant amount in that a competitive wage for a game scout in, for example, Tanzania is only $150 per year according to the Lusaka report. It would not require a very sizable group of elephants in order to warrant its own scout under these circumstance.

This is not the case in those states where the harvesters receive a very small portion of the resource's rents. In the other states listed in the table above, it cannot pay to invest in the protection of the elephant. The individuals actually making the decisions to harvest the elephants are receiving little or none of the rents from the resource. The rates at which they are compensated allow little margin for resource value after consideration of the opportunity cost of the labour, time, capital, transport and risk involved. Although they are making the actual decision to convert the elephant from mammal into mammon, they have a very small interest in the animal itself. The bulk of the resource's rents are flowing to the others in the diverse ownership structure, who seldom make the actual decision to harvest from the stock.

This is the meaning of the concept of the separation of ownership and control.[25] The persons receiving the flow of revenues from the resource have the incentives to properly utilize the resource but not the capacity to operationalize those objectives. The persons able to control the resource, on the other hand, do not share the owners' objectives. Hence, the resource is poorly utilized on account of the separation between the owners (and their correct incentives) and the controllers (and their incorrect incentives).

In essence the rents of the African Elephant have been captured by "non-locals": a polyglot of foreign traders, domestic officials, foreign officials and others at a significant distance from the resource itself. This distance is composed of two facets, the lack of control over the harvesters in the industry and an inability to assert exclusive rights to harvest. Since investment incentives are conditioned on "ownership" (the receipt of a stream of rents from the resource), the actual harvesters have little reason to abstain from this activity. For their efforts they receive a competitive wage (together with a substantial risk premium) and an almost insignificant portion of the resource's rents.

This institutional defect is a significant contributing factor to the current environment of underinvestment and overexploitation; however, it raises the next issue itself: Why does this ownership/control structure exist and continue? That is, why don't the participants recognize the inefficiency of this method of resource management and institute reforms to capture the benefits?

3. Ambivalent Ownership

The issue of reform of the ownership/control structure pertaining to this resource is fundamental to the restoration of incentives for investment in the management of the resource. To the extent that "owners" are able to assert control, either directly or indirectly, then the incentives to manage the resource should be corrected. The immediate issue is why the current owners of the resource (again, in the sense of those capturing the flow of rents) do not assert themselves and bridge this gap.

a. Foreign Traders

For the foreigners involved in the domestic harvest the answer is quite easily devined. These persons have no colourable right to the resource, and would have great difficulty in staking an exclusive claim to its revenues. For them the best possible option is that the resource be rendered an "open access" resource; that is, if they are unable to assert control, then their second-best choice is that no other entity assert exclusive control over the resource either. In this way the foreign trader might be enabled to appropriate a sizeable share of the rents of the resource by attempting to monopolize the second tier of production, and then purchasing the ivory from the initial competitive tier of harvesters.[26] The fact that such a substantial price differential exists between harvesters and consumers of raw ivory (about 800 -1000%) is indicative of the extent to which such "upstream monopolies" exist; if full competition existed at all levels in the industry then the price in Japan would be much closer to the price at harvest (allowing for an approximate 15% differential for shipping and taxes).[27]

The foreigner, or any other person unable to stake a colourable claim to exclude others from the resource, has the incentive to maintain the African Elephant as a de facto open access resource. By maintaining competition at the harvesting level of the industry while concentrating on monopolising the stocks in trade thereafter, the rents of the resource are shifted upstream from the harvester to the trader.[28] This sort of behaviour is not consistent with the proper management of the

resource, but if the ability to completely control the harvest of the elephant is excluded as an option, it is the action most consistent with self-interest. Hence, the pattern of harvesting and underinvestment is entirely consistent with the concept of foreign ownership and local control.

It is also consistent with the observed conduct of foreign trader/owners in encouraging the harvesting of the resource by many individuals. The arming of locals, the dispatchment of traders to many tribes well-situated for poaching, and the organisation and capitalisation of bands of foreign poachers are all means of encouraging competition in the harvesting of elephants, and also means of discouraging organisation efforts by locals. The one means by which the foreigner's return might be removed from the industry is by the capture of the resource's rents by the locals; in that event there would no longer be a return to the trader in excess of the costs of shipping (approximately 10% of value). Hence, investment in the maintenance of competition between harvesters of elephants is likely to produce a good return to traders.

Clearly, the flow of rents to foreign traders is a very destructive course of action for the African Elephants, so long as these traders are prevented from asserting exclusive control over the resource. Not only does it foster the continuing separation of ownership and control, but it presents these individuals with incentives to encourage competitive levels of harvesting at the local level. Therefore, not only does this system encourage underinvestment in elephant preservation, it probably enourages overinvestment in elephant harvesting as a means of protecting the foreigner's monopoly (through the encouragement of competition in the elephant harvesting sector). Again, since the foreigner is unable to assert exclusive control over the resource, its second-best option is then to encourage the harvesting as if the elephant were an open access resource. This is a very destructive system of incentives for the African Elephant.

Foreigners are "ambivalent owners" in the sense that they fail to act upon their incentives to invest in the resource, in this case because of their inability to exclude others by law. If the Hong Kong traders, or whoever the individuals are that reap the consumer-harvester price differential, were able to purchase the rights to harvest elephants in range states, then the incentives to invest would be activated. As this is an exceedingly unlikely eventuality, these persons instead concentrate on the monopolization of the trade at the next level of commerce. So long as harvesting continues at competitive levels, this strategy results in the same proportion of rent appropriation but without the incentives to invest in the resource.

b. Range States

The other "ambivalent owners" in the case of the African Elephant are the governments of the range states themselves; however, in this instance the ambivalence is much more difficult to source. Unlike foreigners, it would be perfectly acceptable for the range states to claim and enforce their exclusive right to harvest the resource. In fact most of the range states have staked this claim in their domestic laws.[29] There is no legal barrier to these governments asserting exclusive rights, and thereby acquiring exclusive access to the rents of the resource, but there must be some other sort of institutional obstacle. Otherwise, it would be cost-effective (an assumption to be discussed further in section four) to assert and enforce exclusive rights in the elephants within their jurisdiction.

There are two possible sources of domestic ambivalence towards investment in this resource. The first, and more obvious, is the economically described "principal-agent problem".[30] This problem arises whenever the principal/owner has objectives which are at odds with those of the agent/controller. In the case of the range states, the owners are the governments themselves, as the revenues from the elephant are intended by law to flow to the state treasury; however, the direct controllers (e.g. wildlife officials, local officials, heads of interior) have only a low level of personal interest in seeing that this objective is accomplished. Self-interest dictates that these "agents" will pocket the flow of revenue when such activity is invisible.

The government's use of agents in the implementation of its objectives necessarily involves the incurrence of some extra costs, as does the use of an agent in any capacity. The use of agents does not necessarily imply, however, that a complete control loss must occur. The degree of control loss, and hence agency costs, depends entirely on the efficaciousness of the system of incentives and disincentives implemented for the control of the agent. The current situation in African Elephant management indicates that a largely unsuccessful system of controls must be in place; however, this failure is not self-explanatory: Why aren't African states asserting control over these agents where an internationally valuable resource is concerned?

One possibility might be that the African Elephant is the sort of resource which requires local control for correct incentives to be instituted. It has been discovered that, in certain industries, incentives for investment in a resource by "local agents" cannot be best instituted within a wage system of incentives; that is, in order for local agents to engage in substantial investments in certain resources, it is necessary for

them to be allowed at least a share of the ownership of the resource.[31] Hence, the results of the CAMPFIRE program in Zimbabwe or the LIRDP program in Zambia might eventually shed some light on the importance of the 'local ownership' element in the management of this resource.

It is not necessary in general to replace waged staff with revenue-sharing staff in order to protect a valuable asset; there are many different means of solving the agency problem. For example, very few banks would consider it necessary to provide cashiers with a percentage of the cash that they handle in order to control their use of these assets. Much depends on the "visibility" of the actions taken by the individual agent, even if these actions are visible only to other agents. Therefore, if sufficient numbers of agents are employed so that a system of monitoring is feasible, then (even though only a competitive wage is paid) much better control of the agency problem is possible.[32]

In summary, the range states are the entities most capable of claiming and enforcing exclusive harvesting rights to the elephant herds as they are presently constituted. They should be able to claim a large proportion of the resource's rents by virtue of these rights. Then the incentives for proper investment should inhere. These incentives include the incentive to solve this agency problem to the greatest extent possible. It is clearly the case that this is another instance in which the failure to invest in resource management is evident; many so-called agents are obviously in business solely for themselves and the states are often doing very little to concentrate management of the resource.[33]

The source of the failure of the relevant agencies to not properly manage the resource must ultimately lie with the range states themselves, but this is not meant as an indictment of lax officialdom or rife corruption. The point is simply that such meagre attempts at the achievement of efficient solutions must themselves be explained by reference to institutional failures; merely citing cultural or political differences is presumptious and unhelpful. "Corruption" is the term for the blatant failure to institute solutions for obvious agency problems. The question remains: Why do the "owners" fail to institute cost-effective reforms within the hierarchy?

The answer to this question must be speculative in nature. It is not readily apparent why the range states would be ambivalent about asserting, enforcing and investing in the exclusive rights to harvest elephants. The answer might be found, however, in the characteristics of the resource which differentiate it from other resources with foreign exchange generation potential. For example, a number of the range states are elemental in the production of a number of basic commodities consumed primarily in the industrial countries, as is the case

with ivory.[34] It would be considered most odd if any of these governments treated any of these other commodities as an "open access" resource; one does not expect to find tin mines or tea plantations open to the public. On the other hand, there are few in the international community who believe it inhumane to hold tea in captivity or to sell tin in the international trade. It is possibly this difference in perspective which generates the ambivalence amongst the range state concerning the exploitation of this particular resource.

International public opinion is key to the African nations. These countries are largely dependent on trade with, and aid from, the industrialized nations for the sustainment of their course of development.[35] The alienation of a significant strain of this public is not a feasible option; it simply would not be politically feasible to be held out to the international community as benefitting from the exploitation of the twentieth century's equivalent of the slave trade.[36] It would be a nightmare for an African wildlife director to have a state culling operation make the cover of Time magazine. The fact is that proper resource management requires the wholesale slaughter of whole herds of elephants, right down to the infants; this probably is seen as an unrealistic alternative in many foreign ministries across Africa.

It would be far better, from this perspective, to allow harvesting of the commodity by agents disassociated with the state, thereafter sequestering a fair proportion of the revenue flow by virtue of seizures of the commodity on account of "illegal harvesting". All that is necessary to accomplish this objective is the passage of laws disallowing private harvesting of the commodity while failing to invest the resources necessary for the implementation of the laws. No law has any deterrence effect (unless self-enforcing through private incentives) without an adequate enforcement structure for monitoring and penalizing deviants.[37] Hence, a law which disallows an industry from operating, without an adequate enforcement structure for deterrence, simply constitutes a license for the government to seize and sell goods from that industry.

This certainly appears to explain much of what is occurring in the case of the African Elephant. Most of the range states have laws which forbid the private taking of elephants, or trade in their products. Most of the range states submit quotas for ivory production without providing for a domestic culling program. Most of the range states' ivory comes from seizures of "illegal" ivory production and trade.[38] The ambivalent ownership of African governments is manifested in this tacit "arms-length" relationship with the ivory industry.[39] This form of relationship brings in ivory revenues while keeping the forces of international public opinion at bay; it is a very efficent sort of compromise from the point of view of the foreign ministry.

It is inordinately inefficient from the perspective of resource management in that it, once again, makes for great difficulty in the institution of effective stock management regimes, with the necessity of maintaining an arms-length distance between the investor and the industry. The separation between ownership and control in this instance is the result of political necessity, but the effect is the same, the incentive system effectuated is one of underinvestment and overexploitation. The resource is treated as an open access resource by the "illegal industry" due to the inability to stake an exclusive and enforceable on-going claim to the stock; just as in the case of the foreigner, this is due to the state of the legislation on the books. The legal owners, the states, fail to pursue optimal investment and production in the industry for fear of adverse international reaction, and instead suffer this ill-organised industry to proceed largely unregulated. The result is once again the open access result: massive overexploitation.

The purpose of these sections has been the construction of explanations for the observed wholesale (and presumably economically irrational) slaughter of elephants. The African Elephant is not an "open access resource" by nature, yet the conditions of its exploitation indicate that it is suffering as if it were. One possible rationale for this result would be the "separation between the owners and the controllers" of the resource. Such a separation results in the failure of investment incentives at the controllers level. It appears, from the revenue flows in this industry, that this is a very plausible explanation for what has occurred.

It still must be explained why this gap would not be bridged by the owners; that is, reasons must be found for the observed "ambivalence" of the owners toward the resource. Much of the revenue may be flowing to foreign traders who would have much difficulty in making direct claims on the resource; their involvement in the trade is very hard on the resource. The failure of the range states to make serious attempts to assert control over this resource, with regard to either foreigners or domestics, is more difficult to explain. One possibility is that the exploitation of wildlife resources involves political tradeoffs for these states, in that many influential outsiders find such exploitation morally objectionable. In that case the range states distance themselves from the inevitable exploitation by not bridging the gap between ownership and control, thus allowing a field day for foreign and domestic harvesters.

It is possible that other reasons might better explain the pattern of resource exploitation in the range states, and it is to these explanations which the next section now turns.

4. Other Institutional Defects

There are two other possible explanations for the observed failure to invest in the African Elephant. One explanation is that the elephant, in its natural habitat and lifestyle, has been rendered "technically" if not naturally an open access resource. The other explanation is that the general instability of tenure in range states introduces a severe discount rate with regard to all investment opportunities in those nations. The primary distinction between these explanations and those discussed previously is that the latter are remediable. It is not at all clear that, if the explanations in this section apply, there is any alternative to vastly lower stocks of all natural resources in Africa.

