Sustainable Development and Governance: Complex Processes and Unpredictable Outcomes

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Abstract

This article tries to demonstrate how the concept of sustainable development is fraught with tensions that are political and ethical in nature. In trying to implement any notion of sustainability the agenda for policy action would be quite different in different contexts. The complex set of problems to be addressed would differ considerably in countries with different levels of economic development. Similarly, on certain issues global governance is called for. In other contexts, local conditions and culture must be understood before any policy intervention can be thought of. This is the first level of complexity with which any governance mechanism for sustainability must come to terms with. Governance itself is also inherently complex. It is an unfolding of a complicated interaction between different participants such as policy-makers, the wide variety of agencies which come together in the process of implementation and the beneficiaries themselves. Policy, and its outcomes, should not be viewed as a linear process. It is argued that governance is the result of the interaction between the processes of implementation and the outcomes that are possible. Governance, in this sense, is both complex and unpredictable. Unintended consequences are more the rule than the exception. The complexity of governance is a result of the interplay of knowledge and culture in a variety of power relations. The dominant narrative of sustainability and its associated pathway may not be the only alternative available. It is important to hear out suppressed and appropriated narratives and what they imply for sustainability.

Keywords

Sustainability, governance, complexity, processes, power relations

Introduction

This article seeks to discuss the importance of sustainable development while highlighting the complex nature of the concept itself, and the different problems and priorities in different parts of the world in meeting the challenge of sustainability. There is a discussion of the complexities of governance also, in the sense of creating durable and resilient processes and outcomes that can sustain a particular pattern of development. The context is, of course, the complicated interrelationships between human beings, ecological systems and a variety of technologies through which societies leverage natural resources and amenities for improving material consumption and economic well-being. The different layers of complexity associated with sustainable development goes to illustrate the fact as to why there is so much debate about the concept itself, as well as so much difficulty and tensions in arriving at acceptable and effective solutions to the threats to sustainability.

Nature and Economic Development

The great human enterprise has always endeavoured to improve the material life of people by transforming natural resources into consumable goods and services. Economic development has long been seen as a continuous improvement in the standard of living of human beings, measured in terms of income and consumption. Conventional economics has focused almost exclusively on the metric of consumption and the utility or satisfaction emerging out of it.

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The notion of the 'good life' has been synonymous with an endless celebration of material consumption. Other human pursuits like self-realization and the ability to reconcile individual advantage with a concern for others have been overwhelmed by the rise of consumerism, especially in the post-industrial revolution era of human history.

Some societies and nations surged ahead of others in transforming the way people worked and lived. Others followed, though not always at a uniform pace and penetration. Industrial growth became equivalent to economic development. This was also the time when human activity began to create an increasing stress on the environment through the creative destruction of nature and an astonishing increase in the energy intensity of daily life. Today, some of the most economically developed countries of the world are also the leading polluters and constitute the greatest threat to the natural environment through emissions of carbon dioxide and their daily use of chemicals. Human beings are part of nature. Hence, if nature is threatened, human existence is jeopardized too. In the twenty-first century, arguably, the threat coming from anthropogenic processes of development and business-as-usual policies for sustaining any form of life on earth runs far deeper than the threats posed by political conflicts, nuclear warfare or terrorist violence.

In searching for answers that may mitigate this threat, the world has to look for solutions that ultimately transform human lifestyles (Worldwatch Institute, 2008). The problems are enormous when it comes to sustainable development. The challenges in developed economies are quite different from the challenges in developing economies. The nature of local challenges is different from the challenges that are more global. Sustainable development has to be made operational in business organizations as well as in government. Whatever may be the challenges, sustainable development has to be consensually designed, the best pathways identified, and new policies and strategies have to be implemented. All of this requires a quality of governance that is transformative. However, there are substantive and fundamental issues in sustainable development that make good governance extremely difficult and complex. Some of them are discussed in a later part of this article.

