Editors' Introduction

The Terracotta vs. Green Vision: Restructuring Incentives vs. Reforming Human Nature

> What is common to many is taken least care of, for all men have greater regard for what is their own than what they possess in common with others.
>
> — *Aristotle*

'The tragedy of the commons' is a modern statement of the insight captured by Aristotle. Any arrangement where benefits accrue to one or a few but the costs are borne by many or all is a recipe for disaster. That is exactly what has happened with our environmental resources of *jal* (water), *sthal* (land), *van* (forests), and *pavan* (air). Fundamentally there are two ways to deal with this tragedy: change attitudes or change incentives.

The green movement aims at changing the attitude of humanity to preserve the environment. This book builds a terracotta movement that focuses on changing incentives to manage the environment. Terracotta means 'burnt earth,' and refers to earthenware made from this material. It is the creation of human action *on* a natural resource: terracotta products are *consumption* items, and a means of livelihood for those who *produce* them. So terracotta symbolises the philosophy that values natural resources not for their mere existence, but recognises the relationship between human beings and environment around them. The greens consider only the biosphere, the green part of the planet, and overlook the terra that supports life on the planet. They worship ecology without humans; we cherish all life, including human life.[1] Theirs is a heroic mission to change human nature, ours is a human endeavour to create a better world by restructuring incentives.

When industrialists pollute, poachers kill endangered species, fishermen grab the smallest fish, forest officers allow illegal felling, when you shower instead of bathing with a bucket, the greens suggest that the only sustainable solution is to change the attitude of industrialists, poachers, fishermen, forest officers and you. How does one change attitude? Increase awareness, raise consciousness, educate, ostracise, cajole. But humans are stubborn and relish the affluence that apparently harms the environment. A stick must go with the carrot: regulate, proscribe, prosecute, penalise. The battle to save the environment has to be perpetual because the enemy is us. It must continue until we completely change our attitude, our nature, or cease to exist.

The enemy is us, not because our nature is to pollute, poach, grab, consume, overuse, but because the incentives are perverse. Change the incentives and the outcomes will change. How does one change incentives? Reconfigure the structure of accountability—institutions and rules—so that those who benefit also pay the costs. The primary means of injecting accountability is to revise the pattern of ownership of natural resources. When that is not feasible, design use rules so that users pay the price for the use of the resource. These use rules are generally referred to as market-based instruments.

Structures of Resource Ownership

Three basic structures of resource ownerships exist: Individual or family; community; and collective or national or international. In short, individual, community, and collective ownership. The nature and workings of individual or private property rights are generally known. Garret Hardin who coined the phrase ‘the tragedy of the commons,’ used the example of a common village pasture for illustration. He reasoned that each cattle owner in the village has incentive to allow his cattle to overgraze since the benefits of overgrazing accrue to him while the costs are borne by all cattle owners in the village. Each one thinks that if he limits grazing of his cattle, there is no assurance that others will also do so. This cost-benefit calculus leads to a situation where all cattle overgraze the common pasture, the grass runs out before the next monsoon, and some cattle die—the tragedy of the commons.

To mend the tragedy, two methods are suggested: one, divide the common pasture into individual plots and give one to each cattle owner, or vest the ownership in an organised collective body, generally the government. The solution is to either privatise or nationalise the pasture. Each private owner would then have an incentive to limit grazing so that he does not run out of grass. With collective ownership, the government would design and enforce rules for the use of the pasture so that the grass would last until the next monsoon.

The Tragedy of the Collective

By all accounts, state ownership and management, commonly referred to as the command and control approach, has singularly failed in managing the use or in the preservation of natural resources. Instances of government failures in management of natural resources abound: in a famous study of grassland degradation in Central Asia, satellite images showed marked degradation in the grasslands of southern Siberia where the former Soviet Union had imposed state-owned agricultural collectives, while grasslands in Mongolia, which had allowed pastoralists to continue their traditional, self-organised group property regime, were in much better condition.