It was assumed at the outset of this paper that the African Elephant was distinguishable from the naturally determined "open access resources". These are resources for which it is inordinately costly to attempt to claim exclusive rights. That is, these resources occur in natural conditions which render it prohibitively expensive to claim and enforce the exclusive right of harvest. For example, the whales are classic examples of an open access resource whereas cattle are not. The determining factors are: the resource's mobility, its natural habitat, the enclosure technology and the harvest technology. All of these factors contribute to the expense in enforcing a claim to future harvesting rights, and accordingly they must be considered in determining the optimal level of investment in a resource.

The assumption that the African Elephant is not an open access resource was based on the observation that its habitat and mobility bears a much greater resemblance to cattle than it does to whales. It should be possible, at some feasible cost, to monitor and control access to the African Elephant. What is not so apparent is whether the cost of such monitoring has not skyrocketed with the improvements in the harvesting technology. It is possible that the widespread introduction of modern weaponry has rendered elephant harvesting a low-cost method of production. As the cost of entry into the business of elephant harvesting is otherwise reduced, it would be necessary for the owners to institute countervailing measures which increase these costs in order to discourage increased production by unwelcome entrants. This is exactly the role of fences and patrols and the like in the enforcement of property rights; it discourages unwanted access by creating production cost differentials for those denied access.

It might be the case that the range states wish to claim exlusive rights of harvest but are unable to do so because the fall in harvesting costs is outstripping their capacity to raise the costs of making access to the resource; that is, the

monitoring technology is not keeping pace with the harvesting technology. This would result in the states treating certain populations of elephants as open access resources. This is essentially the argument of those who believe that the only answer for the African Elephant is the reduction of the population to such small numbers and habitat that monitoring can be made effective.[40] The idea is that some equilibrium population will occur in any event at that point where the monitoring technology equalizes with the harvesting technology, when monitoring resources are concentrated on small areas densely populated with the remaining elephants.

There is no doubt that this factor has contributed something to the plight of the African Elephant; however, it should not be overstated lest it become a rationalisation for inaction. First, it is of fundamental importance that all possible measures be taken to correct distortions which would reduce that equilibrium level of the elephant population. Second, it is not at all clear that an equilibrium would be reached simply by assuming that it exists; note the fate of the Rhinoceros.[41] Third, some African states have been able to monitor and stabilise elephant populations in the context of the same technologies, while others have not. It is clear, however, that the concentration of resources on the monitoring of certain populations of elephants is probably necessary to assert ownership rights; the remaining questions involve the level of those resources and how they should be invested. The "technology lag" argument might explain a certain amount of population loss but it provides little in the way of constructive input into the reform process.

The last distortionary effect to be discussed here is the impact of the general level of instability in African states. Investment presumes a certain amount of continuity, whatever the resource. The reason that an open access resource receives so little investment is because there is no means by which today's access to a particular segment of the stock can ensure tomorrow's access. With regard to fisheries (an open access resource), the problem is most likely to be that the stock of fish is no longer available, having been appropriated in the interim by another. In many of the range states the problem is just as likely to be that the harvester is no longer able to access the resource; that is, the uncertainty of retaining one's position or rank or whatever it is that avails access creates incentives to harvest today and ignore tomorrow.[42] In terms of the discussion in section A, the flow of future revenues is then heavily discounted for the risk of loss of tenure. This factor very clearly bodes ill for investment prospects in all African resources. To the extent that the "owners" of the resource have a diminished expectation of retaining title to that resource in the future, there is very little incentive for investment.

These two defects have been addressed separately as they are of a different nature than those addressed previously. The initial discussion involved particular systemic defects capable of particular reforms. These last defects are more general in nature and would afflict any system of regulation put into place, to a greater or lesser extent. For this reason the policy portions of this paper will continue by specifically addressing the former problems, while comparing the differential impacts of the latter on the various policies. It is by no means apparent that the problems of instability and weapon availability are secondary in nature; however, the differing rates of decline in the various range states indicates that the fundamental problems relating to elephant management should be ultimately soluble. This is not to belittle the importance of these final factors, but it is to concentrate on general problems for which there is a recommendable solution based in international regulation.

5. Summary

High levels of demand for a resource do not necessarily bode ill for the continuing survival of that resource. In fact, it is the converse that ought to be true. The ownership of a highly valued resource should generate incentives to care for that resource.

The problem of conserving the stock of elephants then becomes one of underinvestment. This failure of investment is borne out in the ineffective monitoring of the stock, and the subsequent overharvesting which occurs as a result.

This underinvestment is the result of a separation between ownership and control. The rents from the resource are flowing to persons other than the harvesters. The persons who could control the rate of harvest are not realizing sufficient funds from the resource to make adequate controls worthwhile.

The persons receiving the bulk of the asset's revenues are not acting to acquire control over the resource; they are "ambivalent owners". This is probably because the bulk of the resource's rents are flowing to foreign traders.

Ultimately it is the failure of the range states to assert control over the resource, either by giving exclusive rights to resident individuals or by instituting adequate controls over their appointed agents, which has resulted in the decline of the species. This failure to take control must itself be a product of ambivalent ownership; perhaps the states can ill afford to be seen as profiting from the ivory trade. Alternatively, the general level of instability, or the escalating costs of effective monitoring, has rendered many African resources susceptible to underinvestment.

C. Role of International Regulation

At this juncture it is important to distinguish between the roles played by national versus international institutions in the regulation of domestic resources. Most importantly international regulation is not able to operate as a substitute for effective national management of national resources. One of the functions of state sovereignty is the identification of the parties with exclusive rights to the resources within certain boundaries. In theory then this state has the incentives to utilize these resources in a manner which maximizes its net benefits from them. It manages these resources through its "agents", either directly through government officials or indirectly by means of allocating "property rights" to its citizens. The state has the incentive to manage national resources by the use of the system which produces the greatest revenue flow at the least "agency" cost.

Where something is obviously wrong, other nations cannot (by the doctrine of national sovereignty) "take control" of the situation; the resources are within the exclusive control of another state. Besides, the management defects are soluble by the state in possession, as it should have the incentives to do so.

Other states which take an interest in the resource must act through the vested state in correcting the defects which afflict the resource. This can be accomplished in two ways.

First, the management defects may be addressed "directly" through the instrument of existing state machinery. This is the import of most of the current attempts to provide international assistance in the domestic management of African resources. In this scenario, the international community provides aid and advice in the implementation of various internal management schemes. These policies assume that offerred aid and assistance will be applied to the purposes designated.

Another approach is to identify areas of true international interest in the resource, i.e. the identification of joint courses of action which may result in joint gains to the cooperating states. Then, these forms of joint action might be used to address identifiable deficiencies in the domestic management of the resource. That is, it might be possible to utilise joint interest to "indirectly" shape domestic policies.

The fundamental problem with both approaches is their ultimate reliance upon internal implementation for effect, but the ramifications for each are quite different. The former (direct) approach relies on the willingness and desire of the African state to address the same problem with the aid and assistance which the international program wishes to address;

frequently, it is to be expected, the objectives of the two diverge and a program devised for the accomplishment of the external objective finds its resources rechannelled to an internal purpose. This is largely attributable to the same internal defects which have inhibited the development and implementation of better management schemes internally. It is difficult to address these defects directly, within the bounds of national sovereignty.

The "external" approach first attempts to identify the basis for international cooperation in regard to a particular resource. Where the resource is inherently domestic, the most obvious common interests are those of the "producers" and the "consumers" of the resource. The next step is to ascertain the extent to which these mutual interests are compatible with actions undertaken to remedy existing defects. The approach is "external" in the sense that all aid and assistance is directed to the creation of external or international institutions, and these institutions attempt to enforce agreements consistent with better management of domestic resources. This approach relies more on internal implementation in the sense that it makes no attempt to directly transform internal institutions; however, it relies less to the extent that it re-shapes internal incentives through the mechanism of externally enforcable agreements.

The latter approach is the only method which gives effect to true international regulation of national resources. That is, it represents an attempt to effectively bound the range of discretion of the range states through the construction of an external mechanism. The next part of this paper constitutes a critique of the current international regime, indicating why it fails to achieve any form of what could be called "international regulation". The immediately following sections indicate what precisely is necessary in such a system, and then construct an example of such a system for the African Elephant.

International regulation with regard to national resources is a problematic matter. It can probably be assumed that internal management problems exist when such regulation appears to be desirable. To attempt to address these problems directly through the introduction of new domestic institutions from external sources is the most obvious first approach; however, it is not apparent that these forms of aid and assistance would be used in the manner intended, nor that they would operate with the intended effect in such a different environment. Another possibility is to attempt to address underlying inhibitions to effective internal management through the creation of "external mechanisms": ones which do not rely on internal efforts for implementation, but rather attempt to externally re-shape the incentive structure affecting the management of the resource.

II. Policies for the Conservation of the African Elephant

International regulation of domestic species is a feasible approach to the correction of some types of defects in the internal management scheme. International regulation is a very imperfect substitute for correct domestic resource management, however, and can only be effective to the extent that it identifies incentives to joint action and implements schemes which give effect to these incentives. International regulation must also provide a regime for mutual verification and enforcement, as incentives for joint action invariably contain countervailing incentives for individual defection. To the extent that a scheme of international regulation correctly identifies and performs these tasks, it is possible for it to correct some forms of distortion in the domestic management of natural resources.

This part of the paper addresses the current regulatory system, the CITES system, and discusses its ability to implement the incentives which it envisages. The second section addresses in a more general way the elements of international regulation which are necessary components for the correction of the defects discussed in part I. Then an example of a system which meets these requirements is detailed. Finally, several different options are discussed in regard to their relative capacities for correcting for the distortions in elephant management policy.

A. The CITES System for International Regulation.

1. Description of the CITES management quota system

The current system regulating the trade in the African Elephant is the management quota system adopted under the Convention on International Trade in Endangered Species ("CITES"). The CITES treaty was signed by 21 states in 1973 and came into force in 1975 with the subsequent ratifications. There are now 99 signatories to the convention, and it is the primary international mechanism for the management of most wildlife and its products; however, there are numerous other treaties which deal solely with species which primarily inhabit international territories or waters.[43]

Two very important points are recognized in the preamble to the convention. First, "...States are and should be the best protectors of their own wild fauna and flora..."; ultimately, the management of a resource which lies wholly within national boundaries must be conducted by that nation. Second, "international cooperation is essential for the protection of certain species of wild fauna and flora against over-

exploitation..." That is, it is recognized that it is possible to utilize joint action to conserve the stocks of certain domestic resources. Together these precepts define what should be the overarching objective of the international regulation of national wildlife: the recognition of joint incentives and the utilization of international trade institutions to correct distortions within internal resource management institutions.

The mechanism which the treaty provided for the accomplishment of this international regulation is the CITES permit system. Species listed in the appendices to the convention must receive pre-clearance from the exporting state's management authority prior to export; the authority issues an export (or re-export) permit if the conditions for trade are satisfied.[44] Each importing state is under obligation to ensure that each specimen is accompanied by such a permit. The parties must then submit annual reports to the Secretariat detailing the trade which has occurred in listed species.[45]

The conditions for importation vary depending on the Appendix listing. The import of Appendix I listed species is not allowable if it is "to be used for primarily commercial purposes."[46] The burden of proof is on the importing party to demonstrate a non-commercial purpose, and importation is authorized only in exceptional circumstances.[47]

An Appendix II listing merely requires that the importer "require prior presentation of either an export permit or a re-export certificate."[48] Several states have required import certificates as well, as a means of ascertaining the flow of ivory shipments.[49] The African Elephant was listed on Appendix II at the initial Conference of the Parties in 1976.

Given the rate of exploitation of the resource, it received more attention very soon thereafter. At the third meeting of the parties, in New Delhi, 1981, Conference Resolution 3.12 made the initial attempts at tightening the international regulation of the elephant. It provided for the marking of ivory by punch-die and for the licensing of international traders ("where possible"). It further provided that no importing state should allow raw ivory to enter without mentioning the state of origin in the CITES documentation, and even then not unless "the Party is satisfied the ivory was legally acquired in the country of origin." Finally, it exhorted all parties to comply with the earlier procedures regarding Appendix II commodities, i.e. the provision of annual reports.

As the situation continued to worsen, the Conference of the Parties in Gaborone, 1983, by Conference Resolution 4.14 directed the Technical Committee "to draw up guidelines for controlling the trade in worked ivory as quickly as possible..." The African parties qualified this authorization with the proviso

that further international regulation should be directed toward their realization of the maximum benefits from the resource. The preample to this Resolution provides, in part, that international regulation should not reduce the profitability of trade but rather that it should provide for the sustainable utilization of the resource.

The result of Resolution 4.14 was the introduction of the management quota system via Conference Resolution 5.12 at Buenos Aires in 1985. This system, devised within a consultancy report provided by Rowan Martin, attempted to formulate the international enforcement mechanism for the implementation of domestic management programs.[50] Its basic components are as follows. Each range state was to formulate a management program for the utilization of its elephant stock and then submit an annual "quota" of tusk production to the CITES Secretariat. The exporting nation should inform the Secretariat of any authorized exports, transmitting copies of the permits and details of the tusk markings.

The CITES Secretariat was to fulfill the role of the information conduit within the trade network. It was to receive all information from the exporting states: management quotas, export permits, and annual reports. With regard to reports and quotas, it was to make reports to all parties in order to provide information on which states were legal exporters. It was to provide information to importers on request as to the legitimacy of received export documents.

Importing states were to accept ivory only from states (party or non-party) with a non-zero quota, and then only after verifying the authenticy of the export documents through the Secretariat or the exporting Management Authority. Imports from re-exporters were to be accepted only if the re-exporter provided the correct information with regard to the country of origin.

