

REGULATORY POLICY INSTITUTE

A BRIEF INTRODUCTION TO INSTITUTIONAL ECONOMICS AND ITS POTENTIAL RELEVANCE TO DEFRA

A report for Defra

George Yarrow and Chris Decker*

March 2012

*Views expressed in this and other Regulatory Policy Institute reviews and reports are those of the authors, and they should not be attributed to any organisation(s) with which the authors are associated. The Institute is a charitable organisation dedicated to the promotion of the study of regulation for the public benefit, and it does not itself take positions on the relevant policy issues.

1. Introduction

As part of its programme to seek improvements in its regulatory evidence base, and in the use of that base in implementing regulatory policy, Defra held an open competition for relevant research proposals. The Regulatory Policy Institute proposed a brief evaluation of whether/how insights from research in the institutional economics tradition might contribute to the Department's regulatory approach. As a result, in agreement with Defra, the Institute was asked to write a short paper focused on the following questions:

- i. What is institutional economics?
- ii. What is the relevance of institutional economics to regulation?
- iii. How might institutional economics help inform the development and implementation of Defra's policies?

Each of these questions is addressed in turn below.

2. What is institutional economics?

Institutional economics (IE) refers to a large and growing body of theoretical and empirical work that is interested in understanding the social, economic and political 'institutions' that guide and govern economic behaviour. In broad terms, whilst standard rational choice theory is centred on 'ideal' decision-making, and while behavioural economics is centred on psychological influences on decisions, the focus of IE is on how different social factors and influences (including laws and regulations) affect decision-making and human action.

Put another way, IE is concerned with the formal and informal *social* constraints that shape economic behaviour, including the 'enforcement' aspects of such constraints. Formal social constraints include laws and regulations; informal constraints include norms, conventions, self-imposed codes/standards of conduct, and common understandings. It is these constraints (or sets of rules, whether formal or informal) that comprise 'institutions'.¹

A distinguishing feature of the IE approach is that it abandons a number of the assumptions that characterise many neoclassical models of economic behaviour. In particular, IE starts from a position where economic actors are assumed to make decisions in settings that are often complex, where they have limited information, where there is uncertainty about future events and outcomes, and where transactions are not costless or instantaneous. It is within this framework that the need for institutions arises; institutions are seen as an attempt to simplify and structure human interactions, to make behaviours more predictable through the imposition of various constraints on behaviour.² In short, humans are seen as creating institutions – including written contracts or regulations or norms or codes of behaviour – as a means of simplifying human decision making, and coordinating behaviour so as to provide greater certainty about how others are going to behave. It follows that social constraints on conduct (which is the focus of IE) are to be distinguished from the constraints on economic behaviour arising from factors such as limited budgets, market prices, physical constraints, limited individual information processing capacity (bounded rationality), etc. that are emphasised not

¹ D North (1996) "Economic Performance through Time" *American Economic Review*, vol 84, p 360.

² C. Menard and M. M. Shirley (2005) *Handbook of New Institutional Economics*, Springer, Netherlands, p 1.

only in traditional choice theory in economics, but also in 'individualistic' variants of that theory such as behavioural economics.

As should be apparent from these introductory remarks, IE represents more of an approach to understanding regulation rather than a precise methodology. The relevance of this body of work to organisations such as Defra is broadly related to addressing the 'how' of regulation, including questions about the design of institutions, and the likely effects (and effectiveness in terms of enforcement) of different forms of institutional arrangements, when applied in different settings.

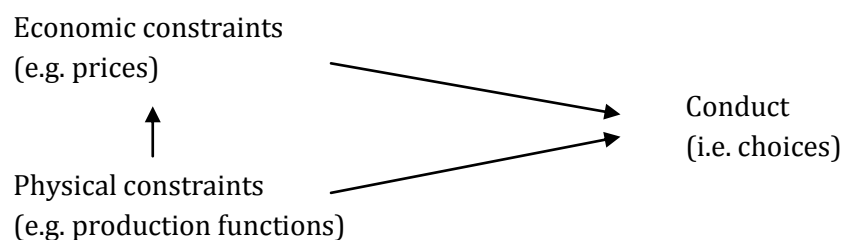
3. The relevance of institutional economics to regulation

Since regulation is most frequently conducted via the establishment of formal and informal social constraints (a change in law is an obvious example), the study of regulation and of regulatory policy clearly falls within the ambit of IE. Recent developments in the IE tradition have addressed two, over-arching questions:³

- What factors determine the shape of institutions (i.e.: the 'rules')
- What impacts do institutions have on economic performance?

