

Inherent conflicts at the coast

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Abstract. Because choice is conflict, decision-making is necessarily about conflict resolution. Choices are necessary because the options are mutually exclusive but the nature of this inherent conflict varies. Typically, these conflicts are multidimensional. In coastal zones, the complex interactions between systems makes decision-making particularly complex; in particular, environmental interests are themselves frequently in conflict. In making a choice, it is important to determine why that choice is necessary in the first place.

There are further conflicts about the objectives to be satisfied by the decision process; between the determination of the best outcome and the best decision process. Social scientists centre upon the requirement for a fair decision process rather than upon seeking an optimum outcome. Unlike physical scientists who seek more and better information, social scientists focus upon the development and maintenance of institutions.

Keywords: Common property; Decision process; Institution; Management; Resource; Sustainable.

Introduction: Choice as a conflict

Choice is a conflict when the available options are mutually exclusive (Green in press). Here we consider the case of mutually exclusive options. Consequently, in order to make a decision it is necessary to understand why we have to make the choice; what is the nature of the trade-offs involved?

Choice is necessary precisely because it is difficult to select between the alternatives: if one option were to be self-evidently superior to all others, choice is necessary in only the most trivial sense. Although in economics it has been assumed that choices are necessary because of the scarcity of resources, this is only one reason why we may have to choose in a particular instance and why the options are alternatives. The strict definition is that the options are mutually exclusive; that adopting one option in some way precludes the other options or the benefits to be gained from those options.

The simplest reason for the options being alternatives is that they are functionally equivalent; they are substitutes for each other so that if we adopt one option we have no reason to adopt another. If a sea wall and an offshore breakwater provide the same

standard of protection against erosion and flooding, and it has been determined that this standard of protection is the optimum, then we will not build both but have to choose one or the other.

One of the main reasons why we are forced to make choices on coasts is that the options are mutually exclusive in space; we cannot, for example, have both a large beach and retain the existing inter-tidal invertebrate site. The options are also frequently mutually exclusive in time; we cannot have both a dynamic and a fixed coastline to preserve existing land use from loss through erosion.

Typically, we also bring a multiplicity of goals to decision-making; for example, we want to protect human life and property, minimize capital and maintenance costs, minimize the risk of failure and uncertainty about the outcome and avoid significant environmental harm. Some of these goals may be necessarily mutually exclusive. Sen (1992) has argued that different forms of equality are mutually exclusive; e.g. choosing equality of opportunity necessarily means equality of income cannot simultaneously be achieved. In other instances, the options identified may be such that no single option enables us to satisfy all our goals, although in principle there may be another, but unidentified option, that would achieve all our goals. Choosing between the options consequently means choosing between the goals and therefore determining which goals it is most important to achieve.

In addition to conflicting 'wants', there can be conflicts with 'oughts'; not only with social norms but the individual's personal beliefs about what ought to be done. These have been shown to be influential not only in individuals' attitudes and preferences but also in individual's choices of recreation (Green & Tunstall 1996). Individuals can have preferences for when they want to receive benefits, an issue that in benefit-cost analysis is intended to be handled by discounting, but also believe that we have duties to future generations. So, too, can 'oughts' conflict; for instance, between preserving human life and protecting other species.

Whilst individuals can and do have goals that are in conflict, in societal decisions there are frequently major differences and hence conflicts between individuals. Firstly, individuals can and often do differ in the