Sustainable Development: A Complex Concept

There have been a number of alternative definitions of sustainable development of which the Brundtland Commission's (United Nations, 1972) one of ensuring 'development that meets the needs of the present without compromising the ability of the future generations to meet their own needs' is undoubtedly the most familiar one. There are two important implications of this. The first issue is a moral one pertaining to the current generation's obligations to the future. The second issue revolves around the degree to which natural capital can be viably replaced by human made capital. It is worth examining each of these issues separately.

The first issue implies the desirability of an inter-temporal income and wealth distribution that ensures capabilities for the future without additionally depriving the present. This immediately leads to the conclusion that a more equal distribution of income within a generation, as well as across generations, will satisfy sustainability more than an unequal distribution of income (Heal & Kristrom, 2007). On the one hand, it is easy to argue that in situations of extreme inequality, the poor may be so desperate that they are unlikely to be able to afford to think of the future, or conserve the quality of natural resources and land, and pass them on to future generations. On the other hand, the very rich will continue to remain rich even if the current generation passes on, for instance, only half of its resources to the next generation. In both cases the overall amount of resources available to the next generation would be reduced.

If the world is to get to a more sustainable path of development a redistribution of income and wealth is required, measured in terms of access to resources. What creates a large and growing demand for resources? Income and wealth are obvious determinants. However, if an entire generation's needs are computed, the size of the generation also matters. Demography is an important dimension of sustainability (Dasgupta, 2010; Ehrlich & Ehrlich, 1990; Ehrlich & Holdren, 1971; McNicoll, 2007). For instance, the US (to take a stylized example) may demand to consume a lot of resources because it is rich and its national income is high. China's per capita income, on the other hand, is significantly lower than that of the US, yet due to the sheer size of the population, the total demand for resources turns out to be very high. If the demand for resources is to be kept in check by both the nations (given current knowledge and technology) then US must consciously cut down on its demand by inducing changes in the lifestyle of her population (use less energy for example). By the same logic China can keep her population in check. In fact both may be necessary. The United States is supposed to cut down on its *wants*, while China tries to keep her population under control to meet the *needs* of the people. Wants are usually deemed less essential than needs.

Hence, this may still involve quite substantial inequalities, apart from the tension that could arise if US pointed a finger at China saying that her population was the real cause of environmental stress on the quantity of resources. China could do exactly the opposite by insisting that it is the US lifestyle that is the central cause of environmental stress since the per capita use of resources and waste creation is unacceptably high. Sustainable development implies a distributional tension between nations (also within each nation) arising from the priorities attached to the different ways of reducing the demand for resources and consequent environmental stress.

There is another moral question that enters any discussion on sustainable development. What importance is to be attached to people who are yet unborn, unknown and unseen? Should the current generation treat them to be exactly as important as them? Or should the importance be discounted as more distant futures are considered? In other words, are all generations to be treated equally? This is a very strong ethical position that could be taken. The other approach is that the importance attached to each subsequent generation is a little less than what is attached to the previous generation.

There are nuanced philosophical debates about the choice of discount rates (Hepburn, 2007) and whether there should be any discounting at all when looking at public policy decisions pertaining to the future. That line of thought is not being pursued in this article. The purpose here is to focus on operational aspects of governance that could address some goals and solutions for creating a sustainable world.

The second feature of sustainability pertains to the possibility of substituting natural capital (Dasgupta, 2001) by human made capital. For instance, all fossil fuels currently available could be used up now, but in lieu of that exhaustion, a new technology centred around hydrogen cells is bequeathed to the next generation that may do all the energy-related work that oil, coal and their related products could do. The future generation's capability would not be affected but there would be an exhaustion of the stock of the natural resource called fossil fuels. Would this in any way reduce the capability of the future generations? The answer is most likely in the negative.