Both questions are relevant for regulatory analysis, since each is concerned with the 'fit' between the relevant bodies of rules (institutions), their purposes, and the relevant economic environment. In many regulatory contexts, however, it is natural to think of the second question first since, as stated, much regulation involves making choices between alternative institutional arrangements on the basis of perceived impacts on economic performance.

Traditionally, basic economics sees the *short-term*⁴ determinants of the conduct of individual decision units (firms, households, etc.) in the following way:



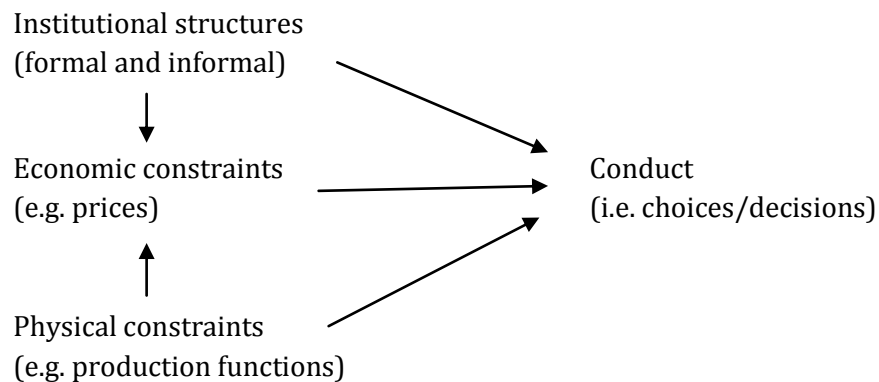
Behavioural economics does not fundamentally change this picture, but develops a different view of the (*short-term*) mappings from constraints to conduct (represented by the arrows in the diagram). Thus, whereas conventional analysis sees regulation as determining or influencing prices or quantities (the economic constraints on conduct), as when a particular

³ See Alston, L.J. "New institutional economics." In *The New Palgrave Dictionary of Economics*. 2nd ed. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2008.

⁴ In the longer-term there will also be feedback effects, for example via conduct that leads to the discovery of new techniques of production (e.g. more efficient ways of using a limited resource) and eases physical constraints. In practice these feedback effects are typically of considerable economic significance.

product/service/activity is subject to a tax or charge (e.g. for water abstraction) or when a quantity limit is imposed on some activity (e.g. on a discharge or emission of a waste product), behavioural approaches also see policy acting along the arrows in the diagram, for example by manipulating or shaping perceptions of perceived decision problems.

In contrast, the picture implied by IE is as follows:



Perhaps the most fundamental way of expressing this is to say that the incentives facing economic agents (whose conduct regulation is intended to influence) are *jointly determined* by a range of factors that includes the relevant institutional structures. Whenever institutional factors are ignored therefore, the analyst is abstracting from potentially important influences on outcomes, and thereby running increased risk of error.

Public policy itself generally operates through institutional arrangements. Thus, a law may be passed or a regulation may be introduced with the intended effect of changing the economic constraints facing decision makers in the economy, but, since the control of the economic constraints is only indirect, via change in law, it cannot be assumed that the intended effect will necessarily be achieved. Failure to study and understand the implications of the relevant institutional linkages is, therefore, a major source of unintended consequences, which in turn implies potentially higher risks of regulatory failure.

As indicated in the diagram, there exist direct linkages between institutions and economic conduct: not everything flows through the ‘economic constraints’ box. That is, for any set of prices and physical constraints on behaviour, economic conduct and decisions can be materially different, and possibly very different, according to the relevant institutional structure. A classic example is the degree of mutual trust in economic interactions, which is an aspect of the institutional structure, and one that is amenable to influence via the conduct of regulatory policy (but which, as the schematic diagrams indicate, is not a factor that would normally be considered in the conventional frameworks).

Thus, referring to the diagrams, it can be said that:

- The degree of trust is capable of affecting conduct directly. For example, for given prices and physical constraints, different levels of trust lead to different types of conduct and different levels of economic performance. Typically, higher/lower trust leads to

higher/lower levels of economic activity *at given prices and in given physical circumstances*. Arguably, it is impossible to understand the financial crunch of the last few years without understanding this linkage, implying that a failure to appreciate the importance of *direct* social constraints on behaviour was, empirically, a very major source of regulatory risk in this example.⁵

- The higher level of activity comes about because trust tends to reduce *transactions costs*, which, as well as leading to higher levels of economic activity, will tend to have a downward effect on prices. Thus, higher trust also has indirect effects on conduct, via its effects on prices.