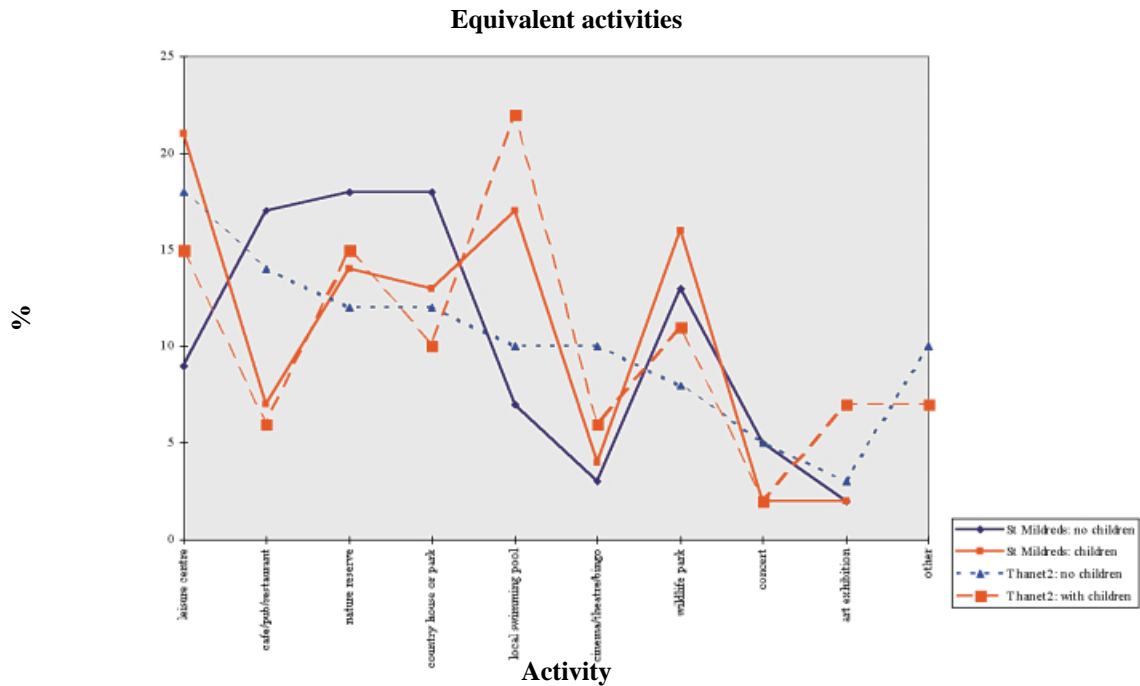


Fig. 1. Activities giving equivalent enjoyment to a visit to the coast (Source: Green 1998).

relative importance they attach to achieving different objectives. We frequently disagree whether, for example, increasing employment and economic development is worth the sacrifice of a mud flat that supports an endangered species. For some people, reducing unemployment is much more important than reducing the risk that some species will be lost. More widely, people differ in the way in which they construe the world and our relationship to it. To some people, that mud flat is unused and wasted land; to others it is a quite attractive component of the valued local landscape and to others it is a rich and diverse habitat which we have a duty to preserve in order to protect other species. These differences in goals and perceptions can lead people to frame the choice in different ways.

We often differ in what we want as well as in what we believe ought to be. Fig. 1 shows the proportions of visitors to two stretches of the Kent coast who stated that different activities would give equivalent enjoyment to their visit to the coast. St. Mildreds Bay is a small bay with a promenade fronted by a wide area of sand; Cliftonville, only a few miles along the coast, is an area of chalk cliffs with a low level walkway at sea level for part of the frontage. Visitors in a group including children held similar preferences in both locations but differed from other visitors in both cases. However, visitors in groups not including children gave quite different answers in the two locations. Adult visitors to St. Mildreds Bay considered that visiting a

nature reserve or another semi-natural setting would give the same enjoyment whilst adult visitors to Cliftonville would prefer to go to a leisure centre or swimming pool instead.

Decisions have distributive consequences; for instance, adopting a managed realignment of coastal defences means abandoning the land, and those living on it, in front of the new defence line. Mutually exclusive, or conflicting, uses again mean that some will lose if others are to gain. In general, the costs of undertaking any one of the available options are seldom distributed exactly in proportion to the benefits; hence, there will always be winners and losers from any given option.

Real social choices often include all, if not most, of these elements when a decision involves the resolution of a multidimensional conflict. In general, these conflicts can be demonstrated by Fig. 2. Resource scarcity is usually an external constraint; we would still have to choose even if we had infinite resources but if we make the best choice in one instance we may then have insufficient resources to take the best option in another case. We need then to match the adopted decision aids to the reason why the choice is necessary. The weakness of conventional economics is that choices are defined as arising solely due to the scarcity of resources. Conversely, that a choice is primarily necessary because of conflicting preferences between individuals does not remove the resource constraint.

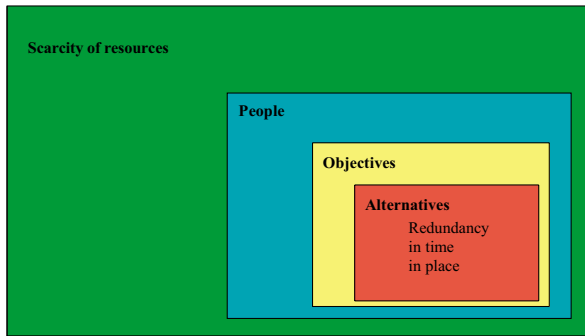


Fig. 2. The nature of choice.

Coasts as centres of conflict

Whilst choice itself is conflict, coasts are particular centres of conflict for a number of reasons. Firstly, coasts are areas of intense human activity. There are good reasons why, for instance, 67 % of the population of Norway live within 15 km of the coast and 75 % of the population of the USA live within 50 miles of the coast. Coastal lands and particularly estuaries offer major locational advantages over other areas of land in terms of flat land, good soils, access to transport and access to offshore resources including fisheries and oil. Resources for human activity are consequently under pressure because of the competing human activities.