The reason for this state failure is precisely the one that Hardin gave for the tragedy of the commons. The benefits of the resource accrue largely to the functionaries of the state but the costs are borne by all citizens. The nationalisation solution had assumed that the interests of government officers and those of the people are the same. That government officers would behave as if the costs and benefits were born equally by all citizens, including themselves. That the forest guard would protect tigers as if they were his. Alas, that is not the case—"all men have greater regard for what is their own than what they possess in common with others."

Given the dismal failure of state ownership, it seems that the only option left is privatisation of the commons. General apprehensions about private property and markets prevent the greens from advocating privatisation as a solution. They instead demand more elaborate and detailed regulations, stricter enforcement with more money and machinery, and novel ways to shame people for their materialism and consumerism. These, they seem to assume, would ultimately change the attitude.

However, the greens are mistaken on both counts: one, a far more forceful state apparatus of the former Soviet Union or of current Cuba has failed to change human nature; and two, privatisation is not the *only* solution, community commons are equally workable. As Elinor Ostrom (Chapter 7) has theorised and documented, the commons function efficiently in a framework of institutions and rules that are incentive-compatible.

Before the advent of the modern, Weberian governments, most of the natural resources were well managed by local communities. Access to a common resource—village pastures for cattle grazing, forests for fruits and fuelwood, wild animals for hunting, river water for agricultural use—was controlled by norms and customs, either articulate or inarticulate. Ever increasing demand for these resources due to growing population, accelerating economic development, and improving technologies began to put pressure on the informal norms and customs that managed the use of these resources. Unfortunately instead of building on the informal arrangements that had worked well, a completely new method was adopted. The state took over the ownership and management of common resources. The genuine tragedy is the nationalisation of the commons.

For incentive-compatibility, the community should be exactly identified, its area of ownership should be clearly demarcated, and it should have a legally enforceable long-term if not perpetual right. Mutual understanding between user communities and governments is not enough: the transfer must be statutory. This is illustrated well by the degradation of the forests in the northeastern parts of India that are apparently community managed (Chapter 9). Many have used this example to argue against the possibility of community management of the commons. Elected District Councils of various tribes in the region control access to forests and not the government forest department. How can one explain severe degradation of forests that are managed by District Councils? It is the difference between vesting rights in *political representatives* of users (District Councils) and in the resource *users themselves*. Political representative bodies suffer from the tragedy of the collective, even at the lower level of administration. They are not incentive-compatible institutions. The rights must be vested with user groups.

The facts of successful community management of the commons and of the failure of state ownership suggest that the famous phrase of Hardin be revised—from 'the tragedy of the commons' to 'the tragedy of the collective.' It is indeed the tragedy of collective ownership, a situation where resources belong to everyone but are cared for by none or a few. In this situation, the accountability structure, the cost-benefit calculus fails to reconcile the interests of state functionaries with those of the people. The interests of the managers and owners are not harmonised.[2] On the other hand, flourishing commons have existed in the past and also exist today. It is in fact the tragedy of the 'collective' and not of the 'commons.'

Towards Solutions through Incentives

One of the most effective ways to right the incentives is to change the structure of resource ownership. The basic direction of this change should be away from collective ownership towards individual and community ownership. Private ownership refers to both the individual and community ownership. But for sake of clarity we use privatisation to describe the shift towards individual or family ownership and communitsation for the correction towards community ownership.

Land exemplifies the gradual evolution from collective to community and finally to individual ownership. Land as land, not as forests or mountains, is largely privately owned. China, which had *de facto* private ownership of land since 1978, has recently amended its constitution to recognise that legally. This transition of land ownership, according to new resource economics (Chapter 5), has been in the right direction. And our experience of generally superior private management of land suggests that the change of ownership structure has been beneficial.