All states were to avoid trade with any state not conforming with the ivory quota system, as so deemed by the Secretariat. Quotas were to be submitted by 1 December of the year prior to implementation; the first year of the system was to be 1986.[51]

The Ottawa Conference of the Parties in 1987 focussed closely on necessary amendments to the management quota system, producing six separate resolutions regarding the ivory trade. Resolution 6.11 proposed pressuring countries "continuing to allow illegal trade in ivory, in particular Burundi and the United Arab Emirates..." Resolution 6.12 recommends that "the Parties ...fully comply with the quota system..." It proposes that the Parties "assist the range states to improve their capacity to manage...", and that "the states be encouraged to offer rewards" in order to arrest and convict illegal traffickers. Resolution 6.13 urges "contributions on a volutary

basis to the Secretariat for ivory trade control co-ordination." Resolution 6.14 recommends the establishment of "a system of registration or licensing, or both, for commercial importers and exporters of raw ivory ..." in each state, and suggests that the ivory carving industry be similarly organized as well. Resolution 6.15 makes official the use of ink rather than punch-dies in the marking of tusks and allows the import of "small" (under one kilogram) pieces without marking; it also recognizes the legitimacy of imports from re-exporters where the information on the country of origin is not provided, "when there is justification given for this omission..." Resolution 6.16 officially adopts the Secretariat's view that worked ivory is "readily recognizable" as a regulated specimen under CITES.

This constitutes a very brief synapsis of the international regulations pertaining to the trade in ivory. In brief, the idea was to have each range state submit a "management quota" of tusks to be produced in the upcoming year as a result of that state's wildlife management policy. The enforcement of the state's quota was to be made possible through the marking of the tusks, and the requirement of proper documentation (and the verification of the authenticity of this documentation) by any state importing (or re-importing) the ivory.

2. Failure of Implementation

This section concerns the natural appeal of the CITES system to each of the range states; that is, it concerns the system's tendencies toward self-implementation. To the extent that a system appeals to the self interest of the regulated parties, it has in-built incentives for implementation. To the extent that a system fails to invoke self-interest, and still relies on individual efforts for implementation, then the entire system hinges on external enforcability (which will be discussed in the next section).

The CITES system failed to create adequate incentives for the internal implementation of resource management systems. This was because it failed to recognize the source of the range states' joint interest, and thus did not provide the mechanism for the implementation of that mutual interest. Within the CITES system, each range state acts unilaterally in the creation of its own resource management program. The sole incentive to act is the mechanism of international enforcement devised within the quota system framework.

The failure of the CITES incentive system to induce action by the range states is amply demonstrated by reference to the Secretariat's statistics on implementation. Of the 34 range states (23 of which are parties to the convention), the following numbers performed in accord with the new system:

Implementation of CITES by Range States[52]

	1986	1987	1988	1989
Quotas Submitted:	13	17	14	10
Annual Reports Received:	6	0	N/A	N/A

As 30 of the range states had indicated their willingness to comply with a system of regulation of the ivory trade, these data demonstrate the minimal incentives towards compliance which the system generated.

In fact, these figures overstate compliance with the system. The purpose of the quota system was to provide a requirement that each state develop a management system, from which it would then derive its production quota.[53] Only 6 of the 18 states submitting quotas in 1986 or 1987 accomplished this objective; the remainder tendered illogical or nonsensical management quotas.[54] This is not meant as an indictment of the range states' performances; the recognized value of a system is demonstrated by its "take-up rate". For example, motorists drive on the left or the right in various countries not because of the importance of following the written law, but rather because of the obvious self-benefit accruing from conforming with the dictated norm. Likewise, the failure to conform with the dictated norm is evidence that there is little recognition of the benefits from compliance.

The major problem with the management quotas submitted was the extent to which ivory quotas were derived from "confiscated ivory". Many of the forms listed illegal killing as the major source of ivory within their management system.[55] The CITES Secretariat has attempted to confront this problem by interpreting Resolution 6.12 to prohibit the inclusion of more than 50 tusks taken by confiscation on the quota submission forms, thereby requiring additional notice of subsequent confiscations.[56] In essence, however, the CITES system has failed to create the incentives necessary to cause domestic elephant management responsibilities to be removed from the poachers; the submitted quotas simply recognize that production within the current environment will be operated by others than the range states themselves.

Finally, the failure to adopt the ivory marking system was itself evidence of unwillingness to invest in the CITES system by

the range states. Despite multiple exhortations to undertake the small investment required for indelible marking, the import of Resolution 6.14 is that punch-die marking is no longer an element of the system, adopting the standard practice of ink-marking instead.

The record of CITES quota system implementation by the range states makes clear that it does not appeal sufficiently to the self-interest of these states to be internally implemented. In this case, as in most instances, some manner of external enforcement is necessary.

3. Failures of Enforcement

Much of the failure of this system must lie ultimately with its unenforcability. Even if the system contained few incentives for implementation by the range states, it might still be implemented through strict control of the international trade through external mechanisms, and the compliance which these controls would then induce within the range states. The CITES system, however, contains general enforcement mechanism deficiencies which renders strict external control of the trade impossible.

These deficiencies in enforcability, the incentives to exploit them, and the continuing underinvestment in the resource are all interlinked in a cycle of systematic evasion which maintains the rate of exploitation of the African Elephant. First, the trade identifies and exploits one of a number of loopholes (which are attributable to the deficiencies discussed below). Second, as any particular loophole is addressed by the Secretariat (such as the control of raw ivory imports into Japan), another springs up (such as the development of carving factories in "free trade zones" and the export of worked ivory); Thirdly, the obviousness of these deficiencies contributes to the feeling of lack of efficaciousness, and the perceived lack of benefits flowing from the system; hence, the range states are unwilling to invest resources which are dependent upon the system for a return. Thus, the internal investment deficiencies remain substantially unaltered. Fourthly, these same investment deficiencies are the source of the incentives for overexploitation of the resource, by reason of open access to the asset. Finally, this unauthorised exploitation of the resource then creates the demand for loopholes for the conduct of the ivory trade, and the cycle is reinitiated.

a. Non-range states

States which are not range states are able to evade the system to some degree, on account of two basic sources of "systemic flexibility". First, each "re-exporter" is capable of

"authenticating" questionable export documents, and then sending the shipment along under its own documentation. This leaves the final importing nations at a loss with respect to the examination of the originating permits; under the CITES system, it is permissible to re-export ivory without its original documentation. Secondly, as discussed below, any state is a potential situs for a portion of the ivory carving industry, and is therefor capable of importing illegal raw ivory and rendering it into largely unregulated worked ivory. Therefore, there is flexibility for any state wishing to exploit the system to do so without the cooperation of any other state involved in the industry; all that is necessary is for the trader to locate itself in some jurisdiction willing to accomodate its business interests.

Under the CITES regime, the unit of regulation has been the raw ivory tusk itself; quotas are to be stated in tusks in order to internalize incentives for efficient tusk harvesting. That is, the member state would then choose to satisfy its own quota from larger tusks as this would create the greater ivory value, while concomitantly serving the conservationist's purpose of harvesting solely from the older stock.[57]

There are two problems with this regulation. First, this is an attempt to distort the internal management incentives without first attempting to identify the source of management deficiencies; these sorts of "arbitrary restrictions" often produce bizarre results. For example, this regulation provides no incentive to invest properly in elephant management (which would involve culling from all ages of the population distribution), only to truncate the upper reaches of the population. It is unlikely that this regulation has had this impact on the harvesting strategy (as it is unlikely that the range states are in control of the harvesting strategy), but the impact that it might have had would have been far from the intended one. Hence, it is very important to identify the distortions which are creating the undesired internal management problems and then to directly address them; unnecessary amendments to the parts of incentive schemes which are not obviously deficient may in themselves create distortions. Second, and more importantly, the choice of the ivory tusk as the regulated unit renders the post-manufacture sector of the industry unregulatable; this has very important implications for enforcability.

The ivory industry involves three necessary components: harvesting, carving and consumption. For the most part, the first and the third are fixed spatially, the first restricted to the range states and the third restricted to those states with substantial international purchasing power.[58] The second component, although traditionally fixed in the Far East (Hong Kong, China and Japan in particular), is far more mobile than the

other two. The essence of the non-cooperator's solution has been to move the cutting and the carving of the tusks closer to the production and further from the consumption (where the bulk of enforcement occurs) and then ship the ivory in some roughly worked, and unregulated, form.[59] The essence of the regulator's response to the problem has been to attempt to close the worked ivory loophole, first in the Far East and then generally by the adoption of Resolution 6.16.

The regulator's approach cannot ultimately succeed within the present framework, because the quota system still regulates only the number of tusks. It is not possible, with worked ivory, to determine whether the originating raw ivory shipment was sufficient to generate the entirety, or merely a fraction, of the subsequent shipments attributed to it. This flexibility within the system renders strict regulation infeasible; although other more serious deficiencies currently overshadow its significance, in the final analysis this manner of flexibility must be removed for serious regulation. The unit of regulation must be equally applicable from the point of production to the point of final consumption; otherwise, manipulation of the system remains possible by transferment of the point of manufacture, or by the falsification of numbers on documents.

b. Range States

A more fundamental source of flexibility in the system is the range states themselves, as there is no real constraint placed on the activities of any ivory producing state. Parker (1989) provides numerous examples of shipments occurring under "speculative permits", i.e. CITES permits provided in blank for the general use by the purchasing party.[60] It is perfectly consistent with economic self-interest for the individual range states to provide CITES permits to stockpilers of illegal ivory; there is an individual benefit realized from the sale of such permits and the joint cost (of encouraging the illegal taking of ivory) will be realized in any event since one of the range states is bound to succumb to the temptation. Hence, it is entirely rational for the range states to sell these permits to willing buyers, and the supply is unlimited as the range states are individually responsible for the establishment of their quotas; the above paper cites one example of a range state which found it necessary to increase its original quota before selling its permits in blank. Parker estimates that about 250 tonnes of ivory (one-third to one-half of the annual harvest) was processed in this way during each of the initial two years of the management quota system.[61] Hence, a re-exporter securing the cooperation of a range state has carte blanche for unrestricted trade in African Elephant ivory.

This manner of evidence is consistent with the incentives generated by the CITES scheme of regulation pertaining to the

range states. This response to the system is entirely predictable. In essence, the system has created a piece of paper that is valuable for foreign exchange on the international market at little or no direct cost to the selling states; it would be unusual for such incentives not to generate the observed response. Since noncompliance with the formal system is not directly observable or punishable while it is individually beneficial (though jointly detrimental), it is to be expected that noncompliance would be the general result in this system.[62]

This willingness to "cheat" on the joint agreement accounts for the greatest amount of flexibility in the CITES system. It is consistent with economic incentives that vast amounts of poached ivory be surrepititiously shipped into Dubai, for example, to be later transformed into licensed imports from even those African states where the ivory was poached.

The important point is that it is the international system which is the source of this ludicrous state of affairs; the role of the entrepot is minimal. This is because the entropot acts only as a "matching up" point between illegal ivory and legal permits. Any state in the world could perform this function; the only constraint on fungibility is the proximity of the state to the line which implicitly links producers and consumers.

Hence, "diplomatic efforts" to close the entrepot in the ivory trade are largely wasted efforts. The closure of one "matching up" point eliminates only one from dozens of possibilities. The trade had initially sought out those bastions of non-interference known as "free ports",[63] but these are inessential characteristics of the entrepot; the trade has amply demonstrated its resilience with regard to its trade route.[64] Thus, there is no real meaning to the closure of one amongst many options, so long as so many totally fungible substitutes continue to exist.

Even if the task of securing the cooperation of every entrepot is accomplished, these efforts cannot succeed because this system ultimately fails on account of the incentives for noncompliance on the part of the range states themselves. Range states have little reason to invest in a system which is so lacking in mutual verifiable commitments; it is a bad result (from each state's perspective) to have all range states fail to implement the system, but it is a worse result (from each state's perspective) to be the only state incurring the expense to implement an ineffective system. This is the source of the problem with speculative permit sales alluded to earlier, and in its most pernicious manifestation it could result in the sanctioning of transboundary poaching expeditions between the range states.[65] Hence, so long as the system makes it so easy to cheat, it cannot pay to be honest. Therefore, the patchwork attempts to remedy the CITES system cannot succeed until the

system is amended to provide the correct incentive structure for the range states themselves.

In general, a system of regulation is usually required because the "natural" order creates individual incentives which are at odds with the jointly recognized preferred state of affairs. The simple agreement of all concerned parties does not solve this problem; the incentives to individual defection remain. For this reason, sole reliance on internal incentives for implementation is misplaced. The CITES system fails ab initio because it has no effective external enforcement mechanism. As this is the case, and it is readily recognizable as being the case by the range states, it makes little sense for any individual state to adopt the system unilaterally; thus, the entire system of regulation stands largely unimplemented.

4. Failures of Administration

Another systemic deficiency of the CITES management quota system is the large quantity of administrative work which it generates; the cost-effectiveness of these expenditures must be *in doubt given the ineffectiveness of the system, and these large* and permanent flows of paperwork are largely unnecessary for the long-run regulation of the trade.

The attempt to regulate an industry by means of monitoring the flow of the industry's goods wherever they may go is a hugely inefficient method of regulation. This method generates mountains of documentation and paperwork, which is inefficient in several respects. First, it is nearly impossible to make sense of the data, on account of its vastness (if it were all credible information) but also due to the wide range of credibility which exists due to the variability of compliance. Second, even where comprehension is possible, it is clearly an expensive method, and such centralised information acquistion is generally unnecessary for the regulation of an industry. It may be a very useful expenditure to provide the basis for the initial construction of a regulatory regime; however, a properly constructed system should not have to rely on such expensive means of control.