Secondly, coasts involve three interdependent and dynamic systems; the geomorphological, ecological and economic systems (Fig. 3). The problem is to manage the dynamic interactions between these three systems rather than to manage any single system in isolation. The three systems are closely coupled, with both positive and negative links. Critically, the economy is conditional about the state of the environment; the relationship can be compared to that of a leaf dependent on the tree. What can be produced and consumed by the economy depends upon the flows of energy and materials that can be harvested from the environment. The differences in the natural endowment can consequently result in substantial differences in the resulting capabilities of the economy. The economic problem is then to manage the other systems so that the yield from the economy is both maximized and is also sustainable in the long term.

The geomorphological system is highly active and both this and the ecological system are impacted by human activity, whilst geomorphological changes can have major impacts on human activity, e.g. as ports silt up and coastal settlements are flooded or lost through erosion. At the same time the creation of land through sediment deposits in deltas has yielded highly desirable farmland.

This close coupling means that the interactions can have substantial effects while it makes the prediction of the consequences of particular changes difficult. For example, in Barbados, the expansion of tourism has resulted in semi-treated sewage being discharged to the coastal lagoon and the destruction of mangrove swamps, partly for tourist development, has also allowed more sediment to enter the lagoon. These changes in water quality have then damaged the coral reef exposing the beaches to coastal erosion and hence potentially damaging the tourist industry. Even apparently relatively minor changes in one system can have major consequences in other systems. The use of tin-based anti-fouling paints on ships had very severe consequences for shell fisheries and the introduction of alien species via ballast water, such as cone jellyfish into the Black Sea, can have major impacts on both the ecosystem and the economic systems depending upon the state of the environment. The existence of positive feedback loops means that a small change in one system can be amplified and reverberate through the three connected systems. The individual links are often difficult to determine.

The ecosystems associated with the coastal zone, notably mud flats, salt marshes, mangrove swamps, coral reefs and sea grass belts are biologically highly productive, supporting rich and diverse ecosystems. For instance, 44% of Great Britain's estuaries are covered, in whole or in part, by designation as a Ramsar site or a Special Protected Area (Davidson 1991). This biological richness underpinned the traditional economies of the coastal communities; Maltby (1986) reported that

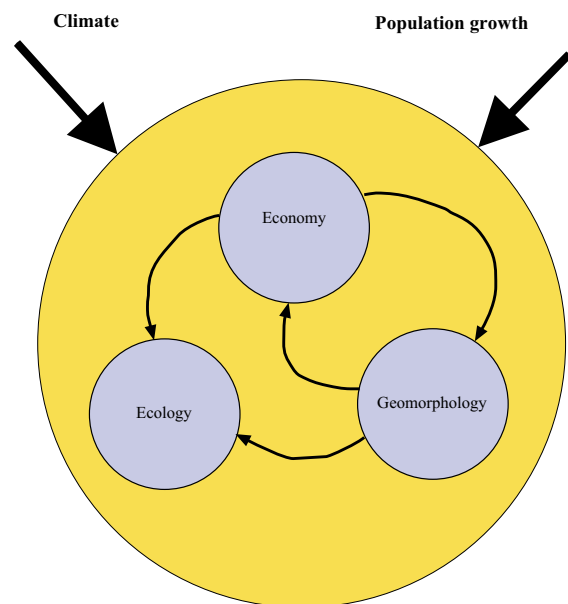


Fig. 3. The coast: interdependencies between dynamic systems.

the Wadden Sea supports, at some point in their life cycle, almost 50% of the North Sea's brown shrimps, 50% of sole, 80% of plaice and nearly all of the herring. More widely the coastal fringes, including salt marshes and algal beds, are known to have the highest primary productivity of any form of habitat (Anon. 1998a).

National and regional boundaries are often ignored and can be spatially extensive whilst any feasible analysis of the consequences of some option must draw some geographical boundaries and economic analysis is limited to national boundaries. Thus, although the Wadden Sea supports the fisheries of all of the North Sea countries it is, at the same time, affected by the pollution loads discharged in Switzerland and the loss of a wetland in southern Spain, used by migrating birds, will affect the biodiversity of The Netherlands. As these examples show, the interactions between land and sea can be highly significant and occur over great distances. It is consequently difficult to define appropriate system boundaries for particular coastal zones.