However, a lot of environmentalists and ecologists argue for what is referred to in the literature as a strong version of sustainability. This stipulates that the next generation must be bequeathed with *at least* as much 'natural capital' as the current generation inherited from the past. On the other hand, economists have been focusing on a more practical concept, referred to as the weaker version of sustainability, where the stipulation is that the current generation bequeaths *at least* as much 'total capital stock' as it inherited from the previous generation. This weaker version (Solow, 1974a, 1974b; van den Bergh, 2007) obviously permits the possibility of substituting natural capital with human made (manufactured) capital. In other words, the weaker version entails passing on a non-diminished stock of total wealth to the next generation as the critical condition underlying sustainability. In the operational sense of policy-making, each society or each organization has to ensure a non-diminishing stock of total wealth with positive investments for wealth creation (Dasgupta, 2001; Ruta & Hamilton, 2007). The total stock of capital would include natural capital (natural resources along with all the other amenities and aesthetic services nature provides) along with manufactured capital, human capital and knowledge (the entire creative output of human society) and social capital in the form of well-functioning public institutions. This is a disagreement (at a very macro level) that could influence and constrain the crafting of policy, even if all involved in the process agreed that some version of sustainability was desirable than none at all.

Ecologists and biologists have begun to realize the value and the role of ecosystems and the different species that inhabit those ecosystems (Ehrlich & Ehrlich, 1992; Metrick & Weitzman, 1998). Biodiversity, according to modern biology, is non-substitutable since loss of species reduces the wealth of the genetic resource pool. The values of these resources are still not fully known, and these could well be revealed in the future. Therefore, the argument goes, we should invest in preserving this wealth because its value (the option value, arising from the option of retaining the resource even though its exact value may be uncertain at the present) may increase immensely in the future. For instance, a rare variety of maize in a small local ecosystem may some day later contribute in raising the productivity of other existing strains of maize by a significant degree. We should preserve the biodiversity, and not try to economically develop this ecosystem by building a factory or a residential complex. This clearly means that in the weaker version of sustainability there is a limit to the possible substitutability between natural capital and other kinds of capital. However, it is also clear from the discussion that there exists some scope for substitution, without loss of biodiversity.

To get an operational definition of sustainability we can look at the concept as the flow of 'genuine' investments made in augmenting the *total* stock of wealth in a society

without hurting biodiversity and the implied ecosystems. This lies somewhere between the strong and weak versions of sustainability found in the economics and ecology literature. Along with genuine investments it is important that current wealth inequalities are reduced across nations, and across people within a nation. It has already been argued that operational decisiveness in promoting sustainability is fraught with difficulties posing serious challenges for governance.

Developed countries that are wealthy and heavily energy intensive in their consumption patterns have one set of challenges for finding the pathway to sustainability (Worldwatch Institute, 2008). Developing countries have different challenges altogether. Some challenges are truly global in nature where transnational governance is vital. Finally, there are a lot of business organizations and small local communities that need to work on their own strategies and pathways to sustainability. Is there a core set of challenges that confront governance of sustainability in general, apart from the lack of a shared understanding of an operational definition of the concept?

Complex Challenges in Developed Countries

The energy intensity of production and consumption in the developed economies of the world has created a pattern of environmental stress that is now associated with rising economic affluence. The biggest challenge, of course, is the problem of climate change and the emission of green house gases (GHGs). How can affluent countries reduce their energy consumption and their ecological footprint? The transition to a low carbon economy requires major technological innovations as well as substantial changes in lifestyles and consumption patterns (Worldwatch Institute, 2008). A listing of some of the major challenges will help illustrate the nature of difficulties in bringing about effective change.

The biggest challenge lies in the reduction of the resource intensity of production and the creation of enormous wastes in productive systems and consumption patterns. This will entail large-scale process innovations as well as looking for innovations in organizational patterns, such as the creation of industrial ecology parks where one firm's waste is another firm's feedstock. Clean technologies are in many instances available but their adoption and diffusion are constrained. One barrier is the increasing returns in adopting energy technologies produced by

economies of scale. The same distribution of technologies and user preferences can lead to different outcomes in usage, as it depends on how things start out. Hence, technologies get locked-in, even if it is known to be inferior from the environmental efficiency angle. Geographical spaces can also be locked-in to energy inefficiency. Compare a densely constructed European city where it is easier to walk from one point to another with a sprawling US city where it is almost impossible to survive without a private means of transportation. Energy consumption patterns will be quite different in the two urban spaces.