Most importantly, the requirement of such paperwork is a "transaction cost" which itself constitutes a disincentive to implementation. The efforts of the trading parties are required in the completion and verification of the standardised reporting forms for each of the ivory shipments, and in the provision of annual reports on the ivory trade. These are necessary components of the system, which are far too costly for some of the African nations involved. When supplying incentives to induce the adoption of a new system of regulation, it is important to note that the costs of compliance constitute disincentives to adoption; hence, it is important to minimize

these for those individuals and states without the resources or the inclination to comply.

This is a general problem with the CITES system. It attempts to regulate through the creation of paperwork. With regard to the elephant management quota system, the Secretariat receives all of the information on all of the flows of all ivory shipments, and the monitoring is to be accomplished by hundreds of diverse parties reporting on standardised forms provided by the Secretariat. This form of centralised information processing is expensive and unworkable in most situations. It spreads limited resources over an impossible task.

5. Summary

The CITES management quota system does not work, in the sense of altering the management programs of the range states. It is requiring huge amounts of effort and resources to accomplish what it is doing; that is, the accumulation of information on the trade in ivory. So it is not the lack of genuine good intentions and sound efforts, it is the failure of the scheme of incentives and enforcement within the system.

The management quota system cannot be effective in assisting domestic management of the resource because it does not address the needs of the range states correctly. Its failure to do so is evident in the low implementation rate by the range states. More importantly, it is evident in the lack of real impact which the system has had on the ivory industry during the past three years.

The system fails most fundamentally because it does not constrain the range states, even when such constraint would be in the mutual interest of all of the range states. It is true that a management system for each state should be in its own interest, and an external enforcement system which reinforces the domestic system would enhance those incentives; however, it is even more appealing to have such a system and then sell permits to your neighbours' resources. Since the system fails to constrain this manner of discretion, or to provide a mechanism for detecting those who engage in it, there is little incentive to invest in the system. If the system is unimplemented, it has little impact on the original investment deficiencies which were contributing to the resource's difficulties.

There are problems with the CITES system which render it more costly for implementation, but the failure to bound the discretion of any range state is sufficient to render it ineffective. It simply fails to recognise the joint interest which the range states have in the implementation of a <u>mutually binding commitment</u>.

B. Elements of International Regulation of National Resources

Deficiencies in the domestic management of resources can be addressed through carefully constructed international regulations. The process whereby this might be accomplished is as follows:

1) The identification of specific management deficiencies;
2) The identification of joint interests which might be used in their correction;
3) The derivation of a mutually binding commitment;
4) The construction of an effective external enforcement mechanism;and
5) The minimization of administrative costs.

Most of these requirements have been touched upon in the previous parts of the paper in the course of the critique of the existing regulatory regime. The purpose of this section is to provide a cohesive presentation of these elements, and an example of a system which contains them all.

The first two requirements are necessary in order for a contract to have any effect on internal management problems. If a joint interest can be linked to the existing management deficiencies, then this joint interest can be utilised to remedy them. If there is no such joint interest, then the problem is wholly internalised and there is little that international cooperation can do to affect it.

In this age there are few, if any, commodities which are produced and consumed wholly internally, and thus international regulation can have a role in the national production of most of them. The extent of this role depends on the nature and location of the production and consumption activities. That is, the impact of international cooperation amongst producers depends on their number and homogeneity, and the nature of the demand for their product.

Ultimately, however, the capacity for reform of domestic resource management by international cooperation is strictly limited. Even where some of the identifiable deficiencies are remediable, the ultimate responsibility for the resource must be domestically supplied. The essence of "effective" international regulation is the identification of those defects addressable through international cooperation, and the supply of an external enforcement mechanism sufficient to address these. "Effective" international regulation cannot substitute for proper domestic regulation; it can merely provide the institutional foundation that removes certain of the inhibitions to proper domestic regulation.

The essence of a contract is the identification of joint action which, if taken, will jointly benefit all parties to it. Usually such joint action involves undertaking restraints on individual options. These restraints, although intended to benefit each of the contracting parties, must be externally enforcable; otherwise, they will be ineffective. This is because each individual party sees the incentive to gaining the benefits of others' restraints without restraining itself. Hence the necessity of requirements three and four above.

The import of requirement five is that the first-best international regulation system will achieve the tasks listed in requirements one through four at the least on-going expense to the parties involved. This will reduce the disincentives to ignore or evade the system, and induce compliance.

These elements are now discussed in the context of the African Elephant, in order to describe the role that international regulation could play in the management of this species.

1. Identification of Internal Management Deficiencies

As has been discussed in great detail in Part I of this paper, there are internal management deficiencies with regard to the African Elephant which can be addressed in the context of international cooperation.

The essence of this deficiency is the dispersion of the flow of revenues from the resource over a wide number of persons. A large part of this flow is probably going to foreign traders. Another part is probably going to various domestic officials. A fairly small part is going to those persons making the harvesting decisions regarding the elephant. Given the small share of the total revenues received by the ostensible owners of the resource, there is little incentive to invest in the resource.

Underinvestment means, in part, the failure to protect the resource from competing users. There can be no attempt at self-denial with regard to the harvesting of the resource, until all others have first been denied access to the resource.

The entities which must take control of the resource are the governments of the range states, via game departments or "local ownership programs" or such other domestic "agents" of their choosing. So long as the flows of revenue are concentrated into a single organisation's hands, the incentives to invest in the exclusion of foreigners should obtain.

A program of international cooperation which would funnel the vast majority of the resource's rents down a single channel within the range states' governments would reveal the true value of the asset (and hence provide the incentives to care for the resource), while simultaneously providing the funding for the effort.

2. Identification of Joint Interest

The role of international regulation in the correction of this "internal" deficiency must be based on the identification of some "joint interest": a mutually beneficial course of action which would provide the basis for international cooperation to address the problem. In this instance there is significant overlap between the states with internal deficiencies and those with an identifiable joint interest; this is a happy coincidence for the cause of successful international regulation.

The location of the problematic deficiencies in investment is a subset of the group of all range states. The location of the identifiable joint interest is the entire set of range states; they jointly produce the entire world's supply of African Elephant resources.

This joint interest is of much significance due to the finding of inelastic demand for the product. Inelasticity of demand means that harvesting of elephants may be greatly reduced without reducing the flow of revenues to its producers. In short, price increases can be expected to more than compensate for reductions in supply. Therefore, there are large gains to be achieved by joint action between the range states; the supply of ivory may be greatly restricted while still providing substantially the same or even greater amounts of revenue.[67]

Without this cooperation the market is flooded with ivory; the price of ivory is driven down far below that of other precious jewels (such as pearls or diamonds), and the incentives to care for the elephants are likewise reduced. The only factor currently sustaining ivory prices is the stockpiling by international traders; however, their appropriation of rents is not channelled into elephant conservation. They are too "distant" from the resource to be able to manage it, and their incentives under these circumstances is to encourage competitive levels of harvesting. Therefore, joint cooperation by the range states is necessary not only to appropriate greater rents for the producers, but, even more importantly, this joint action is required to shift rents out of traders' hands and into producers'.

Once producers capture the rents of the resource there will no longer be a role for the traders, other than the literal one

of shipping. The producers must therefore act jointly to raise production prices, restrict production output and eliminate the middlemen in the ivory trade.

This is in the joint interest of the producer states, so it should produce incentives to implement such a program. The maximization of producer rents by the restriction of ivory supplies should result in a harvest which correllates (to a much greater degree) with the maximum sustainable yield. To the extent that it deviates, it is necessary to argue for the reduction in current profit-taking in order to provide the basis for a long-term flow of rents; however, it is possible that even a harvest of only 50 tonnes per year or less might be at or near the rent maximising supply. Therefore, with a further analysis of demand, it is possible that the producing states' joint interest might be found to deviate very little from the production of the "sustainable yield" level of ivory.[68]

The source of two of the observed deficiencies in the internal management of the African Elephant (i.e. the dispersion of rents across many hands, foreign and domestic) may be addressed through international cooperation. The channelling of rents to range state governments, and the elimination of middlemen, is consistent with the joint interests of all of the range states, and it is achievable through the joint action of the range states. Hence, a program for international cooperation to remedy these basically internal defects can be constructed. The only necessary elements are: increased producers' prices (consequently, reduced producers' supply) and enforcability.

3. Mutually Binding Commitment

The existence of a joint interest in cooperation is not sufficient to produce that joint action. There are always individual incentives to deviate once the joint action has been agreed. Hence, the identification of joint interest is not in itself sufficient to generate joint action; it is always necessary to scrutinize the issue of enforcability.

The joint action in restricting total production and increasing producer prices will generate a greater amount of total revenues for the group, but it is necessary in the context of such artificial restrictions to provide for the distribution of the increased revenues within the terms of the agreement. Even if a distribution is agreed, each participant has the ability to redistribute revenues towards itself through increased production. This is the source of the individual incentive to deviate from jointly optimal action. It is the problem which has afflicted every producers' agreement, e.g. the OPEC production quotas.[69]

The essence of a "mutually binding commitment" is the recognition of this dilemma and the agreement to implement institutions which resolve its contradictory incentives. Each party must agree to verifiable restraints on its own action in return for every other party's agreement to verifiable restraints. In this context external monitoring becomes a means of demonstrating the party's tender of "consideration" for every other party's performance, rather than a mechanism for enforced compliance; this is the "mutuality" involved.[70]

Agreements are meaningless in the absence of a mutually binding commitment. Other states will not perform unless they are able to observe the flow of benefits resulting from their own self-restraint. Hence, only the most benevolent of states are willing to tender uncompensated performances, and thus the system goes largely unobserved.

It is easy to understand how international conventions without binding commitments come into being. It is far easier to acquire accession to multilateral agreements which have no verification structure, as there is no cost to being a signatory under these circumstances and it is possible that some benevolent states will tender uncompensated benefits.[71]

Treaties without verification structures, in the area of natural resources, are worse than no treaties at all. They misdirect attention and resources in areas where joint interest might be able to generate a mutually binding commitment. They provide politically expedient substitutes for effective action, and hence deflect pressures from their most effective targets. They also generate ambivalence about the appropriate use of domestic resources and institutions, and thereby cause much of the actual workings of the industries to be obscured, or worse uncontrolled.

An external verification structure is necessary to generate true binding commitments. Once an external mechanism is included within the system, then it is absolutely necessary to ascertain a joint interest which would facilitate agreement. That is, it must be clear to the individual state that it will receive ample compensating benefits from its agreement to verified restraint. Thus, the necessity of restricting international agreements to the implementation of recognised joint interests (i.e. gains obtainable through joint action) is a corollary of the requirement that all treaties be mutually binding commitments.

In the context of the African Elephant, the gain attributable to restricted production is just such a joint interest. Each party can be made to see the direct benefit received from its restraint, and each party can be allowed (via appropriately instituted mechanisms) to observe the extent of the

restraint practiced by all other members. In this manner the joint interest of the parties can be realised, and without this mechanism it cannot be implemented. Any agreement between the range states must involve mutual restraints which are instantly verifiable by all of the range states.

4. External Enforcement Mechanism

The essence of this requirement is that for "mutually binding commitment" to arise there must be a mechanism which does not rely on unverifiable submissions from the contracting parties. The enforcement system must be external in the sense that it derives all of its information from non-interested sources. The extent to which enforcement is required is a function of the extent to which regulation is desired; that is, the greater the desired variance between the regulated and the unregulated states of the industry, the greater the need for the investment of resources into the enforcement mechanism.

The need for external enforcement mechanisms has been a major stumbling block in the implementation of effective international regulation regimes.[72] Very often external enforcement has connoted international policing and the abrogation of sovereignty; however, this need not be the case. In most instances enforcement could be achieved via the use of "commodity currencies" or other instruments which are unobtrusive and cost-effective. That is, external enforcement does not necessarily require international "policing" for implementation, but merely "rationing".[73] As with any regulatory system, a greater emphasis may be placed on centralised or decentralised measures of implementation; the use of the latter can implement a mutually binding commitment with a minimum of intrusiveness.

This point is simply that effective external enforcement mechanisms need not be the brute command and inspectorate structures which are usually assumed. The reliance on already existing national governance structures (external to the contracting parties but within the trade) together with a decentralised means of control can implement a highly effective control system without intrusive means.[74]

Investment in enforcement mechanisms must be correllated with the rewards to evasion. That is, as a regulatory system attempts to change an industry, it will introduce incentives to profit from evading the regulation; these incentives are the source of the "black market" in regulated goods.

There is no regulatory system which has not been evaded to some degree. This is because there are usually two groups for whom a regulated market produces incentives to engage in evasion.

One of these groups is the prior participants in the regulated industry. These persons have more information on the channels and flows of the industry than any governing body can assemble; thus, even a well-constructed proposal will be obviously evadable from their perspective. For these individuals the question is the riskiness of the venture; even if there is only a small probability of detection, they might be very wary of undertaking it if the potential penalty is high relative to the rewards from evasion. Therefore, this group is deterred by the riskiness of evasion.[75]

Another group is attracted by the riskiness of the venture. These elements exist in every society, and operate in any industry where the regulatory regime creates incentives to evade. They are the professional black marketeers who might have little information on how to evade the system, but are not deterred by the prospect of penalization. They operate in the highly regulated markets throughout the world: drugs, arms, etc. - any commodity which generates a premium once smuggled.[76]

From the perspective of these potential smugglers, the essence of all government regulation is the imposition of cost differentials between those who comply with the system and those who do not. For example, the imposition of a tariff imposes an additional cost on all those who declare the good as dutiable, but that cost is avoided by those who evade declaration. This cost differential is then appropriable by the smugglers after evasion. A less obvious example is the effect of government limitations on quantities. In this instance the regulation of quantities raises the prices received by importers of the good; however, the cost imposed on compliant importers is the foregone revenues from unimported quantities. The smuggler realizes the price increase from others restricting their quantities, while not incurring the cost of restricting his own imports. Thus, the premium to evasion is the same whatever the form of the government regulation, because all regulation can ultimately be framed as the imposition of cost differentials between the compliant and the noncompliant traders.