All three systems shown in Fig. 3 are dynamic, not only in terms of internal factors but also through interactions with the other two systems and in response to external forces. The rates of change of each differ significantly. Geomorphological processes cover a range of temporal scales from seconds to millennia, but the material and energy exchanges involved in these processes are massive. Many of the geomorphological processes are very long-term indeed, millennia being a relatively short span of time. Conversely, the economic system changes rapidly and the only accurate prediction that can be made about the structure of the economy in 50 yr from now is that it will necessarily be completely different to its current form. However, it is the shorter term processes that have the greatest effects on the economic system; an erosion or deposition event of hours duration can have major local economic consequences.

Of the three systems, the ecosystem is the slowest to change, other than by being destroyed, and consequently tends to be dependent upon the other two systems. However, there are major differences between different ecosystem types in the time they take to develop, some environmentally important wetlands and lagoon systems are less than 50 yr old and are the result of human intervention. Other ecosystems have developed, it is believed, over hundreds if not thousands of years and would take a similar time to re-establish. The critical conditions for such habitats are often very specific and hence they are very vulnerable to changes induced by the other two systems.

Whilst the geomorphological and ecological systems are shifting towards equilibrium states – though not the ones that are necessarily preferred from the

short-term perspective of the economic system, the economic system is rapidly evolving and expanding. Technological change in the last hundred years has been dramatic; for example, the shift to containerized freight and the development of air transport having radically changed the distribution of ports. Economies have been simultaneously growing, increasing the demand for resources and changing the pattern of demand.

These three systems are exposed to external forces which are themselves dynamic; climate and population growth and structure. Climate is a major influence on all three systems but climate change will change the behaviour of all three systems. Population growth, patterns of migration within and between countries and changes in demographic structure all affect the demand for land in the coastal zones. The differences between the systems in the rate at which they change and in their susceptibility to external changes, as well as the links between them, introduce conflicts.

Environmental conflicts

Although the focus in coastal zone management – also called coastal management – is typically on conflicts between the interests of the economy and those of the environment, the coastal zone is typified by conflicts between different forms of environmental and related interests. Fig. 4 shows Hengistbury Head, an ironstone outcropping connected to the mainland by a sandy bank. Erosion is occurring along both the western cliffs of the ironstone outcropping and on the bank itself and there is a risk that a storm event would result in a permanent new opening being made through the sandy bank, turning the headland into an island. The Head is important in a number of different ways. In addition to attracting some 800000 visitors each year, the heathland of the Head is designated as a Site of Special Scientific Interest and Christchurch Harbour is of some importance for waterfowl. The ironstone is designated as being of geological importance whilst the area is also important archaeologically. The headland itself contains a number of Mesolithic and Palaeolithic sites whilst the Iron Age Double Dykes defensive barrier across the sandy bank was built to protect a settlement which later developed into a major Romano-British port (Parker & Thompson 1988; Penning-Rowsell et al. 1992).

A number of options were considered for slowing or delaying erosion of the Head. Parker (1995) asked a number of different environmental and heritage specialists to rank these options in terms of their impacts on the special interests with which they were concerned (Fig. 5). As can be seen, there is complete disagreement between two different groups of specialists as to the desirability

of the 'do nothing' option, of allowing erosion to continue unchecked. The specialists in geology and geomorphology considered this the best option; all the other specialists agreed that this was the worst option.

Such a conflict between environmental interests is not atypical; indeed, it seems quite common. For example, in the Wentlooge Levels the offshore area is designated as a Ramsar site, which is the existing defence line, after the land had been reclaimed in medieval or Romano-British times. It is also a scheduled archaeological site and the freshwater drains in the protected area are designated as a Site of Special Scientific Interest (Chatterton et al. 1993).

That such conflicts are commonplace follows from the differing interests of the various environmental and heritage sciences. These differ across two dimensions:

- process vs. state;
- between the coastal zones (inland, boundary, shore and near shore).

Whilst geologists, palaeontologists and geomorphologists wish to see the processes, or consequences of those processes, continue other environmental and heritage specialists want to preserve a particular state from change. Geologists prefer erosion to continue at some rate because it ensures clean exposures of strata; if erosion is stopped or slower then debris may accumulate and vegetation will obscure those exposures. Similarly, palaeontologists wish for erosion to continue so that fossils will be exposed and can be recovered. Geomorphologists are not interested in the consequences of the process but in observing the process itself.