The above discussion has introduced another central concept of IE, namely transactions costs, and this brings us to the first of the over-arching questions identified at the outset: what factors determine the shape of institutions? There is a substantial literature that emphasises transactions costs as a key determinant, originating in work of Ronald Coase which first identified this factor as being key to understanding the boundaries between markets and the non-market structures of economic organisation. Transactions costs are in turn influenced by a range of factors, of which two of the more important are trust and information and communications technology (ICT). Lower ICT costs tend to lower obstacles to economic interactions of a variety of types, and one of the most profound developments in today's economy is the way in which, through its impacts on transactions costs, the advancement of ICT is re-shaping the economic institutions of society.

In Britain this is occurring in a relatively *ad hoc*, trial and error way; which whilst having advantages in terms of limiting the exposure to some of the risks of large scale policy experimentation, also has the less desirable feature that it fails to make use of existing economic knowledge to promote more effective institutional development to changing circumstances. A better understanding of the underlying forces at work (which is one of the over-arching aims of IE) should, in principle, facilitate such adaptation.

In addition to transactions costs, two other factors have been found to be highly significant in determining institutional structures, each of which also appears in more traditional regulatory economics (but only playing minor roles):

- *Property rights, which are the central focus of Coase's classic article on social costs.* Textbook treatments of the control of external effects (third-party harm) have recognised property rights reform as an alternative to taxation/pricing, command and control, and tradeable quotas as an approach; but the focus has usually been on mitigating social costs in circumstances where property rights have not been previously well defined. An institutional approach recognises this (lack of definition) as *one* of a wider range of problems associated with potentially inefficient property rights structures. For example, property rights reform might be warranted where it could:

⁵ For economists interested in the history of their subject, it is also intriguing to note that the one and only reference to the *invisible hand* in Adam Smith's *Wealth of Nations* is to make a point about the direct effects on trust on economic conduct. Smith's argument was that transactions with foreigners would (in 18th century conditions) be characterised by a lower *average* level of trust than transactions with fellow Britons, and that free trade would, through the unintended (to merchants) consequences of this 'home-bias', be favourable to Britain. Nowadays, Smith's metaphor is widely misunderstood.

- lead to significantly lower transactions costs, or
- help mitigate opportunistic behaviours (see below).
- *Circumstances where the value of investments may be at risk from opportunistic behaviour.* These usually involve some imbalance of economic/market power between the parties to economic interactions, and such imbalances may occur for a number of reasons. Work by Oliver Williamson and others provides a taxonomy of relevant circumstances, but one of the most obvious is the imbalance in power between regulators and regulatees, which is a source of regulatory uncertainty. Institutional adaptations, including by property rights reform, can provide control or governance arrangements that can mitigate regulatory opportunism, and a wide range of alternatives have been studied, ranging from the development of formal institutional structures such as ‘independent’ regulation to informal norms and sanctions.

The relevance of these factors for the conduct of regulatory policy should be immediately obvious. Institutional adaptation and design lies at the very heart of policymaking: regulators can only very rarely control outcomes directly, and necessarily have to rely upon institutional developments to achieve their goals. Hence, all major assessments should examine the factors that might affect the relative efficiencies of alternative institutional arrangements. This involves addressing the two, over-arching questions raised at the outset, and it will typically require consideration of a number of sub-questions about matters such as:

- Transactions costs associated with the status quo and with potential alternatives to the status quo, including likely developments in such costs over time due, say, to changes in technology.
- The scope for opportunistic conduct, including by regulators, and the possibilities for its mitigation via institutional design.
- Levels of trust, the potential for their development, and the trade-offs with property rights reform (e.g. reform without adequate compensation for lost rights might reduce trust and have the unintended consequence of increasing transactions costs).
- The structure of property rights, and the implications of feasible, alternative structures for economic performance.

Such issues are often considered implicitly in policy making, but they are rarely approached on the systematic basis made feasible by the available scholarship.