The affluent countries' dependence on cars as private transportation has become a symbol of economic development. It is a hard challenge to change the culturally ingrained habit of using gas-guzzling, powerful cars as private transportation. Demanding more fuel efficiency may mean moving over to smaller (less powerful) cars and gradually moving towards a mass transit system on a larger scale. Similarly, energy use is quite high for domestic and commercial heating purposes. Many of the developed nations are in the temperate zone where the natural climate warrants heating during winter. Typically, with economic growth, the per capita consumption of space increases, and in land-abundant countries like the US people get accustomed to living in large houses where the total space heating energy requirements are considerable. Again, asking people to reduce their consumption of space is going to be difficult and challenging for any policy regime that is interested in moving to a sustainable path of development.

One of the most environmentally expensive and carbon-intensive lifestyle issue is the typical diet of a person living in the developed countries—the large dependence on animal protein in the form of meat and fish. Fish stocks are being rapidly depleted through non-sustainable harvesting in the global commons like the oceans. One unit of meat (for example, a kilogram) requires much more feed (agricultural produce and hence carbon emitting) than does a kilogram of cereal like paddy or wheat or corn (Worldwatch Institute, 2008). Dietary changes are also very basic lifestyle changes and hence inducing changes in them through usual pricing policies or taxes are unlikely to succeed. More imaginative and engaging interventions may be necessary.

Thus, moving away from a carbon footprint that is very large compared to any other parts of the world is going to be difficult (Goodwin, 2008). There has to be a strong social learning coupled with a change of long-standing preferences. What kind of governance is most likely to succeed? What are some of the problems of designing the best strategies for wealth creation for the future?

A Different Set of Complexities in Developing Countries

The biggest challenge in the developing countries is to get rid of poverty fast and decisively. Poverty creates yet another set of environmental stresses and endangers sustainability. People who are desperately poor cannot place a high value on the future when faced with an acute deprivation in the present. If felling trees for firewood is important for the present as a survival strategy, then no amount of persuasion about preserving wealth for the future is likely to be effective. Food now, sustainability later, would be the predictable reaction. In poverty ridden agricultural sectors, over-cultivation and inefficient resource management destroy the fertility of soil and run down water levels to an alarming degree. The felling of trees and associated loss of forest cover for generating current income create large-scale desertification (Adger & Winkels, 2007). All these add up to significant environmental stresses.

Related to the problem of poverty and deprivation is the problem of population growth and demographic transition. There has been a large body of research that has demonstrated the relationship of increasing poverty to larger family sizes. One reason is the uncertainty about the survival of children beyond the age five. The second is the income contribution an additional hand in the family brings. Finally, children are an important source of old-age security in the absence of social safety networks and social insurance. Research has also revealed that one of the most effective ways of controlling fertility rates is women's education in particular, and gender empowerment in general. So the strategy for population control and reducing fertility rates is integrally tied to the expansion of education, health care and women's empowerment. Investment strategies aimed at building human capabilities are important. So are investments for protecting the ecological systems that provide livelihood for poor people when they have no assets that can be marketed for earning income. There is a two way relationship between poverty and environmental stress (Dasgupta, 1993). Poverty induces environmental stress, and people living in environmentally vulnerable regions are usually desperately poor.

The strategy for improving well-being would be centred round better natural resource management that would increase the ecological dividend to provide sustainable livelihoods. Secure income based on nature—an expanded notion of agrarian activities—would be vital to induce better and genuine investments. Natural capital depreciation may be smaller in these countries than in the developed countries, but the institutional mechanism for maintaining the quality of existing resources is, in most cases, inadequate. It is not that people who live closer to nature do not understand the importance of such resources being a sustainable source of income and wealth. There could still be a deterioration of the resource base because basic survival strategies warrant it.

The need for a wide set of policies that are aimed at providing secure and sustainable livelihoods along with civil liberties and democratic rights as the source of empowerment is the crux of genuine investments in such countries. The institutions through which these policies are supposed to take shape are often inefficient, corrupt and myopic—leading to governance outcomes that have negative effects on the well-being of already poor people. And most poor people of the world live in countries run by dysfunctional governments that fail to move to a path of sustainable development.