Conversely, archaeologists do not wish sites to be lost through erosion, nor do they wish to excavate those sites, preferring them to be preserved untouched. Excavation is typically regarded as a second best option because it often destroys evidence contained within a site. Archaeologists hope that future developments in

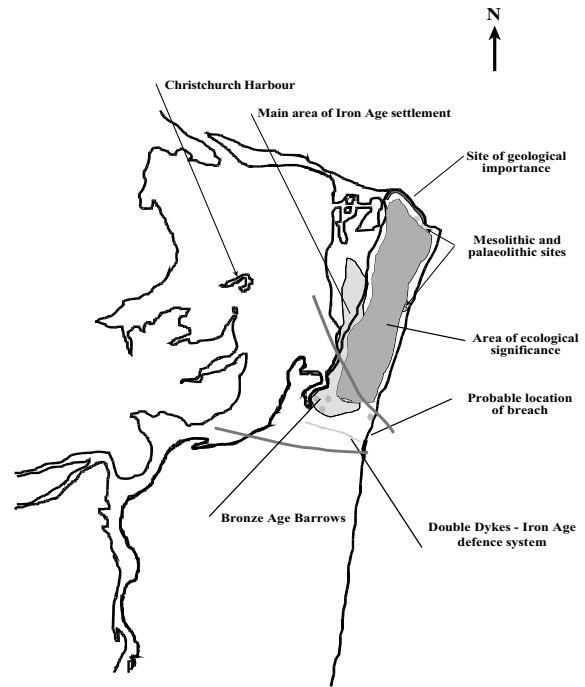


Fig. 4. Hengistbury Head, east of Bournemouth, in Dorset.

techniques and technology will enable them to recover more of that evidence if excavations are delayed. Ecologists typically want to conserve what there is rather than gamble on change resulting in a more valuable, if different, local ecosystem. Some ecosystems do depend upon a degree of dynamic change, such as cliff habitats, but ecologists wish the rate of change to be kept within limits. Landscape specialists will normally wish what is there that is valued to be preserved.

The interests of different ecological specialists may also differ because they are concerned with different parts of the coastal boundary. The 'coastal squeeze' resulting from sea level directly pits the concerns of

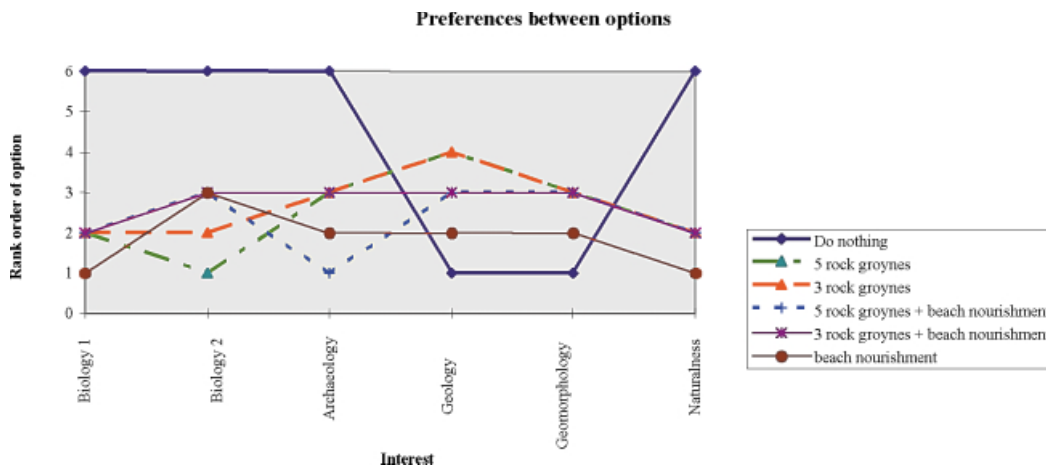


Fig. 5. Hengistbury Head: ranking of the 'do nothing' and 'do something' options by environmental specialists.

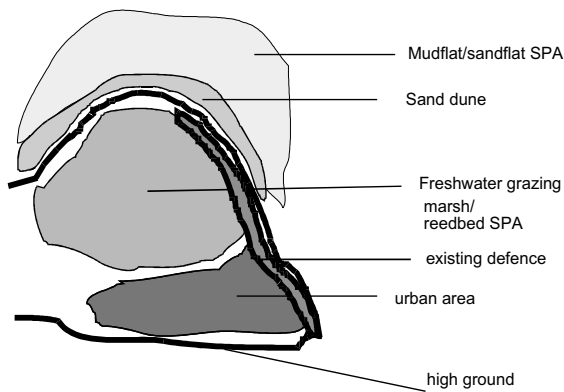


Fig. 6. Hypothetical coastal area at risk of erosion. SPA = Special Protected Area.