Previous studies of government regulation of trade confirm that the compliance gap (i.e. the proportion of goods in the industry brought in illegally) opens up with each increase in the "magnitude of regulation".[77] That is, as cost differentials are increasing between compliance and noncompliance, a greater proportion of the industry opts for the latter. This is because the potential premium to noncompliance becomes greater, and thus appealing to a larger proportion of industry participants. Interestingly, these studies have found that as the magnitude of regulation becomes very "high" (i.e. prices are greatly increased or quantities greatly decreased), the actual impact of the regulation is to decrease prices and increase quantities in the market![78] This is because the proportion of noncompliants in the

market becomes so great (by virtue of the apparent awards to noncompliance) that they actually begin to compete for customers and thus begin reducing price below the "full compliance" price; this means that there can no longer be any compliant suppliers in the industry.

It is always important to provide an effective enforcement mechanism in order to induce a mutually binding commitment by the interested parties, but it is particularly important to implement and fund well-constructed enforcement structures as the magnitude of the regulation increases. Otherwise, the impact of dramatic regulatory alterations to an industry is very limited.[79]

5. Administrative Cost Minimisation

There are a few general points to be made about the means by which administrative costs might be minimized; however, each industry will require an individually constructed mechanism to a certain extent.

First, it is possible to regulate an entire industry from points of production to points of manufacture and then final consumption by strict controls applied at a single point. The flow of an industry is something like pipeline which will back-up throughout its course if constricted at a single point. Therefore, it is certainly unnecessary to monitor the product throughout the course of its commerce if a single point through which it is certain to pass is known. Regulation at that one point can be sufficient to accomplish all that might be done throughout its entire journey.

This is good news because, for the African Elephant, there are several possible candidates for such a "point of regulation". The points of production are certainly fixed, and must ultimately be monitored, but they are numerous and do not lend themselves to the "external" verification system that is necessary. Also fixed to a large extent are the points of final consumption; these sites must be related to international purchasing power, and in this case the bulk of final consumption occurs in a single state. This points to the use of Japan, the U.S. and the E.E.C. as the points of regulation for the industry, together with other points of final consumption as their cost-effectiveness is considered.

The ability to concentrate resources for effective regulation is fundamental. So long as mandatory points of passage can be identified, it is much more effective to allocate enforcement budgets to a small set of jurisdictions while securing substantial compliance rates than it is to distribute

the same budget over a large set thereby obtaining low compliance rates. Again, substantial compliance at a single "fixed" point is all that is required.

Another cost-effective measure is the utilization of national institutions which are universally in effect, rather than the creation of new institutions. Much could be accomplished by the increased standardisation of national customs practices in regard to wildlife products which would be beneficial for many purposes. For example, the adoption of suggested methods for declarations concerning "worked" animal products would make this information useful for the regulation of the trade in particular species. Since the data is already being collected, and the cost incurred, it makes little sense not to undertake standardisations of national reporting requirements in order to make them useful for the purposes of international regulation.

Finally, one underutilized method of monitoring trade is "inside" surveillance. Since by definition a trader must be looking for a buyer, it should be relatively easy to infiltrate and monitor an industry from the inside. This information would be of immense helpfulness to the regulators in their pursuit of individuals attempting to evade the system. Rather than relying upon random surveys of traded goods, well-placed insiders would be able to describe the probable originators of shipments of ivory. This method would have to be one of the most cost-effective means available of detecting evasive conduct.

The most important point raised in this section is the irrelevance of multiple controls at different levels of an industry. If carefully constructed, all that is necessary is a greatly focussed enforcement mechanism at a single point in the commerce, together with an amount of supplementary surveillance. Regulation which attempts to control all points at once is distributing its limited resources over too many unnecessary locations, and hence it is unable to accomplish strict control at any single location.

6. An Example: The Ivory Currency Unit System

This section briefly describes a system which would meet each of the four requirements above. It is important to note that it is only one example of such a system, and that many others could be constructed which would also meet these requirements; however, this one has been developed with the objective of minimizing administrative costs.

It has also been developed with the belief that it could be implemented within the CITES framework, although it should be

clear from what has been previously stated that there are substantial alterations to the quota, documentation and administrative systems involved. In any event, it is my belief that this system could be implemented without the need for an amendment to the convention itself; only the adoption of a number of replacement resolutions is necessary.

The elements of this system, provided in something like chronological order, are as follows:

a) Reports from technical committees;
b) Agreed quotas by range states;
c) Development of Ivory Currency Unit;
d) Monitoring of final demand states;
e) Surveillance of trade.

The basic ideas of the system are: first, the use of the joint interest of the range states in order to restrict production of the commodity; second, the concentration of enforcement resources at a couple of points in order to maximise compliance; third, the channelling of revenues to the range states in blocks attributable solely to ivory production, in order to raise interest in the protection of elephants (and to provide funds for the accomplishment of that purpose); fourth, the allowance for some "agency costs" in such a way that they induce further conservation of the elephant stocks; fifth, the provision of explicit but limited roles for non-range states in order to draw clear lines concerning internal and external affairs in the matter of domestic wildlife usage.

A shorthand description of any solution to the problems of the African Elephant would have to be along the lines of an "enforcable producers' cartel". As the elephant is clearly a national (rather than an international) resource, domestic underinvestment problems can only be addressed domestically, or alternatively through the joint action of all producers of the resource. Such joint action is capable of raising the total revenues realised from the resource by means of restricting the amount of production; hence, the underinvestment difficulties may be solved by means of a joint producers' agreement rather than through internal adjustments. The role of the international community in this situation is to assist in the enforcement of the joint producers' agreement.

This is not to say that internal modifications are not ultimately necessary or desirable; it simply provides a route around them for the first step of instituting mechanisms for the restriction in the production of an overexploited resource. In the final analysis, investment in the resource must occur within the national boundaries and this must be supplied by the range state itself. International regulation can only provide the

direct incentives to invest, and the rents from the resource for investment; the final step must ultimately be taken by the range state in regard to a national resource, irrespective of the regulatory system utilized.

a. Reports from Technical Committees

There are two new technical committees necessary for the international management of the African Elephant ivory trade: the Population Management Technical Committee and the Demand Management Technical Committee.

The Population Management Technical Committee's role is to ascertain the "sustainable yield of ivory for each range state during the forthcoming biennium". They must, in the conduct of this responsibility, conduct population surveys and studies for each of the range states in order to ascertain stocks and age distributions.

More importantly, they must agree a single number, in kilograms per biennium, for each of the range states. For this purpose it is very important that their terms of reference should be as "purely scientific" as is possible; they should include no "flexibility factors", such as "human needs" or "environmental considerations", within their ambit. A simple biological exercise in flow estimation given current stocks of animals and available resources is precisely what is required. Extraneous factors must be eliminated from this enquiry, not because of their insignificance in the overall perspective, but because agreement will be difficult enough on the single number, and the basis for political maneuverings must be restricted.[80]

The Demand Managment Technical Committee performs this same role in the analysis of the final demand for worked ivory. That is, the terms of reference for this committee should authorise, in the narrowest possible terminology, the ascertainment of "the jointly revenue maximising output by all ivory producing countries." Again, this should be provided in terms of kilograms of ivory for the biennium.

Although the official output of these two committees is very limited, it is important that a large amount of resources within the system be utilised in this effort, as it makes very little sense to invest heavily in the re-channelling of an industry in the wrong direction. The purpose of the Population Management Technical Committee is to point in the correct direction; the purpose of the Demand Management Technical Committee is to point to the range states' interests in pursuing that direction. It is my assumption, given the inelastic demand in the industry, that further demand analysis will point to "revenue maximising

outputs" which are close to the "sustainable yield outputs"; to the extent that the two deviate, it is necessary to point to the importance of investing in stock rebuilding in order to be able to reach sustainable revenue maximising outputs.

The committees should be permanent committees with representatives from any state willing to supply the resources to fund the on-going enquiry into range states' populations. Each state should be allowed to choose its own representatives subject to the restriction that any candidate must have appropriate academic or experience-related qualifications, as specified by resolution. These representatives then must agree a single number for each range state prior to the Conference of the Parties.

b. Agreed Quotas between Range States

The information from the Technical Committees is then supplied to the range states at the Conference of the Parties. The range states must then agree: 1) individual quotas; and 2) the minimum price of a currency unit (as described in the next section). These agreements are then ratified by resolution in the full Conference of the Parties.

c. The Ivory Currency Unit

The CITES Secretariat develops a verifiably authentic ivory currency note which is printed in various denominations, all kilograms of ivory. This stock is maintained by the Secretariat and then distributions are made once biennially to the designated Management Authorities in the various range states in accordance with the agreed quotas.

The Management Authorities must then sell these ivory currency units at a minimum price per kilogram, in accordance with the agreement of the range states.

The essential purpose of these ivory currency units is the allowance of the right of passage to the centers of final demand. That is, no ivory in any form whatsoever is allowed into designated states absent the appropriate number of ivory currency units, which are then retrieved by representatives of the Secretariat's currency control team.

Each state with substantial <u>final</u> demand for ivory products, and the international purchasing power to implement that demand, would be subject to designation as a "currency monitoring center". For ivory, the states that must be designated are: the U.S., the E.E.C. and Japan.[81] The demand management committee

should monitor customs returns in order to determine what other states should be included as designated monitoring centers.

d. Monitoring of Final Demand Centers

The enforcability of the entire system hinges on the ability of the system to adequately monitor the final demand centers, in order to detect and punish noncompliant trading.

The existing national institutions for the governance of international trade are the customs inspectorates. These are the most cost effective sites for the monitoring of the ivory currency system. At the points of entry to each of the designated monitoring states, it would be required to produce a currency unit for each kilogram of declared ivory.

The domestic customs inspectorate is responsible for the monitoring and enforcement of the ivory currency system, but they are aided by a permanent Secretariat staffmember: an ivory currency specialist capable of identifying counterfeit notes and managing the information incoming from trade surveillance (as discussed in Section e below).

In order to have immediate and effective penalties, each of the designated monitoring states should require the registration and bonding of all "ivory traders": i.e. any entity taking any consignment of any shipment of goods containing any ivory whatsoever. In the same domestic legislation, it should be made a requirement for any dealer in ivory to provide the name of its supplier on request. A one-time survey of the workers and dealers in ivory should be capable of identifying the existing entities trading in ivory at the initiation of the system. Any breach of the registration system or the ivory currency system should then result in immediate forfeiture of the bond. Any party dealing directly with an unbonded trader should be liable for fines in the amount of the bond.

e. Surveillance of the Trade

In order to provide information to guide the customs inspectorates of the designated monitoring states. It is of the utmost importance that a few traders are established and an intelligence network is instituted in order to acquire information on the flows of ivory. Any agency willing to establish and finance such information sources would be provided with the names of the currency monitoring staffmembers in the designated monitoring states. These individuals could then supply information on possible illicit trading in order to channel the monitoring states' investigations of incoming shipments.

f. Summary of the System

The objective of this sort of system is the creation of an "enforcable producers' cartel". The cartel is the instrument utilised to address the investment deficiencies existing within the range states, as has been discussed in some detail above. The remainder of the elements of this system focus on the enforcability of the concept.

One basic element of enforcability is the creation of incentives for implementation in the range states. The ability to maximise joint revenues should encourage involvement and implementation. In addition, there is no incentive for any range state to stand outside of the system. So long as the primary centers of final demand agree to implementation, no non-member range state (or any other state) will be able to supply ivory to the centers of international demand in the absence of an ivory currency unit.

In addition, there is no "paperwork" disincentive to avoid the system; range states are required only to sell the only pieces of paper which this system generates. "Corruption", in the sense of agency costs (petty official charges), does not operate against this system. Such charges simply add to the rents collected by the range states, although in a dispersed rather than a concentrated fashion, and thereby raising the final price and further reducing the amounts of the commodity demanded.

Another fundamental element is the creation of an external enforcement mechanism which will prevent "cheating" by the range states with regard to the joint agreement. This function is fulfilled by the ivory currency system; once agreement is reached, no individual state can unilaterally alter its agreement.

Enforcability for non-range states is relevant only for the "designated monitoring centers". No other state's efforts are required to implement the system.

Enforcability with regard to existing traders and "black marketeers" is the sole remaining problem. This problem can never be completely avoided; however, two basic principles may be appealled to in addressing these problems.

For maximum monitoring effectiveness, it is best to concentrate resources on the smallest number of points in the trade with the largest possible coverage. For this purpose, monitoring the final demand points is the most logical alternative. These points will always be closely correllated with international purchasing power with regard to an internationally traded commodity. Hence, these are relatively

immobile points in the trade (in the medium term) and the monitoring of only three states should provide coverage of about 75-80% of the trade. (In addition, as the rents of range states are increased and the amount of ivory produced is restricted, it is likely that this remaining marginal portion of the trade will be restricted to a much greater extent.) Hence, it is possible that the entirety of the trade may be completely monitored at only one point once ivory production is restricted.

Secondly, a legal trade is generally susceptible to "internal monitoring". A seller is motivated by economic incentives to communicate its intentions to as many buyers as possible. Of course, this is not at all true for an "illegal trade"; in that case, the incentives point toward the use of reliable channels and foresaking all advertising of the trade.

This entire mechanism should be able to be funded by smaller amounts of aggregate resources than is currently being expended; the ivory currency system requires only a staffmember in each of the designated monitoring states (perhaps one to three in number). The NGOs would be asked to channel their efforts into the monitoring of the trade via internal surveillance. All states willing to contribute would be asked to channel funds into the two standing technical committees by the appointment of scientists and consultants to the committees. The designated final demand monitoring states would need to bear a greater share of the enforcement burden, through licensing and bonding regimes, industry surveys, and customs inspections. They would also be required to tolerate the presence of Secretariat personnel within their inspectorate, and agree to cooperate with them on received information. All of these are substantial burdens, but it is not unfair to assess them to the sites of final demand in order to provide for the continance of the flow of the commodity for future consumption.