In these economies it is not so much the faulty design of policies that make a pathway to sustainability difficult to attain. The issue is more of failure of governance, and the inefficacy of collective public action. Completely failed states are rare, but dysfunctional states with a lack of probity of public institutions are far more common (Dasgupta, 2001).

Complexities in Local Communities

It is being increasingly felt that local community-based management of environmental resources can no longer be left to the designs of elected representatives. It is important to create a climate in which individuals, communities, private and public institutions of business and local government can come together to be involved in the planning and execution of projects that have a bearing on the local community. This requires an open deliberative approach that is participatory, and where voices that are normally silent are allowed to be audible. Inclusive decision-making is deemed to be essential for nurturing a sense of ownership of a project.

It is also considered important that local people take the leadership in identifying and assessing problems and their appropriate solutions. If external managerial (expert) help is required it should be the collective decision of the community. This collective action could foster informed debates about issues around which a consensus is needed. The community would also need to consciously build human and social capital so that a growing and diverse portfolio of assets could be taken care of.

The real challenge in community-based inclusive decision-making is that the process can be influenced by, or sometimes even usurped, special interests and powerful groups. The stakeholders can be so diverse that a powerful group can exert undue influence. In rural areas stakeholders can include local landlords, cooperatives, peasants, religious leaders, financial institutions, civil society organizations and political parties (even local militia in certain countries). They can have widely different interests that may not easily lead to a consensus-based decision. In urban areas decisions can be influenced by local crime mafias or by land mafias. At the national level the media can play a powerful role, but even bigger interests like international donors, multi-national corporations and organized lobbies can exert undue influence. Civil society is complex and heterogeneous in terms of power and influence.

The Complexity of Governance

Sustainability has to be fostered at local as well as global levels. Certain issues of managing the environment, such as stewardship of the global commons, reducing GHG for fighting climate change, moving to a more uniform standard for environmental regulations and protecting biodiversity, are all essentially global in character. Nature does not divide the world into nation-states and territories. Nature is a common set of resources in a closed ecological system called the planet earth and that is already being stretched to the limit and perhaps much more in terms of the carrying capacity of the earth. Some estimates of the carrying capacity of the earth, based on current consumption patterns and population, indicate that already three planets are needed to keep the resilience of ecosystems intact. Is there an irreversible ecosystems damage going on? Most projections estimate world population to be anywhere between 9 and 12 billion people by the end of the twenty-first century (Brown, 2008; Sachs, 2008). This may require six planets by then at current technologies and consumption patterns. Even if the astonishing pace of technological change in the twentieth century is projected on to this century, there will be more people inhabiting the earth than the carrying capacity of the planet, unless systematic reductions take place in patterns of resource use in production and consumption (Cohen, 1995).

If the threats are real and not too distant in the future, why is it that consensus-based policies are extremely rare and effective mitigation of the threats so difficult? An answer to this question would lie in having a deeper understanding of governance as a socially dynamic process where unintended consequences are highly possible, and where politics plays a critical role in shaping results.

The real challenge of sustainability lies in creating processes and outcomes that stabilize stresses on nature, and enable resilience to shocks. It is essentially a matter of governance. While there is no unique definition of governance, it may be viewed as the intersection of power, politics and the institutions (both public and private) from where they emanate. Examples of such institutions would be markets, political and civil processes, and the relationships of knowledge and power embedded in them. Governance is often confused with policy-making and its implementation. The concepts are related but distinct. Policy-making is often viewed as a very structured process of agenda-setting, decision-making and implementation by a monolithic state with homogeneous actors. The concept of governance is broader; it does encompass policy-making but goes much beyond the structured processes to the ways by which the decisions of social actors like business firms and families are actually influenced and shaped.