Finally, in terms of ‘big picture’ implications of the institutional approach for the way in which regulatory policies are conducted and assessed, it can be noted that, when it does touch on institutional matters, the traditional approach to regulation has the following two characteristics:

- The emphasis tends to be on changing *formal* aspects of the institutional structure, such as laws and regulations. Although in practice there is a growing emphasis on informal

institutions, as indicated by Defra's current portfolio of activities, one of the obstacles limiting this benign development is often the absence of an assessment framework that is broad enough to encompass, in systematic ways, the 'missing influences' (on economic conduct and performance) that are identified in this note.

- Critically, it is generally assumed that, in changing one aspect of the institutional structure (e.g. laws and regulations), other aspects of that structure will remain unaffected. Again, this amounts to a major omission of pathways of influence from regulatory decisions to eventual outcomes and effects on economic performance.

When one part of an institutional structure is changed, it is a matter of common observation that other institutions evolve and adapt in consequence. That is, the economy does not operate in the manner of a machine, or even of biological structures (where the time periods for evolution tend to be long). The consequential institutional changes can be very rapid, and, once again, failure to take them into account can be a major source of assessment error.

To illustrate, a change in formal regulatory arrangements can lead to adjustments in informal mechanisms of social control. For example, by 'crowding out' pre-existing informal mechanisms of social control, formal regulation may turn out to be much less effective than might have been expected *ex ante* on the basis of an analysis that gave no weight to informal institutions and to their interactions with formal institutions.

Such responsive adjustments in institutional structures also demonstrate why the only sound way of conducting policy evaluations is via what has been called a 'comparative institutions' approach. Notions such as 'market failure' have no place in this framework, since they imply comparisons of realistic economic circumstances with an ideal set of arrangements that can never be known. Markets themselves are simply a type of economic institution, and they neither succeed nor fail on their own, since performance depends on their interactions with a wider set of economic and social institutions.

4. How might institutional economics inform the development and implementation of Defra's policies?

We now turn to briefly explore how some of the insights of work in the IE tradition might be of more direct relevance to the work of Defra, including in the development and implementation of its policies. Before doing so, two points should be made. First, it is important to recognise that, like other parts of the discipline, IE represents a particular perspective on, or way of thinking about regulation, rather than a body of settled conclusions that can be mechanistically applied in different settings. JM Keynes once described economics as being "*a method rather than a doctrine, an apparatus of the mind, a technique of thinking*", and IE should certainly be considered in this way.⁶ This means that it is not possible, and indeed that it would be misleading, to simply list out the conclusions of work in IE and suggest that these conclusions

⁶ The full quote is: *'[T]he theory of economics does not furnish a body of settled conclusions immediately applicable to policy. It is method rather than a doctrine, an apparatus of the mind, a technique of thinking'*: JM Keynes 'Introduction to the Series' in EAG Robinson *The Structure of Competitive Industry* (Nisbet & Co Ltd London 1931)

could be easily applied to, or could 'solve', the various regulatory issues that Defra faces, without further ado.⁷ Indeed, by stressing the importance of institutional factors in economic life, this way of thinking puts an even greater emphasis on a general implication of economic and social analysis: *context matters*. Rather, what becomes available to the regulatory analyst is a body of principles, questions, and experience (from other contexts) that can be developed and adapted in helping to think through the particular challenges that the analyst faces.

The second point is based on the recognition that Defra appears, on the basis of our preliminary research, to already be applying an IE approach in discharging some of its regulatory responsibilities, without necessarily always being aware that it is working within a well developed tradition (like Moliere's *gentilhomme*, who discovered he had been speaking prose all his life). However, whilst Defra may be doing this in a 'do-it-yourself' way, there may be much to be gained from using potentially valuable knowledge and experience derived from more systematic approaches.

In addition to providing potential insights and different perspectives on specific areas of Defra's regulatory activity (such as those briefly discussed below), at the more general level IE provides a way of thinking about Defra's regulatory approach and the issues that it confronts, including in terms of development and implementation of its policies. In this respect we note that Defra has recently undertaken to take stock of *what* activities it regulates and to estimate in general terms the costs and benefits associated with regulation.⁸ This work also seeks to develop an understanding of *why* Defra regulates different activities and areas, and details the specific regulatory policies it uses to effect this regulation (answering the implicit question *how?*).