The primary difficulties with this system are the same ones that will afflict any system developed to address the problems of the African Elephant. The two underlying issues for elephant managment are: 1) the correction of investment deficiencies; and 2) the use of an enforcable mechanism for the task.

In regard to the first issue, it is possible that the range states would not react to the incentives presented and commence investing in the resource; in that case, the elephant populations would continue to be rapidly depleted. This might occur if, for example, the range states agreed unsustainable quota levels, or if the source of the investment deficiencies was solely the insecurity of tenure of African officialdom. Even if the investment incentives invoked responses, but these responses varied widely between range states, then it would be possible that some states' populations would be preyed upon by others.

With regard to the second issue, it is possible that smuggling would undermine this system despite concentrated enforcement and the use of surveillance. The objective of this system is the raising of the final end-use price of ivory by a factor of five or ten; this is risky in that it will clearly increase the incentive to noncompliant activities. Currently, the system produces little incentive to "smuggle", and the records of the trade indicate substantial compliance; however, the introduction of any means of control for the industry will vastly increase the rewards to noncompliance.[82] It is of the utmost importance that all attempts at regulation provide a substantial commitment to an enforcement mechanism. If the noncompliant traders are able to funnel trade past the monitoring mechanism, the regulatory regime will be of little effect.

C. Other Suggestions for Controlling the Ivory Trade

Within the framework which has been developed in this paper it is possible to provide a quick analysis of the other suggestions which have been discussed in regard to the control of the ivory trade: the trade ban (partial and total), the Ivory Producers Cartel, and the use of tariffs and taxes.

It is not truly possible to give a complete analysis of generally phrased options; it requires too many assumptions as to how the proponents propose to fill-in the many blanks concerning regulation and enforcement. This makes it very difficult to contrast the merits of the various systems.

It does raise the issue of enforcability to the forefront, as it should be apparent that no system proposal can be implemented without an enforcement mechanism. It is the inclusion of this issue which generally makes one system preferable over another. It is the failure to address the question of the enforcement mechanism which makes the adoption of many proposals unrealistic.

Any proposal must address the twin issues of investment deficiency and enforcability. That is, the proposal must describe how it will secure implementation if it is adopted ("enforcability"). And if successfully implemented, it must then prescribe a solution for the problem of underinvestment in elephant populations within the range states ("investment deficiencies").

1. Appendix I Listing

There are several clear implications of an "Appendix I listing" for the African Elephant, given the framework developed above.

First, on the issue of enforceability, the advancement of the African Elephant to Appendix I would constitute a substantial move toward a "mutually binding commitment" between the range states. That is, since an Appendix I listing means that the range states agree to not license any trade whatsoever in the species, it is no longer possible for the states to "cheat" in the production of individual quotas. In effect, an Appendix I listing acts as an "agreed quota" of zero for every range state.

This assumes that a "mutually binding commitment" is possible at the level of zero quotas. If a single range state decides to take a reservation with regard to such a quota, then the question of enforcement becomes very problematic. In addition, this state would then have incentives to supply ivory from its own, and every other range states', elephant stocks. Since a ban on trade produces little in the way of investment incentives (as discussed below), the picture in this case is grim indeed. In short, Appendix I with any reservations by the range states is not a desirable policy to pursue. It will be assumed in what follows that an Appendix I policy would be adopted only if all range states consented to its adoption.

An Appendix I listing does not contain an adequate external enforcement mechanism at this time. On this count, the prior criticism of the CITES enforcement mechanics still stands. It is clear that the mere assessment of zero quotas has had little impact on the production in other industries, e.g. the rhinoceros. Without substantial commitment of resources to a well-constructed monitoring and enforcement mechanism, the imposition of strict regulation simply increases the reward to illicit activity and increases its proportion of the industry output. If Appendix I is a seriously considered option, there must be much more consideration given to its enforcement mechanisms prior to its implementation.

The more significant failure of the Appendix I listing is its inability to address the investment deficiency problem of the species in any way whatsoever. If the failure of the species is at all linked to the absence of a concentrated flow of revenue coming directly from its management, then the removal or reduction of what flow there is can only contribute to its management deficiencies.

An Appendix I listing reduces, rather than enhances, the incentives to protect and preserve the animals. Even if there is

significant domestic interest in protecting the species, there can be no implementation of this objective absent the funding to make it possible. In short, an Appendix I listing (in the absence of a strict enforcement mechanism) has dual perverse effects: it increases the rewards to smuggling and it decreases the capacity to invest in the protection of the animal. Thus, the advancement of the species to Appendix I is again a very risky step, which is doomed to failure in the absence of significant new commitments to enforcement.

An Appendix I listing (combined with a substantial commitment to new enforcement mechanisms) might be the only feasible alternative under certain very specific circumstances. If the source of the African Elephant's overexploitation is not in the dispersion of its rents amongst middlemen and corrupt agents, but rather its difficulty is that every person in Africa is "living for today", then there is no possibility of correcting the investment deficiencies at this time. This means that all resources in Africa, wildlife, tin, tea and whatever, would be hopelessly abused and overexploited, and that in fact there would be no possibility of correcting the situation internally. In that event, a short-run savings of a portion of the population would occur if the external demand for the products were reduced to zero; so long as the elephant was wandering on unwanted lands and using unneeded food and water sources, its presence would be tolerated in the short-run.

This is probably the way that most people view the situation in Africa, and this is probably the reason why most people view an Appendix I listing as the only viable option. There are two reasons why this is an unconstructive way of viewing resource management. First, it is a very costly option which is unlikely to be successful in its implementation. This is because the enforcment mechanism must be so strict that it reduces the outflow to nearly zero in order to reduce the external effects on internal prices to zero. This is a very expensive idea to contemplate; the initial reductions in external demand (as the "compliant" traders exit the trade) are fairly inexpensive, but the costs of detecting the remaining traders goes up with each further reduction of the trade. This is because the premium to smuggling goes up, and the "easy finds" in the trade have all been previously detected. Therefore, each successive step in the closing down of the trade is just that much more costly. Actually reducing a trade to or near zero would be hugely expensive. Note that the U.S., with its vast national resources, has been completely unable to close down the trade in "illegal drugs".

Secondly, this is purely a short-run response to the problem. To attempt to <u>reduce</u> the value of resources is a very roundabout method of preserving them. In the longer run perspective, the elephant with a very low value is much less

tenable than the higher valued one. Sooner or later Africa will have a use for the resources which the Elephant relies upon to sustain itself, and then the species will have to generate value itself in order to merit the use of those resources. Hence, attempts to regulate by the reduction of external demand can only have a constructive effect in the short run.

Generally, an Appendix I listing might be the only effective policy, as an interim measure, if the source of the African Elephant's problem is the general level of instability in the African States. In this event, massive injections of resources into a new enforcement mechanism are necessary. Even in that instance, the policy would not be very cost-effective. One of the most significant problems would be the costliness of surveillance in an illicit industry. Another problem would be the lack of incentives to protect the resource at the domestic level. In any event, a very different permanent policy is necessary to preserve and protect natural resource stocks in Africa in the long run.

2. Partial Ban

One policy which might be more effective is the institution of partial bans, with regard to certain consumer states where easy and inexpensive monitoring and enforcement is possible. Again, reductions in external demand can only be considered as interim measures, i.e. as "moratoriums" while the level of stability in the national regimes increases.

A partial ban makes sense because the requirement for enforcement depends largely on the individual state's compatibility with the restrictions in place. If the state, and its citizens, wish to evade the restriction, then substantial expenditures on enforcement mechanisms are necessary; however, if the state's objectives are compatible, then little enforcement is necessary.

In the case of the African Elephant, the three great consumers of the final products are the U.S., the E.E.C. and Japan. This is because these states have the international purchasing power to control the use of most internationally marketed commodities. The first two are very likely "objective compatible" with a ban on ivory products; that is, if a ban were introduced, it is likely that consumers would themselves turn away from the use of the products, and little incentive to evade would exist. The question of Japan's reaction to a ban is more problematic.

It is possible that a substantial reduction in consumer demand might be effected by simply allowing the adoption of embargos in the U.S. and the E.E.C., as is currently happening on

a piecemeal basis.[83] This is a sort of compromise measure, which requires little and accomplishes little. With regard to investment, it does nothing to reform deficiencies in the range states. If the source of the problem is the general level of instability in Africa, then it is possible that such a moratorium would reduce the harvest of ivory in the very short run. It is not possible for this measure to have any longstanding impact because other consumers would surely substitute for the removed demand, once the price of the commodity began to fall. This is because there appears to be a latent demand for ivory throughout Asia which becomes activated by rises in national incomes and hence international purchasing power. This is the reason why Japan's consumption of ivory has increased so vastly in the past two decades; its "income elasticity" of consumption has been very high.[84] The result of the removal of the U.S. and the E.E.C. from the international marketplace is to render the commodity affordable to the other Asian states: Taiwan, South Korea, Thailand, Malaysia...

A partial ban might have a limited interim impact and it would certainly be very inexpensive to implement; however, it does not respond at all to the permanent deficiencies in the industry, and it is unlikely to have anything but a very short-term effect.

3. Ivory Producers Export Cartel (IPEC)

This proposal has been previously solidified in the form of R. Martin's proposal to the Secretariat.[85] The idea of a producer's cartel is essential to addressing the investment deficiencies in the range states; however, the IPEC concept contained no discussion of the necessary enforcement mechanism, an equally important element.

In short, although it is in the joint interest of the range states to restrict production and raise prices, there are very real individual incentives to cheat on any system put into place to effectuate that joint interest. Therefore, an external enforcement mechanism is necessary to create a mutally binding commitment and then to preserve the cartel.

An "enforcable cartel" is the essence of the idea presented in the previous section. Its advantages and drawbacks are discussed there.

4. Taxes and Tariffs

Taxes and tariffs may be used to produce an equivalent system to the producers' cartel; in fact, the producers' restriction of supply through an agreed quota system has the identical impact of an agreed producers' tax system.

A quota system has been proposed for the accomplishment of the dual objectives of resource management for two reasons. First, an external enforcement mechanism (for removal of the incentive to cheat on the system) is necessary in either instance, and this is more easily accomplished via a quota system. The alternative is to place the power of taxation in a party other than the range states, e.g. the consumer states or the Secretariat. This is not a good idea, since it funnels a portion of the resources' rents through yet another set of hands very distant from the resource itself. The first objective is to channel the rents of the resource in as concentrated a form as possible directly to its "owners".

Another reason to utilise a quota system rather than a tax system is the inexpensiveness of administration of the former. An external tax system would require the handling of money by one state for another, and would be a complicated accounting matter. It is far simpler to implicitly "tax" the resource at the producers' end of the industry, utilising a quota system to collect a "consumers' tax" at the point of production.

In short, any number of systems of quotas, taxes or tariffs might be utilised to achieve the two objectives of investment and enforcability. The choice of the correct alternative depends on the comparison of the cost-effectiveness of the various options.

D. CONCLUSION

The African Elephant is suffering from the vastly increased demand for its ivory. This increase is very likely attributable to the unsurpassed rates of income growth which have been experienced in Japan and other Asian states over the past two decades; this "income effect" has created pressure for large quantities of ivory production.

This is definitely not the sole "cause" of the observed patterns and rates of elephant harvesting, however, as high-level demand for a resource does not necessarily equate with over-exploitation of that resource. Rather, it is the combination of demand pressures with management failures which produces resource exhaustion.

This is not the case with all resources, but it clearly is the case for resources which are subject to "highly inelastic demand". Where demand for the goods produced from the resource is of this nature, the total amount of revenues generated by the resource is largely independent of the rate of harvest. That is, large harvests result in low prices and small harvests result in high prices; since there is no overall benefit received from the larger harvest, there should be no incentive to undertake it.

This logic is necessarily true where a single individual/entity is receiving the entire flow of revenues from the resource, but it is not the case where the revenues are widely dispersed and not susceptible to consolidation. Under such circumstances each individual harvester is able to increase its individual share of the revenues by increasing its rate of harvest. Therefore, although the "size of the pie" may be constant overall, individual harvesters might overharvest in their attempts to maximise their individual shares.

This should not occur in the case of a "national resource". These resources are susceptible to consolidation under the sole authority of the vested state. This is one of the functions of the doctrine of state sovereignty; it vests exclusive authority for resources within a given boundary with a specified governing body. This body should have the correct incentives to channel demand for a resource into the proper management of that resource.

In some instances it is clear that this institutional structure is subject to significant defects. The case of the African Elephant is a good example; existing management schemes in many range states are incapable at present of handling the demand pressures which exist. Massive "mining" of the resource is occurring in a pattern which evinces little investment in the efficient management of the elephant stocks.

What is the role of international regulation in the case of domestic mismanagement of a national resource?

The correction of such defects must lie in the proper channelling of demand forces into the management of the resource.

To meet this objective it is first necessary to identify the sources of current management failures, and then to determine the means by which international cooperation is able to address these defects.

In the case of the African Elephant the probable source of existing management failures is the capture of the resource's rents by "non-locals". That is, a group of individuals unable and unwilling to invest in the stock of elephants are the primary beneficiaries of the current mining campaign. It is probably the case that the vast majority of the ivory revenues are being appropriated by Hong Kong traders (who "share" to some extent via payoffs in Africa). There may be other groups who have benefitted from the recent harvest levels, but all share the same characteristic: the inability to invest in the resource.