those concerned with preserving terrestrial ecosystems against those concerned with coastal fringe ecosystems such as mud flats, salt marshes and mangrove swamps. For example, although Fig. 6 is a hypothetical example (Burney & Collins pers. comm. 1998), it is based on the situation at Brancaster, Norfolk. The existing defence structure protects both a small urban area and a freshwater grazing marsh, designated as a Special Protected Area under the European Union's Bird Directive for its importance as a breeding site for the Marsh Harrier (*Circus aeruginosus*) as well as a feeding ground for the Bittern (*Botaurus stellaris*). Replacement or renovation of the existing defences to protect the freshwater marsh and urban area will not allow the mud flats and sand flats, themselves a Special Protected Area, to retreat inland as sea level rises. The choice is necessarily between preserving one or the other habitat. In this particular case English Nature, the national body responsible for nature conservation, has decided that its preferred option would be a controlled breach in the existing defences and localized protection for the urban area. It would prefer to sacrifice, in this instance, the freshwater habitat to protect the mud and sand flats.

In England and Wales the government has recently determined that sites designated under the European Union's Birds and Habitats' Directives are to be removed from the normal process of economic appraisal required of all flood and coastal defence schemes (Anon. 1998a) and to remove funding of schemes to protect such sites from the basic funding procedures. However, this will not remove the necessity, in many instances, of choosing which habitats to sacrifice in order to protect others. Again, the option of the principles of Constant Natural Assets, together with habitat banking (Reppert 1992) and 'no net loss' policies (Heimlich 1991), and of Critical Natural Capital (Anon. 1993) provide a way of managing this trade-off. However, in the above example

it is probable that the mud flats/sand flats would be classified as Constant Natural Assets whilst the freshwater marshes would probably be deemed to be Critical Natural Capital, the re-creation of equivalent areas of mud flats being more likely to be possible than the marshland ecosystem. In this instance, English Nature was influenced by the effects down-drift of the continued efforts to protect the area; a wide area ecological systems approach rather than a localized view being adopted.

Management

Coastal zone management thus involves resolving conflicts that are both inherent and multidimensional. This inherent conflict extends to the management principles to be adopted; specifically, there is a tension between identifying the best outcome of a decision and adopting the best process of decision making to identify that outcome. We have demands both about the process by which these decisions will be taken and expectations about what is an appropriate or desirable outcome. We want to make the 'right' decisions where 'what is right' refers to both the outcome and the way in which we take those decisions.

These demand characteristics for societal decision processes have been labelled as 'procedural' equity, or justice, and outcome equity. What is meant by a 'right' decision is, therefore, conceived of in terms of being both 'correct' and also 'just', goals that themselves may conflict, as may the desire for the right outcome conflict with the desire to achieve this by the right means. The desired process characteristics may themselves conflict; on one side we value the use of reason as a way of taking decisions, such as the use of economic analysis and environmental assessment; on the other, public participation has been included as a defining characteristic of sustainable development (Anon. 1992). On one hand, there is a desire for a rigorous, science based analysis; but on the other, for the inclusion of the public view. A 'science' based approach seeks to identify the optimal solution, the 'right' answer and that which the environment needs; a participatory based approach is often seen to result in a compromise, or even the lowest common denominator outcome, and the outcome is what the public wants. There can be a sharp divide between that which is seen as the 'right' solution from the perspective of one science and the agreed 'solution' from a participatory process. One way leads towards a search for better techniques and more information to determine the best outcome; the other towards seeking to develop better institutions and decision processes.

Studies on procedural justice have shown that the perceived legitimacy of the decision-making body is

important. This legitimacy is enhanced when people believe that the authorities are honest and competent, this enhances both people's willingness to voluntarily accept the authority's decisions, and people's feelings of obligation to follow the rules implemented (Tyler & DeGoey 1995). Where individuals are personally involved in a dispute, they are more likely to believe that they were fairly treated if they have an opportunity to have an input to the decision (Thibaut & Walker 1975). It has been suggested (Stroessner & Heuer 1996) that what is important is that group members perceive that they were treated in a manner implying respect for the group and its rights. A possible implication is that public participation can create a virtuous circle, increasing the perceived legitimacy of an authority and the perceived obligation to follow the rules implemented.

However, choices about institutional forms create their own conflict. For example, it is usual to call for 'integrated' management of the coastal zone. This tends to be interpreted as a more centralized form of management through the bringing together of different functional and geographic administrations. Through integrated management it is hoped to achieve a more complete understanding of the interdependencies and a more successful management of the coastal system as a whole. Independent functional and localized area management is expected to result in piecemeal, partial and, from a systems' perspective, suboptimal outcomes. Integrated management is thus seen as a way of achieving a better outcome.