Against this background, the general insights of IE could potentially offer the basis for a more innovative and 'developmental' approach to Defra regulatory strategies, whether the particular focus is upon policy development and or upon policy implementation. At a broad level, this might be said to involve asking *why* questions about *how* of regulation (Why do we regulate in this particular way? Why should we regulate in this particular way?) More specifically, in each of the seventeen different areas of regulatory activity identified by Defra in its stocktake document, the following sorts of general questions could be asked:

- i. Are there institutional adjustments that could be expected to reduce the costs of regulation and increase its benefits?
- ii. That is, are the existing arrangements are the best feasible fit to the context?
- iii. Can the institutional arrangements be expected to continue to be the best fit in the future, given what is known about how circumstances might change?
- iv. Are the arrangements able to adapt to changes in the underlying economic environment?
- v. What are potential alternatives to the current arrangements, and how do they compare to one another in terms of various indicators and measures? (eg:

⁷ For similar reasons, we would caution against such an approach being adopted when considering the conclusions of work in other areas of economics, such as behavioural economics.

⁸ Defra (2011) 'The costs and benefits of Defra's regulatory stock' August 2011.

transactions costs, possibilities for achieving compliance, participation by different parties etc.)

To illustrate these points we have selected three areas of Defra's current regulatory activity – flood management, marine environment and water management – and briefly examine how work in the institutional economic tradition might be relevant to some of the regulatory issues currently on Defra's agenda.

(i) *Flood management*

According to Defra's recent regulatory stock document, the direct costs of Defra's regulation on business in relation to flood management have been estimated at about £271 million (or 5% of the total costs of Defra regulation). The rationale for regulating this area is described in the following terms:

Market failures mean that incentives for private action to tackle flood risk are weak. In particular, benefit is generally collective within affected areas (public good), and the adverse impacts on third parties from actions (e.g. development) are not priced (externalities). These issues have led to flood management becoming a collective public activity – and the basis for this goes back centuries.

This represents a fairly conventional statement in support of the need for a collective approach to flood management. However, when some of the aspects of this statement are looked at through the lens of IE, a number of questions and issues suggest themselves. For example:

- Flood management is characterised as a 'public good', but this is clearly not the case in the strict sense of that term (a good/service that is provided under conditions of non-rivalry and non-excludability). Moreover, use of an abstract term such as 'public good' tends to distract attention from the fact that the potential harm caused by physical events such as heavy rainfall or storms at sea is a function not only of decisions relating to 'public' projects but also of myriad private decisions, which are themselves affected by the public decisions.
- Most obviously, individuals and businesses can locate away from areas with higher risks of flooding; or can incur expenditures that have the effect of reducing their own exposure to harm (sometimes, of course, to the detriment of others, but that will depend on the particular circumstances). Whilst public actions in response to flood risks may go back centuries (or even millennia), private actions go back further still.
- More generally, the various trade-offs among possible ways of adjusting to risks of flooding can be expected to vary from area to area, suggesting the desirability of an institutional design that is responsive to local conditions. The concept of a 'public good' offers little assistance in the task of developing and assessing such designs, since it is drawn from theory that abstracts from such variation (at best it can be used when local areas are, in effect, geographic 'islands' with little in the way of interdependencies; but such geographic segmentation is rarely the case).
- The balance between public and private activities can be expected to depend heavily on the allocation of property rights, which is one of the central issues of work in IE (see

above). Public policy in the flood management area involves consideration of options that, among other things, amount to transfers of property rights between different sub-groups of the general public, an example being options in relation to the supply of relevant types of insurance against flooding. Whilst such transfers of property rights inevitably give rise to contention over the distributional effects of the relevant measures, it is often not appreciated that property rights realignments amount to changes in institutional structures that can also be expected to have potentially important implications for the efficient use of resources.