From the perspective of these individuals the optimum strategy to pursue is the encouragement of high levels of harvesting. This maintains a very low (competitive) price at the point of production (about $5-15 in 1985). Meanwhile the traders are then able to secure a much better price for the same ivory ($50-90 in 1985) through "stockpiling", i.e. the withholding of harvested stocks from the final market. This "separation between ownership (rent appropriators) and control (harvesters)" is the likely candidate for the primary management defect.

International cooperation can very likely remedy this defect. All that is needed is a mechanism which channels (nearly) all revenues from the demand for ivory directly to the range states, thus avoiding the "middlemen". Such a mechanism would accomplish a number of desirable objects.

First, it would eliminate the middlemen. There would be no revenues available to traders, except for the amounts necessary for shipping costs.

Second, it would generate funds for the range states which would be available for resource management. Currently, most of such funds are not available to Africa as they are probably flowing primarily to Asia.

Third, it would generate incentives to invest those funds in resource management. Merely giving funds to range states (e.g. via NGOs) does not create incentives to invest those funds where international bodies would like to see them invested; the range

state treasury may hardly take notice of the donor's intentions. Linking payments to the rate of ivory exports generates incentives to take notice of how the rate of such exports can be increased and maintained.

Fourth, it would generate incentives for enforcement by the range states. The prospect of increased yields to the range states, by the elimination of the middlemen, should produce a basis for broad acceptance of such a scheme.

Fifth, it would generate incentives for enforcement of the system by the consumer states. Any system which attempts to constrict supply is subject to incentives to engage in evasion, by consumers, traders and even the range states themselves. The consumer states are best placed, in the instance of the ivory trade, to enforce the system due to their smallness in number (because international purchasing power is a prerequisite to ivory consumption) and because of their relatively well-developed customs inspectorates. A system which attempts to restrict the amount of the product flowing to the consumer states is a priori against the consumer states' interests; however, a system which has the objective of reducing flows to sustainable amounts is in the long-term interest of both producers and consumers. It will be much more difficult to persuade consumer states to assume the necessarily heavy burdens of enforcement in the case of the elimination of the trade. Therefore, a binding international agreement may be constructed which addresses the management defect discussed above.

The important characteristics of an effective international agreement are that it is compatible with the self-interest of each of the parties, and (it is able to be constructed so that) it is enforcable through external monitoring of each parties' performance.

Effective international agreements must exhibit these characteristics. Proposed regulations which are incompatible with state self-interest will be subject to non-accession and reservation problems. Proposed regulations which are not enforcable through external monitoring are subject to "lip-service" accession; that is, many parties may accede but few will actually internally enforce the provisions of the convention.

Much international regulation suffers from these defects. In some instances it may be unavoidable due to the inability to identify joint actions compatible with the elimation of management defects. This is not so in the case of the African Elephant; it is possible to identify such a regime for the regulation of this species.

International regulation is always problematic. The identification of joint interests and the construction of mutually agreeable institutions effectuating those interests is always a difficult task. This is especially so where the resource concerned is primarily "domestic" in nature; in that case the identification of joint interests is particularly difficult, and the construction of institutions highly unusual.

This paper identifies one manner of joint interest which might be used to address many sorts of "domestic management problems": the "enforcable producers' cartel". Where the international community is concerned with the domestic strategies for resource management, one option which it has available is the encouragement of the formation of "producers' cartels" with regard to the exploitation of those resources. The consumer states can evidence their interest in cartel formation by volunteering to undertake the burden of "enforcing the cartel". This paper demonstrated how such a system might be effective in conserving the African Elephant; however, in the broader context, such a system might also be used to address problems in the domestic management of many resources: rain forests, wildlife, wilderness, etc.

NOTES

1. See African Elephant and Rhinoceros Specialists Group (1987), Elephant Populations Estimates, Trends, Ivory Quotas and Harvests [Report to the CITES Secretariat] which estimated that 1.2 million elephants existed in 1981 and 764,000 in 1987. The population studies commissioned with this paper have indicated that the current population is now closer to 500,000.

2. See IUCN Environmental Law Centre, African Wildlife Laws, IUCN Environmental Policy and Discussion Paper No. 3 which details the status of wildlife laws in each of the African states. Most African range states vest title to ivory in the state itself, and allow hunting of elephants only under permit or special circumstances. Id., at pp. 807-18. Fourteen states currently impose a minimum tusk size limit on permitted elephant kills, usually around 5 kilograms. Id. Several states have long ago imposed "bans" on the taking of elephants, e.g. Central African Republic (1985), Congo (1984), Gabon (1981), Ghana (1961), Kenya ( ), Niger (1962). Some states have required trade in ivory to be registered or have prohibited it altogether, e.g. Benin (1980), Botswana (1961), Congo (1983), Gabon (trade prohibited) (1982), Ghana (1971), Ivory Coast (1966), Kenya (trade prohibited) (1976), Mozambique (trade prohibited) (1981), Tanzania (1974), Uganda (trade prohibited) (1975), Zambia (1968).

3. See Wijnstekers, W. (1988), The Evolution of CITES, Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Lausanne.

4. The AERSG report, n.1 supra, lists 36 "range states"; however, two of these states, Mauritania and Burundi have populations very near zero. In fact, it has been recently reported that Burundi's one remaining elephant is now dead. Another three states, Rwanda, Senegal and Togo, have estimated populations of 100 animals or less. Only 24 states have populations in excess of 1,000 animals, according to this survey.

5. See Populations studies published in connection with this report.

6. Id.

7. In some instances these investments have been quite substantial, e.g. U.S.$1,000,000 per annum has been spent on the maintenance of a helicopter in Zimbabwe for use in patrolling rhinoceros. In other places the expenditures are far lower, e.g. U.S.$150 per annum per "game scout" in Tanzania. See Report from the African Elephant Workshop, Lusaka, Zambia, 10-11 April 1988 (hereinafter "the Lusaka Report").

8. An example of the "modest success" achieved by the anti-poaching efforts in Africa is the Tsavo National Park where the population has fallen to about 12% of its level at the time of park designation, from 42,000 to 5,000 animals since the mid-1960s. More recently, it is hoped that this level of poaching has been curbed by the recent introduction of "airplane monitoring". See "Two-Legged Rogues Are on the Run", The New York Times, 11 February 1989.

9. Clark, C., "The Economics of Overexploitation", Science, 17 August 1973.

10. This estimate is based on the export quota derived for the population in the state of South Africa, which was attempting to maintain a constant population in Kruger National Park of about 8,000 animals. In culling the population (across all age levels) the average tusk weight was 3 kilograms; thus the total amount of ivory that could be realised in a one-time harvest would be approximately 24,000 kilograms. The annual offtake in the managed system was about 2,500 kilograms, or 10%. See Martin, R.B., Establishment of African Ivory Export Quotas and Associated Control Procedures, Report to the CITES Secretariat, 1 August 1985, at p. 45.

11. Barbier, E., "Explaining the Demand for Unworked Ivory in Importing Countries - Japan", Ivory Trade Review Group Working Paper.

12. Although this figure seems quite high compared to the historical price of traded raw ivory, it is not at all high as compared to other internationally traded precious commodities, such as pearls or diamonds. The fact that worked ivory competes against such precious jewels is evident in its retail pricing. See, e.g., Martin, E.B., "China's Ivory Carving Industry", Traffic Bulletin, vol. 10, no. 1. (carved ivory fans retail at $200 in China, a "lantern" at $2,850).

13. Pearce & Pearce, "Aggregate African Ivory Exports 1950 to 1987", Ivory Trade Review Group Working Paper 89-08.

14. Pearce, Luxmoore & Pearce, "The Value of Ivory Exports to Africa 1979 - 1987", Ivory Trade Review Group Working Paper 89-06.

15. It is important to once again emphasise that the range of inelasticity is fundamentally important in the determination of the possibility of "optimal extinction". Further demand analysis of a sophisticated nature would be necessary to determine this issue.

16. Ulen & Cooter, Law & Economics, Scott, Foresman & Co. (1989).

17. This problem manifests itself in many different instances of multi-party asset ownership. In the case of the publicly held corporation, for example, the "ownership" of the firm's assets is distributed over a wide number of "shareholders", each of whom has too small of an interest to carefully manage those "in control" of the firm, i.e. the management. This separation between ownership and control results in the failure of those in control to invest in the assets to the extent that the owners would desire. There is a vast literature elucidating the nature of this inefficiency, commencing with the classic work of Berle & Means, The Separation of Ownership and Control in the Corporation, (1937), and continuing more recently in numerous works. See, e.g., Fama & Jensen, "Separation of Ownership and Control", Journal of Law and Economics, vol. 26, p. 301 (1983).

18. Martin, R.B., supra, note 10, at 84.

19. Id., at 86.

20. Id., at 90.

21. Id., at 93.

22. Child & White, "The Marketing of Elephants and Field-dressed Elephant Products in Zimbabwe", Pachyderm No. 10 (January 1988).

23. Barbier, supra.

24. Martin suggests that currency exchange restrictions inflate raw ivory prices in Zimbabwe. Martin,E.B. (1984), "Zimbabwe's Ivory Carving Industry", Traffic Bulletin, vol. 6(2), p. 33. It is also worth noting that, of the above states, Chad, the Central African Republic, and Zaire have been singled out as the primary producers of raw ivory in Africa in the mid-80s. Caldwell,J., "Current Trends in Ivory Trade & Prices", Lusaka Report (1988).

25. The phrase originated in Berle & Means, supra.

26. The rents from production may be appropriated at any "level" (producer, wholesaler, retailer, etc.) within an "industry". Since the "flow of production" must pass each point, all that is necessary is to acquire control over any one level of the industry in order to acquire the flow of rents. In fact, if any single level is monopolised, it is then desirable from the monopolist's viewpoint to maintain competition at the other levels. See Vernon & Graham, "Profitability and Monopolisation by Vertical Integration", Journal of Political Economy (1971).

27. It is probably the case that a group of foreign traders in Hong Kong have been able to monopolise and appropriate rents via "special connections with African dealers", as claimed by Mr.

Wang of the Compagnie Franco-Chinoise de Commerce a/k/a The Asia-Africa Trading Company. See "The Ivory Crisis", Asiaweek 5 August 1988, at p.38.

28. Consistent with this hypothesis is the reported "stockpiling" of raw ivory by the ivory traders. This would be a necessary adjunct to rent creation at the "second tier" of an industry, as the competitive level of production would exceed the monopolist's desired rate of supply.

29. See Africa Wildlife Laws, note 2, supra.

30. This theory originated in Ross,S. "The Economic Theory of Agency: The Principal's Problem", American Economic Review vol. 63, p. 134 (1973). It holds that there are "agency costs" to the accomplishment of any individual's objective by means of the delegation of responsibility to another individual; this is simply because the two individuals' objectives are likely to diverge at many points. Hence, it is necessary to "monitor" the actions of the "agent" to provide disincentives to "shirking behaviour", or to provide incentives to the agent in the form of partial "ownership". See also Riley and Zeckhauser, Principals and Agents: The Structure of Business, Harvard Business School Press (1985).

31. See Grossman & Hart, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", Journal of Political Economy, vol. 94(4), p. 691. For example, Grossman & Hart demonstrate that local asset ownership in the insurance industry corresponds to the importance of local representative's on-going investments; that is, if an insurance representative sells one-shot (e.g. life) insurance policies then this representative is likely (88%) to be an employee of the company, but if the representative sells on-going renewable policies (e.g. property insurance) then it is likely (65%) that the agent is "independent". In essence, insurance companies have had to devise different schemes to control "agency costs" for different types of assets.

32. The "optimal" solution might be to hire waged "scouts" mainly from "local" people, hence providing wages tied to the preservation of the species.

33. See, e.g., Cummings, Pachyderm, (1986).

34. One estimate places 81% of worked ivory consumption in the E.E.C., U.S.A. and Japan. Caldwell, "Current Trends in Ivory Trade and Prices - Patterns of Demand and Consumption", Lusaka Report (1988).

35. See Gillis, Perkins, Roemer, and Snodgrass, Economics of Development, Norton and Co., London (1983).

36. A substantial number of "conservationist" organisations argue that the use of animal-derived products is immoral. These groups have argued for a "ban" on the trade in ivory for many years. See Redmond, "The Ivory Divide", BBC Wildlife, May 1989.

37. The economics of crime was initially theorized in Becker, "Crime and Punishment: An Economic Approach", Journal of Political Economy vol. 76(2), p. 169 (1968). In this article, Becker showed that individuals will balance the probability of detection and the ensuing penalty against the gain from violating the law. In essence, no law is enforced simply by enactment; monitoring and penalisation are (usually) necessary elements of an effective law. See Also Pyle, The Economics of Crime and Law Enforcement (1983).

38. Ivory quotas are satisfied substantially from confiscated ivory. See AERSG Report, n. 1, supra, at 5.

39. This is not intended to imply that, in every case, African states are encouraging the harvesting of ivory; although, in individual cases there are reports of high level involvement in encouraging the trade. See, e.g., New African, November 1988, p.37 (alleged letter of President Barre of Somalia authorizing the taking of Kenyan elephants). The failure to institute adequate enforcement measures, however, indicates a certain lack of resolve; clear intent to ban the industry could be represented by an unwillingness to trade in seized ivory.

40. African Elephant and Rhinoceros Specialist Group, "A Strategy for Conserving the African Elephant", 1988 ("The impracticality of saving all elephants under threat requires that a minimum set of selected populations be identified to conserve the essence of the species...").

41. There are now only small populations of black rhinoceros located in Zimbabwe (approximately 3000), and almost no white rhinoceros remaining.

42. Studies have demonstrated that implicit discount rates pertaining to consumption and investment in Africa are very high, resulting in little incentive to invest.

43. Lyster, S., International Wildlife Law, Grotius (1985). For example, there are specific international conventions pertaining to the following "international" wildlife: whales, seals, polar bears, antartic marine living resources and waterfowl.