At the same time, achieving successful public participation is likely to require the decentralizing of decision making and the shifting of decisions down to small scale geographical and functional units. Integration and public participation seem to pull in opposite directions. This tension can be seen in the current debate in England regarding the proposals for a national coastal defence agency to replace the existing 88 coastal protection authorities, local landowners, private port authorities and the Environment Agency currently responsible for coastal defence. Whilst the local authorities have organized liaison groups for each of the coastal cells, these have no statutory powers. Equally, some of the authorities are small and lack technical resources. Some groups have, therefore, called for a single national agency (Anon. 1998b). Conversely, the present system does promote some degree of local democratic control. This debate took place before the House of Commons Agriculture Committee who recommended that coastal protection should come under the remit of the regional governments that the Labour Party has proposed should be established in England; responsibility in Wales passing to the new Welsh Assembly.

A practical problem in the way of integration through the redesign of institutional arrangements is that the appropriate geographical boundaries of coastal zones often bear little relationship to the historical boundaries of the government units included in or overlapping those zones. The natural boundaries of coastal zones rarely correspond to historical, ethnic, cultural, religious or national boundaries. Equally, in management, there will always have to be boundaries, both geographical and functional, and the appropriate functional boundaries can differ geographically between functions. Consequently, there will always be the problem of integrating across boundaries of one kind or another, both national and international. Nor, indeed, simply by creating a new integrated institution is the problem of integration resolved; it is merely converted to one of achieving internal integration within the organization rather than integrating decision making across organizations. In some ways, therefore, the practical challenge is how to have an unholistic and fragmented institutional structure which can deliver integrated management (Green & Tunstall 1998).

There is then a fundamental difference between definitions of planning the future either in terms of a product, an optimal future, or in terms of a process.

Policy instruments

Neither an agreed plan for the future nor an optimal science based solution are very useful without some policy tools to implement that planned future. Two quite different strategies are often proposed for moving towards the optimal solution: the use of planning controls or a shift to the use of market based solutions such as tradable permits and taxes. The use of the first depends upon their being some form of agreement as to what the planned future should be. Planning controls only seem to be effective when either development pressures have been reduced, or the adverse consequences of unrestrained development have been so widely recognized, that there is a general will to restrain development so that breaching planning intentions is socially unacceptable. Free-for-all development may then simply be a sign either that there is no community to share a vision or that the existing community has been overwhelmed by migrant companies or individuals. Planning controls thus seem to work best when they are least needed.

The libertarian economists see the choice of policy instruments as a non-issue, the solution being self-evident: create individual property rights to everything and then the market will provide, by definition, the optimal outcome. Their claim is at least as much about the ends to be achieved as about the means of achieving a given sets

of ends. The argument for individual property rights is, in the first instance, ideological: private property is seen as the highest form of individual liberty and government is to be minimized if not abolished. From a global perspective, this is a provincial view, the majority of cultures have developed, over millennia, complex structures relating to individual entitlements and obligations, and a clear differentiation as to that which the individual can own, that which they can use and that which is held in common by the community. Generally, these culturally determined rules relating individual and communal rights are rooted in religious beliefs about the relationship of man to the environment, to others and to the deity.

The claim for the virtue of a market is that markets are inherently homeostatic, optimizing and tend to an equilibrium. This is essentially an article of faith rather than something which normally is subject to test in any particular instance. From a systems' perspective, it is a grand claim since it is made of any 'perfectly competitive' market and economic theory has not yet been able to prove the general claim without recourse to assuming, for example, that the individual participants have 'perfect, but myopic foresight'. In reality, rather than there being a 'hidden hand of the market' there is only the outcome of individual decisions and behaviours.

More generally, it is a rather nineteenth century view of the world as a mechanical toy with simple rules and simple interactions. Chaos Theory suggests that homeostasis is not a common state in nature and only occurs under relatively rare conditions. If individuals do not make choices about the future in ways that are consistent with these simple forms, then the outcome will be chaos.

This is not to say that economic instruments cannot be useful but only that the creation of a market is neither necessarily a desirable end in itself nor a magic solution. Rather, it is another potential policy instrument that should be analysed to determine its likely effectiveness in the particular circumstances. In particular, the local goals must first be set and then the policy options compared against them rather than it being assumed that if only the right prices can be established, whatever emerges will necessarily be the optimal solution. For instance, tradable quotas for Southern Blue Tuna were introduced for the Australian fleet when Australia, Japan and New Zealand agreed to reduce the total catch; the Australian catch being cut by 75%. These quotas, which can be bought and sold between trawlers, replaced the previous unsuccessful efforts to manage the catch through restrictions on the type of gear and boats to be used. However, a tradable permit is simply another form of scratch restriction and a key question is the extent to which fishermen will

actually comply with the limits of their quota or permit. The level of compliance with fisheries zoning regulations may be dependent upon moral and legitimacy factors.