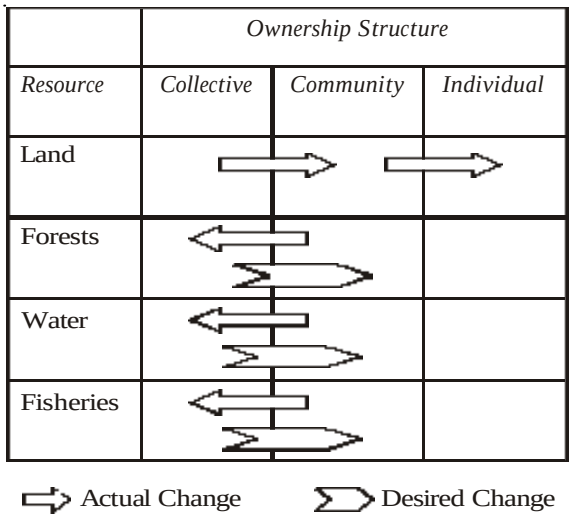
In case of forests and water, however, the shift has been in the opposite direction—from community to collective ownership. The almost universal nationalisation of these resources has led to the tragedy of the collective, as predicted by new resource economics. People predict that water would be the cause of the next world war. The best way to avoid such tragedies is to put forests and water back in the hands of communities (Chapters 9 and 13).

The rural and tribal communities whose historical claim on these resources has been expropriated through nationalisation have also lost

the most remunerative resources for their livelihood. In every country, they are the poorest communities. Governments, national and international, are doing everything to help them except to give them back their water and forests.

As the CAMPFIRE programme of Zimbabwe and Nepal's Community Forestry experiment indicate, community ownership solves two problems simultaneously: better management of natural resources and wildlife and provision of dignified livelihood to the poorest communities. With the ownership natural resources, they will be able build their own future according to their values, customs, and traditions.

Changing Resource Ownership Structures



Air, however, has always been a collective resource. At this level of knowledge and technology it is hard to imagine any change in its ownership. Nonetheless it is important that the air is not left as an open access commons. Market-based instruments (MBIs) are an attempt to put a price on the use of air. Many experiments in MBIs in as diverse environments as of the European Union, United States, and China have been relatively successful.

Experiences the world over have made it amply clear that resources in the hands of private parties—be that of individuals, communities, or corporations—are better managed than in the hands

of governments. Who should be entrusted with these resources depends upon the type of resources, circumstances, and local customs and traditions. For resources that have generally been in the commons, like water and forests, the best stewards are the local communities who have been managing those commons historically. Entrusting these resources to any other entity would mean keeping the communities out forcefully—by guns and guards. Whether these guns and guards are employed by governments or by private corporations, they would not able to withstand the battles for survival by the communities. Neither corporatisation, nor collectivisation is a solution.

In addition to all the utilitarian or efficiency arguments, it must be remembered that local communities have a prior claim—a moral claim—on these resources. They have been using the resource for generations and centuries. It is on the premise of prior use that all resources have been settled in any civilised society. The privately owned land today was at some point in time a forest. Some cleared the forests for agricultural, residential or commercial use and they received property title to the cleared land. But some people did not clear the forests and lived in them. These forest dwellers are now refused the same process of land titling that we enjoyed. The people who kept the forests intact are being penalised for not clear-cutting them in the past as we did! It is gross injustice not to recognise the rights of forest dwellers. The most efficient as well as moral resolution is to take our forests from the foresters and put them in the hands of forest dwellers.

For these new ownership arrangements to work properly—for them to be incentive-compatible—reliance on the common law of torts and negligence and an efficient judiciary is inescapable (Chapter 4). State regulators simply cannot foresee all contingencies and craft regulations to deal with them. The common law of torts is better suited to accommodate uncertainties of real life. The Bhopal Gas tragedy clearly shows the superiority of the law of torts approach in dealing with aftermaths of calamities. The day after the Bhopal carnage, many lawyers flew in from the US to sign up victims for lawsuits against Union Carbide in American courts. The lawyers came because of two characteristics of the American judicial system: contingency fee and the tort laws of strict liability (far stricter than

what exists in India). To protect Bhopal victims from 'exploitation' by American lawyers, the government of India decided to file the case itself on behalf of all the victims by invoking the *parens patriae* principle, that is, seeking to represent the victims as a 'parent.' Judge John Keenan (District Judge of the Southern District of New York) used the *forum non-conveniens* and asked the Indian government to be the 'parent' in Indian court. The rest is history.