44. Articles III-V, The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Mar. 3, 1973, U.S.T. 1087, T.I.A.S. No. 8249.

45. Id., Art. VII(6)-(7).

46. Id., Art. III(3)(c).

47. Fifth Meeting of the Conference of the Parties, "Definition of 'Primarily Commercial Purposes'", Resolution 5.10 (1985).

48. CITES, supra, note 44, at Art. IV(4).

49. See, Wijnstekers, supra, note 2, at note 37.

50. Martin, Caldwell and Barzdo, African Elephants, CITES and the Ivory Trade, Report to the CITES Secretariat (1986).

51. The general guidelines for the implementation of the CITES management quota system were reported in a CITES Secretariat Manual. Ivory Trade Control Procedures, (Nov. 1985).

52. All data derived from the CITES Secretariat reports, except the 1989 quota submissions. See CITES Secretariat, Ivory Notification No. 26, 28 June 1988. Also U.S. Fed. Reg., vol. 54, No. 52, p. 11449, 20 March 1989.

53. The management system to be implemented by the range states was incorporated within the quota submission forms (Forms Q1 and Q2) included within the Secretariat's guidelines. See Ivory Trade Control Procedures, Annex 3 and 4.

54. AERSG, supra, note 4, at 5-6. ("In one country, where there is no policy to cull, crop or control elephants, large numbers in each of these categories have been entered.")

55. Id. ("This year the quota is for 18,000 tusks, of which about 7,000 will arise from elephants dying in the quota year, 2,000 are current stocks and 9,000 will be confiscated during the year. This implies that poaching can not be prevented.")

56. CITES Secretariat, supra, n. 52, at p. 3.

57. Martin, R., supra, n. 50, at 36.

58. As mentioned previously, perhaps 80% or more of worked ivory if finally consumed in the three points of major international purchasing power: the U.S., the E.E.C. and Japan. See Caldwell, supra, n. 34.

59. This is the essence of the strategy being employed by one major ivory trader, Mr. Poon of Hong Kong, who thereby claims that all of his operations are "legal". See Asiaweek, supra, at 39.

60. Parker, I.S.C., The Raw Ivory Trade, 1979-1987, Report to the CITES Secretariat (1989). Parker cites Sudan, Tanzania and Uganda as range states which, according to the statistical evidence, probably provided CITES permits for illegal ivory stockpiles in Burundi.

61. Id., at p. 122.

62. This is known as the "Lemons Market" result in the economics literature. That is, the inability to correctly observe and penalise poor performance in a system generates an equilibrium in which good performances go relatively unrewarded and hence disappear. See Akerlof, G., "The Market for Lemons", Quarterly Journal of Economics vol. 90(4), p. 629 (1976).

63. As Asiaweek discovered in discussing this issue with the chairman of the Jebel Ali Free Zone, such "free ports" attract revenue flows by refusing to regulate trade: "I think that this is one of the best places with the least red tape...", said Sultan bin Sulayem. See Asiaweek, supra, at 39.

64. The identity of the "entrepot" in the ivory trade has changed frequently in the past decade; all of the following, according to numerous reports, have played a major role at one time or another: Belgium, Hong Kong, Singapore, Macau, Dubai, Burundi, Taiwan. None of them is an "obviously necessary" link in the ivory trade.

65. The "letter from President Barre" does exactly this. According to the New African (supra, n. 40), President Barre "authorised two Somalis to kill Kenyan elephants and bring the ivory back to Somalia."

66. Part I.B of this paper provides a complete discussion of these issues.

67. Id.

68. Profit maximisation from the resource would imply that range states would restrict current harvests for two reasons: 1) to exploit price inelasticities; and 2) to create greater stocks of the resource. The latter possibility depends critically on the regeneration rate of the resource and the time discounts involved. See Clark,C., supra, n. 9.

69. This is a variant of the incentive system known as "the Prisoners' Dilemma". In this situation neither party is able to observe the performance of the other, but if both "don't cheat" then they receive the highest possible joint return; however, if one party "does cheat" while the other doesn't, then the "cheater" does a little better than the jointly optimal outcome while the "non-cheater" does a lot worse. Faced with this sort

of incentive system, and the inability to observe the other party, it is expected that all parties will become "cheaters".

70. There is a substantial literature dealing with the issue of international agreements on the limitation of strategic nuclear weaponry. This literature generally supports the necessity of "verification" procedures for implementation of an international arms agreement. See, e.g., Brams and Kilgour, Game Theory and National Security, Basil Blackwell (1988).

71. See Birnie,P., The International Regulation of Whaling, at page 199. ("No advantage accrued to states that stringently imposed the restrictions if other states did not do so. The purpose of the convention, i.e. to ensure parity of sacrifice by equality of regulation, was thus vitiated for many years, until agreement to introduce international observors could be reached.")

72. Id., at 202. The international observor scheme implemented under the auspices of the International Whaling Commission was initially adopted in London in 1963, but required ten years to develop a system to which the whaling states would acquiesce.

73. This is analogous to the discussion of the various means by which "pollutants" may be restricted: standards, charges, auctions. The point is that it is possible to restrict activity in less obtrusive ways than direct monitoring of internal actions. See Pearce,D., Environmental Economics, Longman, 1976, chapter 5.

74. For example, many states' access to crude petroleum reserves (and many other "international commodities") is restricted by their ability to obtain U.S. dollars, an instrument controlled by agencies of the U.S. government. The enforced limits on the availability of the currency provides the instrument which effectively rations these commodities amongst the world's consumer states.

75. See Ehrlich, "Risk Aversion and the Choice of Criminal Activity", Journal of Law and Economics (1973). The unwillingness to "risk" incurring a penalty, although (if paid) the activity would still generate a good return, deters many potential smugglers from the activity. Traders with a reputation at risk, or who have a small involvement in the ivory trade, are unlikely to continue after prohibition; others, without these traits, are less concerned about the illegality.

76. Manning, P.K., The Narc's Game, MIT Press (1980) (U.S. budget for drug enforcement was $786 million in 1976); Greenwood, P., Firearms Control, Routledge & Kegan Paul, London (1972) (the number of confiscated firearms remained constant between 1946 and 1969, "indicating that the source is by no means drying up").

77. Bhagwati, J.N.,(ed.), Illegal Transactions in International Trade, North-Holland (1974).

78. Cooper, R.N., "Tariffs and Smuggling in Indonesia", in Bhagwati, supra, at 183. Cooper's excellent analysis plots the Indonesian market price (as a percentage of foreign market price) against Indonesian tariff protection, and finds a decreasing positive correlation. In fact he finds that "increases in tariffs above 258% will result (on average) in an actual reduction of market price". Id., at 189.

79. Two points: 1) less developed countries have less developed customs institutions which display a more marked incapacity to control smuggling. See, e.g., Naya and Morgan, "The Accuracy of International Trade Data" in Bhagwati, supra, n. 77, at 123. 2) Many studies have charted the ineffectiveness of international "bans" on trade in general. See, e.g., Doxey, M., Economic Sanctions and International Enforcement, Royal Institute of International Affairs (1980); Kuyper, P.J., The Implementation of International Sanctions: The Netherlands and Rhodesia, Sijthoff, (1978); Hufbauer,G. and Schott,J., Economic Sanctions Reconsidered, Institute for International Economics (1985). These case studies all develop the themes of evasion, opportunism and smuggling in the undermining of economic boycotts in several states: Italy (Mussolini), Rhodesia, Israel, COMECON, South Africa.

80. The issue of the proper construction of the Scientific and Technical Committees for these purposes has already been the subject of some debate. See Holt and Gulland articles debating the matter in the 1982 issues of Marine Policy.

81. The "designated monitoring centres" must be determined by a balancing of the costs of additional monitoring with the benefits of reduced trade in non-monitored states.

82. A study recently performed by the U.S. Fish and Wildlife Service revealed that less that 1% of "declared" wildlife products were nonconforming with their accompanying documentation. Sutton, M., Report on the Analysis of Imports, 30 March 1989.

83. The U.S. has recently enacted its own "piecewise bans" against nonconforming range states and traders. African Elephant Conservation Act, P.L. 100-478, 7 Oct 1988. The E.E.C. has recently adopted a similar directive, for implementation in 1990.

84. Barbier, supra.

85. Martin, R.B., African Elephants, CITES and the Ivory Trade, at Appendix 13 (the "Ivory Producers Export Cartel").

REFERENCES

African Elephant and Rhinoceros Specialists Group (1987), Elephant Populations Estimates, Trends, Ivory Quotas and Harvests [Report to the CITES Secretariat].

African Elephant and Rhinoceros Specialists Group, "A Strategy for Conserving the African Elephant", (1988).

Akerlof, G., "The Market for Lemons", Quarterly Journal of Economics vol. 90(4), p. 629 (1976).

Asiaweek, "The Ivory Crisis", 5 August 1988, at p.38.

Barbier, E., "Explaining the Demand for Unworked Ivory in Importing Countries - Japan", Ivory Trade Review Group Working Paper.

Baumol, W. & Oates, W., The Theory of Environmental Policy, Prentice Hall (1975).

Becker, "Crime and Punishment: An Economic Approach", Journal of Political Economy vol. 76(2), p. 169 (1968).

Berle & Means, The Separation of Ownership and Control in the Corporation, (1937).

Bhagwati, J.N.,(ed.), Illegal Transactions in International Trade, North-Holland (1974).

Birnie,P., The International Regulation of Whaling, London (1982).

Brams and Kilgour, Game Theory and National Security, Basil Blackwell (1988).

Caldwell,J., "Current Trends in Ivory Trade & Prices", Lusaka Report (1988).

Child & White, "The Marketing of Elephants and Field-dressed Elephant Products in Zimbabwe", Pachyderm No. 10 (January 1988).

CITES Secretariat, Ivory Notification No. 26, 28 June 1988.

CITES Secretariat, Ivory Trade Control Procedures, (Nov. 1985).

Clark, C., "The Economics of Overexploitation", Science, 17 August 1973.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Mar. 3, 1973, U.S.T. 1087, T.I.A.S. No. 8249.

Cooper, R.N., "Tariffs and Smuggling in Indonesia", in Bhagwati (ed.), 1974.

Dasgupta,P. & Heal,G., Economic Theory and Exhaustible Resources, Cambridge (1979).

Dasgupta,P., The Control of Resources, Basil Blackwell (1982).

Doxey, M., Economic Sanctions and International Enforcement, Royal Institute of International Affairs (1980).

Ehrlich, "Risk Aversion and the Choice of Criminal Activity", Journal of Law and Economics (1973).

Fama & Jensen, "Separation of Ownership and Control", Journal of Law and Economics, vol. 26, p. 301 (1983).

Fifth Meeting of the Conference of the Parties (CITES), "Definition of 'Primarily Commercial Purposes'", Resolution 5.10 (1985).

Gillis, Perkins, Roemer, and Snodgrass, Economics of Development, Norton and Co., London (1983).

Greenwood, P., Firearms Control, Routledge & Kegan Paul, London (1972).

Grossman & Hart, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration", Journal of Political Economy, vol. 94(4), p. 691.

Hufbauer,G. and Schott,J., Economic Sanctions Reconsidered, Institute for International Economics (1985).

IUCN Environmental Law Centre, African Wildlife Laws, IUCN Environmental Policy and Discussion Paper No. 3.

Kuyper, P.J., The Implementation of International Sanctions: The Netherlands and Rhodesia, Sijthoff, (1978)

Lyster, S., International Wildlife Law, Grotius (1985).

Manning, P.K., The Narc's Game, MIT Press (1980).

Martin,E.B. (1984), "Zimbabwe's Ivory Carving Industry", Traffic Bulletin, vol. 6(2).

Martin, E.B., "China's Ivory Carving Industry", Traffic Bulletin, vol. 10, no. 1.

Martin, R.B., Establishment of African Ivory Export Quotas and Associated Control Procedures, Report to the CITES Secretariat, 1 August 1985.

New African, November 1988, p.37

Martin, Caldwell and Barzdo, African Elephants, CITES and the Ivory Trade, Report to the CITES Secretariat (1986).

Naya and Morgan, "The Accuracy of International Trade Data" in Bhagwati,

New York Times, "Two-Legged Rogues Are on the Run", 11 February 1989.

Parker, I.S.C., The Raw Ivory Trade, 1979-1987, Report to the CITES Secretariat (1989).

Pearce,D., Environmental Economics, Longman, 1976.

Pearce, Luxmoore & Pearce, "The Value of Ivory Exports to Africa 1979 - 1987", Ivory Trade Review Group Working Paper 89-06.

Pearce & Pearce, "Aggregate African Ivory Exports 1950 to 1987", Ivory Trade Review Group Working Paper 89-08.

Pyle, The Economics of Crime and Law Enforcement (1983).

Redmond, "The Ivory Divide", BBC Wildlife, May 1989.

Report from the African Elephant Workshop, Lusaka, Zambia, 10-11 April 1988 (hereinafter "the Lusaka Report").

Riley and Zeckhauser, Principals and Agents: The Structure of Business, Harvard Business School Press (1985).

Ross,S. "The Economic Theory of Agency: The Principal's Problem", American Economic Review vol. 63, p. 134 (1973).

Solow, R., "Resource Economics or Economic Resources", in Dorfman (ed.) Readings in Environmental Economics, 2d ed. (1977).

Sutton, M., Report on the Analysis of Imports, 30 March 1989.

Ulen & Cooter, Law & Economics, Scott, Foresman & Co. (1989).

U.S. Fed. Reg., vol. 54, No. 52, p. 11449, 20 March 1989.

U.S. Public Laws, African Elephant Conservation Act, P.L. 100-478, 7 Oct 1988.

Vernon & Graham, "Profitability and Monopolisation by Vertical Integration", Journal of Political Economy (1971).

Wijnstekers, W. (1988), The Evolution of CITES, Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Lausanne.

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