Governance processes are neither set in stone nor are completely seamless. There exists a range of processes with different styles and practices that can be observed, especially in the context of social, ecological and technological systems with their complicated interfaces. The challenge of governance, then, is to consider all actors and settings beyond the core set of individuals (Richards & Smith, 2002) who may be directly involved in the crafting of the formal content of a policy. Not only that, in today's world of rising global connectivity there is an ever-increasing variety of actors and terrains that are involved in public policy. These actors are often networked across social and spatial dimensions and interact in many intricate ways.

It may be more useful to view governance (Stoker, 1998) as a networked, multi-level process rather than a linearly structured one. In that case it is not difficult to understand why policies that look attractive on paper may never achieve the results they are supposed to. The outcomes cannot be predicted in any simple fashion. Unintended consequences are more the rule than the exception (Scott, 1998). Without this appreciation, governance outcomes can never be reconciled to surprising and even unpleasant consequences in terms of some fundamental issues like violation of individual rights or the creation of deep inequalities (Kymlicka & Norman, 1994). If governance is viewed as a multi-level network, the concept of a defined citizenry in a nation-state is no longer valid in many fields such as climate and energy. Problems of governance have

international architectures such as in those prevailing in carbon markets arrangements (Aldy & Stavins, 2007), non-government civic groups and business firms, and a large variety of grassroots movements (Newell, 2006). Each nation's policy-making process engages with these networks in many complex ways that shape final designs and outcomes.

Towards a More Nuanced Understanding of Governance

In recent times, there has been a substantial increase in what is called participatory governance in development projects in many countries of the world (Chambers, 1997). Popular participation in design and implementation of these projects and the power relations through which decisions are taken is supposed to improve effectiveness. It also helps to create a better alignment of the participants' goals and values with those of the other stakeholders who co-created the blueprint of the policy. There is an increasing recognition of the role of people's agency in social and economic policy interventions. Here, people would include any participant, from a state civil servant or a field worker of a non-governmental organization, to a potential beneficiary.

The process of governance transforms the structured policy into 'rules of the game' for the specific context where it is being implemented (North, 1990). The 'rules of the game' that emerge in the local institutions or the 'temporary organization' of stakeholders who get engaged in the unfolding of the project are actually the outcome of complex and continuous interactions between different stakeholders. There are alternative interpretations, and some accede to while others subvert the original policy rule to fit particular intentions and circumstances. The engagement of stakeholders with each other during the management and governance of the 'project' entails negotiations, mutual exchange and a shifting of interests and perspectives. This may even alter the direction of implementation and hence the set of final outcomes too. Hence, outcomes can deviate from original expectations, and reflect a reality that is much more messy and unpredictable than captured in the policy blueprint.

The context of sustainability is where people interface with ecological systems and use knowledge and technology in the process. There has been a large literature that has focused on the power of knowledge and the process through which it gets created, as well as the alternative ways by which 'nature' is represented in different contexts. Technology and anthropology together shape the understanding of nature. How 'nature' is represented depends on social positions, knowledge and experience of the participant. Hence, there will be alternative representations and these could compete and engage with one another. Both the major constituents of the representation of nature, namely culture and technology, are the consequences of experience and power (Keeley & Scoones, 2003).

It is relatively easier to conceive of culture as being influenced and moulded by power. However, technology too is not free from similar influences (Castells, 1996; Jasanoff, 2004). Knowledge, on which technology is based, is often created through a variety of contributions of experts and specialists who also compete with one another for acceptance and hegemony, and the dominant paradigm emerges out of the struggle with a new idea or phenomenon. There is a politics of knowledge as well, where according to Foucault, truth speaks to power. In other words, there are alternative ways of knowing, (epistemologies) and pathways to action that emerge out of them (civic epistemologies). Framing of a particular problem is relative to the position of the framer in the social order. Many studies have shown that specific forms of grounded local knowledge are linked to political and material claims of participants for controlling resources, for establishing rights, and for seeking particular ways of living; and how these, in turn, get connected to wider claims made in national or global arenas.