Community Ownership to Private Ownership?

Many suspect that community ownership of water and forests will be just a first step towards their complete privatisation. We don't think so, for three reasons. First, the distinction between ownership and use of the resource is important. Community owned water could be delivered to households, farms, or factories through private for-profit companies or non-profit user associations. We argue that competition in delivery is necessary for the resource owners to earn a fair price as well as for efficient use of the resource (Chapter 13).

Second, the nature of the resource determines what type of ownership structure is efficient. In case of water, riparian and prior appropriation rights are generally individual rights. This option of individual ownership is however unlikely to be available for forests, if for no other reason than the route we advocate for their transfer from the hands of the state into the hands of user communities. The government should identify user communities and transfer, not sell, the forests to them. Once a community of users owns forests then it's hard to imagine their wholesale transfer into individual or corporate hands. Dividing the forests into separate parcels would destroy their essential character. Thus the nature and characteristics of each resource decides the appropriate structure of ownership and its evolution.

We rule out the option of auctioning the forests or water bodies to highest bidders. Auctioning is completely unjust. The example of the government of the state of Chattisgarh in central India is often cited to point to the future state of natural resources. The government leased out a stretch of a river to a private company, denying people living on the banks of the river the use of the water without permission and payment. This is theft, not privatisation. Natural resources such as forests and water bodies belong to the communities

who have been using and managing them historically. The state does not own them. The government has no right to auction them. The resources should be given back to user communities.

Third, the institutional framework and constraints and evolutionary processes are different in the two situations: one, where natural resources has never left the hands of the communities, and two, where the resources are first nationalised and later transferred to communities. It would surely be instructive to construct a conjectural history of how ownership and management would have evolved if the resources were never nationalised. We may be tempted to mimic that trajectory as historically correct, but it is unrealistic to expect to replicate that process now. The shift from collective to community ownership today would not be without some extra restrictions on the rights of new owners. It would most likely require that large parts of forests couldn't be converted to altogether a different use, including stipulations about some minimum levels of diversity and quality of flora and fauna that must be maintained.[3] The new owner communities are unlikely to have much option but to accept the limitations. These restrictions would surely result in a different evolutionary trajectory. One cannot undo history.

Nonetheless, the future of natural resources under community ownership would be far more preferable to the one that would emerge under continued collective ownership. This would be true even if tighter rules and stricter enforcements were brought to bear. The best way to manage the environment is to communitise natural resources, to avoid the tragedy of the collective. The change from collective to community ownership restructures the incentives for proper management.

Plan *versus* Process

The incentive model discussed here could be understood from a different perspective: Plan versus Process. It is humanly impossible to plan an ecology or an economy—the amount of information necessary, the system of accountability and incentives for the enforcers of the Plan with corrective feedback mechanisms, and the managerial prowess required to make all people of the country accept and carry out the Plan simply can't be mustered. What should be done is to put institutions and processes in place that enable the people on the spot

to marshal the information and to have the incentives to make right decisions to deal with the problems as they encounter or foresee them. It is not the Final Decision, even if decided upon by the best minds of the time, but the process of decision-making that is critical to solving problems consistently and comprehensively. The most fundamental question is not what decision to make but who is to make it—through what processes and under what incentives and constraints, and most importantly, with what feedback mechanisms to correct the decision if it were to turn out to be ineffective.

As Ludwig von Mises and F A Hayek have demonstrated, centralised structures are comparatively inefficient in gathering and processing information and in generating right incentives for implementation and improvisation. Moreover, the order that is observed in the universe, or ecology, or economy is not the result of any human plan. It is generated through characteristic behaviour of the individual constituents—galaxies and stars, flora and fauna, and consumers and producers—within a framework of laws, rules, norms, and customs. The order emerges through the process; it is not ordained from outside.