The alternative model is the institutional model; institutions are an expression of a community and to be effective they depend upon the existence of a community. Thus, the critical difference between Open Access resources, and the generally catastrophic consequences to that resource, and Common Property resources that frequently have been successfully managed for hundreds of years is that in the former case there is no community controlling the resource. Ostrom's (1990) list of the conditions necessary for successful Common Property management effectively define a community. Indeed, Common Property management organizations usually have the structure of a state in miniature with an assembly, taxing powers, executive, courts and police powers. A community may then be a necessary precondition for planning controls and so, rather than arguing for planning controls, it might be more useful to look at how communities could be created or strengthened. That there is a community does not mean that there is a single common interest. Thus, Sprey (1969) has argued that a household is a form of 'cooperative conflict'; the members of the household having an interest in maintaining the household but also having conflicting individual interests. Zwartveen's (1997) study of the way in which men and women in agricultural households in Burkino Faso negotiate their labour inputs to the fields owned by each member is an elegant example of this model. The 'cooperative-conflict' model may then be an equally good model of a community. The community decision process may then have two requirements to: to maintain the community and to resolve the conflicts of interests of the members of that community.

Social Dilemmas Theory (Dawes 1980) has explored the extent to which people are prepared to cooperate in groups and the allocation rules adopted by individuals in such groups. This work has shown that individuals consistently allocate a substantial proportion of resources to the group rather than to themselves as individuals; rather than the selfish individual of neoclassical economic theory and Hardin (1968), cooperative action seems to be the expected norm. Again, the implication is that successful management depends upon the existence or creation of communities.

Conclusions

If there were no conflicts, then we would have no choices to make. On the coast, these conflicts are multi-dimensional and we are attempting to manage interconnected dynamic systems subject to major forces. There will never be enough information, although there can be so much data that it makes disentangling information difficult.

In these circumstances, choosing will always be difficult. Some of the tensions are probably not resolvable by a unique fixed solution so that each individual choice will be the result of the balance struck in those particular circumstances. The decision reached there will then be part of the context of other future decisions and past trade-offs may influence the trade-offs made in those future choices. The way we manage these conflicts also helps to define the nature of our social relationships, and the process by which we make decisions can be as important, because of what it says about the nature of the social contract, as the decisions themselves.

Understanding why there is a conflict

Firstly, it is necessary to determine what is the nature of the conflict in any particular context. The different available decision tools are specialized in the nature of conflict they are designed to handle. Benefit-cost analysis is concerned solely with choices necessitated by a scarcity of resources and conflicts between alternative uses. It can handle a single objective, economic efficiency, and consequently is of limited use in resolving conflicts whose primary cause is a conflict of objectives or conflicts between people. Multi-criteria analysis, or multi-attribute utility analysis, focuses choice as a result of conflicting objectives but is of limited use in resolving conflicts between people or in determining whether any of the options being considered actually justifies the resources required to implement it. Environmental mediation defines choices in terms of a conflict between people and again does not take explicit account of the wider context that the resources sacrificed in the choice in question will not be available for other purposes.

Better and not-optimal decisions

Achieving optimal solutions is impossible; and consequently so is the achievement of economic efficiency. To achieve optimality would require more information that we can have; in addition, the conflicts between objectives and between people mean that we will have disagreements as to what is optimal. In addition, optimality

is almost certainly a moving target; as Mitchell et al. (1993) wrote in a similar context: "Justice is not a stable, well-defined ideal end-state toward which people purposefully move; rather it is a dynamic, ever-shifting equilibrium ...". Instead, we simply want to make better decisions; now. Pursuing optimality will simply lead us away from the practical problems of making decisions.

Avoid ideology in favour of pragmatism and eclecticism

We cannot afford to rely on magic; we cannot assume that economic instruments are necessarily superior because they are economic instruments or that markets have some inherent characteristics that make them superior. It is necessary to demonstrate that they are likely to deliver in any particular circumstances. Having implemented a particular policy tool, we need to assess whether or not it was successful and, if so, why.

It is an interesting hypothesis that there should be universal models for successful coastal management rather than local, culturally specific approaches. An eclecticism, of searching between different cultures and societies for working systems, is preferable to the assumption that any one culture has developed the best answers.

The decision process is at least as important as the outcome

The challenge is build communities and ways of taking decisions that are consistent with the demands of those communities. A particular problem with extending public participation is how to democratize scientific knowledge; how to make this knowledge accessible to the wider public in a way that is useful.

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Received 10 June 1998;

Revision received 20 February 1999;

Accepted 15 March 1999.