Governance: Towards an Integrated Approach

Bringing together different strands of the literature on governing complex systems, it can be seen that emphasis is put on multi-level networks, participatory processes and power relations. Governance is not something readily predictable. It unfolds on a day-to-day basis from messy interactions between stakeholders, where the culture of the actors and the context of the terrain matter. The politics of representing nature, and the politics of knowledge creation play pivotal roles too, in the rise of different narratives that connects processes to outcomes.

The full complexity of governance can be understood only through the explicit recognition of political processes and power relations that become institutionalized. A dominant narrative emerges that embodies rules and practices, defines a set of things to 'do' and 'not to do'. Gradually, a

narrative may acquire some degree of predictability and staying power. There is a 'lock in' for one narrative and its associated pathway to sustainability to the exclusion of others. Other competing narratives and pathways do not die down entirely, but the alternative framings of the people–nature–technology dynamics are suppressed through outright coercion or (perhaps more frequently) by the creation of a consensus that legitimizes the hegemony of the dominant narrative (Burchell, Gordon & Miller, 1991).

What emerges from this process may well have negative effects on livelihoods and well-being, and the emergence of the narrative itself may be a long and tortuous process. This narrative of governance, as mentioned earlier, is neither cast in stone nor is it seamless. It changes continuously as it is contested by alternative narratives. It absorbs some of these and suppresses others. As the original intervention becomes altered, the inevitability of unintended consequences becomes clear. The complex unfolding of processes and outcomes indicates the impossibility of the people, involved in governing, having a full and complete knowledge of the object of governance. What then is the essence of this unfolding nature of governance in the people–ecology–technology context? It is a configuration of trust-building, sense-making, conflict resolution and resource mobilization, all combined in an intricate fashion.

The configuration that emerges in a given context seeks to accommodate ambiguities about sustainability goals, differentials of power and control over implementation strategies. Goals are rarely set once and for all, since knowledge and power relations keep changing over time. At any moment of time the sustainable solutions that are accepted in a system may well be a new set of sustainability problems for another set of actors engaging in another system. For instance, a conversion of food crops like maize for making bio-fuels that reduce carbon emissions could create problems of availability of, and access to, food for many people.

From Ignorance to Risk

One important aspect of governing sustainability is the knowledge about outcomes and the likelihoods of those outcomes occurring. This knowledge is created by the processes that have already been discussed in the previous sections. One way of attempting to understand the state of knowledge of sustainability would be to use the familiar two-by-two box diagram to see the four broad possibilities
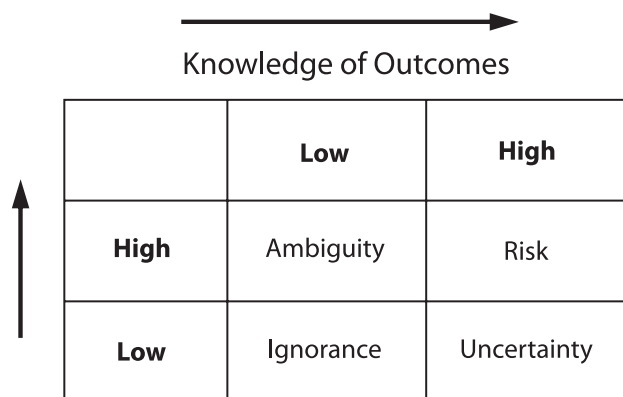

Knowledge of Outcomes

	Low	High
High	Ambiguity	Risk
Low	Ignorance	Uncertainty

Figure 1. Knowledge of Likelihoods

that could be identified. Figure 1 is derived from Leach, Scoones and Stirling (2010). As the figure shows, a low level of awareness about outcomes, as well as the knowledge of the likelihood of their occurrence, is a situation of ignorance; 'we do not know what we do not know' case. This would be the situation prevailing a hundred years ago when there was no powerful narrative about the influence of human activities, and the use of science-based technologies, on the natural environment.