The Nature Conservancy exemplifies the distinction between plan and the process approach in the arena of conservation. Instead of one conservation master plan for the country, the Nature Conservancy, a private association of concerned people purchases lands that have significant ecological value. They manage the land so as to protect the endangered species or provide a nurturing habitat to several sensitive species. The Nature Conservancy preserves over 92 million acres of land, both within and outside the United States, runs the largest system of private nature sanctuaries in the world, has over 20,000 wildlife species under its watch, and is running a $1 billion campaign to save 200 of the world's Last Great Places. Several such voluntary organisations would achieve far better results in a cost efficient manner, instead of one Master Plan and a giant bureaucracy.

Iceland and New Zealand's successful system of Individual Transferable Quotas in fisheries (Chapters 15 and 16) are also an example of individual property rights that have proved to be superior to all government regulations in replenishing and conserving fish stocks. Designing a right incentive and ownership structure for thousands or millions of fishermen is a more sustainable solution than relying on a single bureaucracy to manage diverse water bodies.

With the right institutions and rules, we get thousands or millions looking after the fish than a few government officers.

The success in all these areas depends on getting the process rather than the plan right.

Wilderness *versus* Wise Use: The Conflict of Two Visions

Many view the well being of forests and that of forest dwellers as two different and mutually exclusive options. This is based on a premise that the forests can be well protected only if forest using communities are excluded, and that the needs of the forest-dependent communities can be met only if the society is ready to suffer the loss of forests. One must choose between these two alternatives. This mindset is shared not only by the forest administration and the 'greens' but also by many who have the interests of native communities foremost on their minds. The champions have come to believe that under the pressures of modern culture and corporations, local communities would ultimately degrade and destroy the forests and the forests have to be 'protected' from them and the best protection can be ensured by the right and tight control of the state.

This is the Western vision of wilderness. It is in conflict with the vision of wise use. One views humans as outsiders in the natural ecosystem and the other as integral to the ecosystem. It is the green vision versus the terracotta vision.

I=PAT or 1/PAT?

The green credo has been formalised into a mathematical identity, which Garrett Hardin has called the 'third law of ecology': The IPAT equation. $I = P \times A \times T$, where I denotes man's impact on the environment, P is population, A is affluence, and T is technology. All else equal, any increase in population, production/consumption, or improvement in technology, the law suggests, *must result* in greater environmental degradation and greater pressure on finite natural resources. Sustainability, therefore, requires that all three factors, population, economic growth and technological change, should either be slowed down or are altogether halted.

Not surprisingly, the terracotta vision is exactly the opposite. As Julian Simon has demonstrated with a tremendous amount of

historical data, population is the 'ultimate resource' (Chapter 2). Each child is born with a stomach that needs to be fed, but the same child has two hands and most importantly a mind. If the economic and political system allows the child to use them fully, she will produce more than her needs. So the problem is not population but the system of liberty or lack of it. He shows that energy and resources are infinite—the only limit is our imagination and ingenuity. As we face shortage of a resource, the price of the resource rises, and this signals to all entrepreneurs that profits await for those who discover a substitute or a better method of production (Chapters 20 and 22). At the time of Industrial Revolution, charcoal was the main source of energy. The forests of England were clear cut and burnt for charcoal. As fewer and fewer trees were left, the price of charcoal rose. 'Greedy businessmen' began the search and found coal under the ground. The coal replaced charcoal; the forests of England came back up. There is a lot of coal left in England but no one mines it since petroleum is even better. Fuel cells are being developed, which run on hydrogen that comes from water! The Sheikhs of Arabia would one day be sitting on oil that no one would want.

Put the (inflation-adjusted, real) price of natural resources against time for last two hundred years or so for which we have the data, the unmistakable trend is downward. Despite Malthusian geometric increase in population and Galbraithian 'conspicuous consumption,' prices of natural resources are falling. The price that has been continuously rising is that of human labour. Human labour is scarcer than any other natural resource. Our numbers are still not large enough to result in excess supply.

Human ingenuity is exercised through technology. Watch 'Modern Marvels' on the Discovery channel to get a glimpse of what technology has accomplished to improve human life as well as the environment. Despite this consistent historical track record, the greens view technology as an accident but calamity as certainty. They use the precautionary principle as an incantation to stymie technological progress (Chapter 17). No one can guarantee that we would not face any resource problems in the future, but all the historical evidence suggests optimism.

Growth in population has not increased scarcity of natural resources and technology's track record leads to optimism about the

future, even if one wants to be cautious. The third variable in the IPAT equation, 'affluence,' can be measured by gross domestic product or better by the Human Development Index of the UN. By any account, an average person in the world today lives longer, is better fed, clothed, and sheltered than at any other time in human history (Chapter 1). Interestingly, those with affluence and those without affluence have a rather different conception of 'the environment.' Those without affluence think of environment as sanitation, potable, may be running water, food storage in hot and humid weather, a smoke-free kitchen. Those with affluence think of global warming, endangered species, Amazon forests, organic food. The level of affluence affects environmental priorities. That is to be expected. What is unacceptable is to raise the concerns of the affluent so high that those of the non-affluent cannot even be discussed; they get dismissed as materialism and consumerism. International agencies and NGOs take pride in dealing with the environmental concerns of the affluent but become prudish in promoting development to address the concerns of the poor. This is the worst form of imperialism the poor have ever suffered (Chapter 25).

Imperialism of the Affluent: Green versus Brown Oustees

Internationally, environmental concerns of the developed North supersede those of the developing South. The same phenomenon plays out nationally where demands of the urban educated class dominate those of the poor rural inhabitants. For a city dweller, the endangered specie is the tiger, for a villager it is he who is endangered. Urbanites campaign for forest and species protection but the costs of protection are imposed on forest dwellers. They are forced to vacate the area that is declared as a national park or a sanctuary. Their displacement however is rarely highlighted. We hardly ever see NGOs and celebrities standing up against their evacuation. The green oustees get little sympathy or support. Brown oustees—those displaced by developmental projects like dams and roads—get all of it. This is another form of imperialism.

The terracotta vision turns the IPAT equation upside down: $I = 1/P \times A \times T$. The impact is *inversely* related to P, A, and T. Another way to consider this vision is to read 'I' not as 'impact' but as 'improvement.' Environmental improvement depends directly on P, A, and T.

In the incentive-restructure approach, as opposed to the attitude-reform approach, the impact on the environment comes from the institutions and rules about ownership and use of resources that create the tragedy of the collective. The impact depends on the proportion of resources that are collectively owned and managed (C), the ratio of resources whose use is not priced (P), the extent to which tort laws are under-utilised to determine liability and negligence (T), and the level of anti-science, anti-reason attitude (A). I=CPAT.

The principles recommended here are old wisdom: user rights and user ownership, and user responsibility for managing common services and common resources. This wisdom somehow died in recent years—historians may identify and debate the reasons—but now is the right time to recognise it. The modern disciplines of new public management, new resource economics, public choice, and new institutional economics provide further support to the old wisdom. New technologies have made it possible for people to acquire necessary information and take prudent decisions. All the ingredients for sustained development and wise use of natural resources are present; we need only the courage and foresight to bring them together.

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Notes

1. According to Hinduism and Buddhism, the cosmos consists of five elements: earth, water, air, fire and ether. Earthenware items that have been fired are called terracotta. Thus terracotta has a significant meaning in Hindu philosophy because it is made of earth, with the element of water and air and is burnt in fire.
2. A similar principal-agent problem occurs in the management of a corporation. The interests of the managers would not always mesh with those of the stockholders. Various market mechanisms exist, the threat of take-overs and mergers being one, to ensure that managers do not stray too far away from maximising shareholder value.
3. These restrictions would vary from country to country and from place to place within a country. As discussed in detail later (Chapter 9), the stipulations in the CAMPFIRE programme of Zimbabwe are different from those in the Community Forestry Programme of Nepal, which are distinct from those on the land purchased by Nature Conservancy.