A greater knowledge of outcomes, without a concomitant increase in the knowledge of likelihoods, would be a situation of uncertainty. In many areas of climate change, for instance, there is awareness of outcomes but information about answers to questions such as the quantum and extent of damage, or when an event is likely to occur, who exactly would be affected by the event, what would be the human and economic costs, are often too inadequate. On the one hand, in this zone of uncertainty assigning probabilities would be difficult, and inference about occurrence would be largely based on subjective judgements. On the other hand, when likelihoods are known with greater confidence, there could still be situations where the relative importance of multiple outcomes could be debated either on the basis of incomplete information, or on the basis of different priorities attached to the importance of different outcomes. For instance, while developed market economies of the world attach a greater importance on the reduction of total carbon emissions to mitigate the effects of climate change, many developing market economies, like India, would be pressing for a reduction in the carbon intensity of a unit of national produce, thereby not making a commitment on total emissions. This difference in perspective of countries like India is based on the need to use existing technologies to produce more income and wealth

for its residents, and reduce acute poverty and deprivation. Finally, as shown in the north-eastern box, there could ultimately be a situation of 'risk' where knowledge about outcomes and likelihoods are adequate enough to assign probabilities with reasonable accuracy. This is a zone where the technical aspects of policy crafting become much easier.

A couple of issues are worth noting when discussing the schematic box shown in Figure 1. The space in the box should ideally be viewed as a continuum of points where the degrees of knowledge of likelihoods and outcomes are different. In other words, the purpose is not to think of the alternatives as discrete and closed, but as alternatives that keep unfolding in a dynamic manner. The journey from ignorance to risk reveals one hegemonic narrative and associated pathway while many other alternatives could have been completely, or partially, suppressed or appropriated along the way.

The second issue worthy of note is in a particular context; the actual location of knowledge is determined by the power relations in that society or network. Hence, even if likelihoods are known and outcomes are mapped with some comprehensiveness, there is no assurance that the process of governance emerging from the particular historical context would be able to actualize the goals and solutions that a well crafted policy would aim for. The inevitability of unintended consequences (Jessop, 2003) in the practice of governance has already been discussed.

Conclusion

This article attempted to demonstrate that the challenge to promote sustainability is very different in different contexts and different layers of institutional governance (Dasgupta, Levin, & Lubchenco, 2000). The heterogeneity of the challenges and their sheer complexity can be awesome—whether they are in developed market economies or in developing emerging economies, or whether they are in local communities confronted with their own problems. If sustainability is in essence a global problem then it must be ultimately viewed in that fashion. The different layers of governance must be consistent with the overarching requirement to create a world where bequeathing non-diminishing wealth for future generations is possible. Nations, communities and businesses cannot work at cross purposes. Similarly, local communities and global forums must share the same objective of sustaining wealth and

reducing inequalities. Is there a core set of issues that drive all the different layers with different challenges?

The first common feature at every level of governance is the need for a realization that any understanding of sustainability must be based on scientific understanding of the world and its environment along with the choice of ethical values assigned to life in general and human well-being in particular. Scientific knowledge and ethical judgements form the core of any understanding of sustainability.

The second issue that guides all levels of intervention in terms of policies, whether at the micro or the macro levels, is the importance of estimating values where markets do not exist. Risk, uncertainties and ambiguities abound when looking at possible future impacts of non-market activities and public goods. In quite a few cases a low probability event can have catastrophic impacts. Policy-making in such circumstances is bound to be complicated by estimates and judgemental choices that nonetheless drive the system to the zone of 'risk' in the figure.

The third common issue pertains to processes of decision-making and consensus-building. They have to be inclusive and participatory encompassing a wide set of stakeholders. The importance of keeping special interests at bay cannot be overemphasized. These may even be in the form of special national interests or the interests of large business lobbies. Alternative narratives will have to be heard and engaged with. Global and local governance processes must find ways to transcend particular interests into a human agenda that goes beyond the limiting boundaries of nation-states and particularistic interests.

Finally, it has been argued that the pathway to sustainability involves changing lifestyles. This is the most difficult part of all. Changing lifestyles is not only about policies or science; it is about values, beliefs and choices. The ultimate complexity of governance could be how an individual governs her own self and defines an individual representation of nature that would affect her actions and her way of life. But even that representation is clouded by the experience of everyday politics and power struggles.

Acknowledgement

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