- As an example, one of the Coase theorems that appears to have direct applicability to flood management (including insurance issues) is that, if those suffering from an adverse externality are compensated in full for the harm they suffer, the resulting outcome will tend to be inefficient. This is because the compensation (or, more strictly, the *right* to compensation) will tend to crowd in/out private actions that serve to accentuate/mitigate the problem. Put another way, an institutional structure that gives all the rights to those adversely affected by flooding risks is likely to be inefficient. We stress, however, that this is not a general result that holds across all contexts, and that its significance in a flood management context lies in the capacity of households and individuals to choose their locations.
- Whilst conventional textbook economics tends to insinuate that unpriced third party effects (externalities) are a problem, and also that their existence generally points toward public interventions, researchers in the IE tradition have shown why such beliefs are wrong, and how there can be other ways (in addition to ‘pricing’) of dealing with externalities. In practice, it would likely be highly inefficient to try to put a price on all external effects: the transactions costs would simply be too high.
- The rationale for intervention has been explained as a response to ‘market failures’. As noted, IE directly challenges this as a rationale for regulation/government intervention on the basis that the relevant comparison should not be between an ‘ideal’ state of affairs and the real world, but rather as between alternative and imperfect institutional arrangements.
- The observation (in the regulatory stock document) that an institutional economist might latch on to immediately is the reference to collective flood management going back centuries. This suggests the existence of a body of experience that can be drawn on in considering the relationship between the precise nature of the problems/risks and the kinds of approaches that have been adopted in the past. History provides a catalogue of ‘experiments’ that can potentially be used to compare the relative performances of different institutional arrangements in different contexts.

As indicated above, Defra policies already take account of some of these points. A good example is provided by the new Flood and Coastal Resilience Partnership Funding arrangements which, among many other things, effect a shift to greater local influence on decisions (and hence to potentially greater diversity in approaches), and contain a provision that properties built after January 2012 will not be included in calculations that determine funding, so as discourage ‘inappropriate’ new developments. The structure of the thinking about institutional design is,

however, not entirely systematic. For example, it is not clear that the balance between the funding incentives provided to local authorities and the 'private' incentives created by *total* exclusion of new-build from 2012 onwards is based on any very detailed assessment of the trade-offs.

It might, of course, be argued that the intention is to proceed by trial and error, whereby the parameters of the new scheme will be adjusted as experience is gained as to how the new arrangements are working out; and in many circumstances such an experimental approach would be admirable for its flexibility. However, this simply highlights the more fundamental difficulty, which is the potential lack of credibility that might attach to the current incentive structure. Whatever is said now, there may be a belief that, in a few years time, houses built in 2012 will come to enjoy the same sort of status in future funding assessments as houses built in 2011; and this may adversely affect the development of today's projects.

As described earlier, in its various guises this policy credibility problem is one of the central areas of interest of IE. What is required in the flood management area, like in many other policy areas, is an institutional design that combines credibility with flexibility. In the absence of flexibility, there is a tendency toward 'stranded' regulation – arrangements that are adapted to yesterday's policy challenges, not today's. In the absence of credibility, there is a tendency toward under-investment.

Since the Flood and Coastal Resilience Partnership Funding arrangements leave considerable flexibility with the Government in relation to the future parameters of this or successor schemes, a *prima facie* institutional assessment suggests that the larger of the risks lie on the under-investment side. That is, the exclusion of new properties aspect of the scheme may lead to the adoption of smaller, less efficient 'avoidance' projects in the first phase – not because the exclusion is misguided, but rather because of expectations that there will be adjustments to it in the future.

(ii) *Marine*

Although Defra's regulatory activities in relation to the marine environment are less costly (in terms of direct costs to business) than the other examples noted here, the issues associated with regulating the marine environment fall squarely within the scope of IE. Defra's Regulatory Stock document notes that among the rationales for Defra's regulation of activities associated with the marine environment is the following:

Our seas are a common public resource so we aim to ensure they are sustainably managed for a range of social, environmental and economic benefits. We are tackling the issues of how best to strike a balance between conservation and development of marine resources. Supplies of fish as a healthy food source need to be secured, without destroying fish stocks and damaging the marine environment, and enabling a sustainable fishing industry.

There is a direct connection between the issues raised here and the work on common/shared pool resources in IE, particularly the work of Elinor Ostrom and her colleagues, but also of many others working in the same or similar traditions. One of the striking things about this work is the sheer diversity of different institutional arrangements that have been tried in one place or another, and at one time or another, in response to the management of common pool resource

systems (like fisheries), and the relevant literature is therefore a rich source of both ideas and of information about the performance of different approaches in different circumstances.

One of the aims of Ostrom and others has been to try to extract a number of principles of resource management from this diversity. This comparative work on problems connected with shared resources has led to the identification of a number of types of 'design principles' for resource management systems. We do not have the space here to explore each of these principles, but simply list out some of some of the most important:

- Clearly defined boundaries for the resource system (effective exclusion of external un-entitled parties);
- Rules regarding the appropriation and provision of common resources that are adapted to local conditions;
- Collective-choice arrangements that allow most resource appropriators to participate in the decision-making process;
- Effective monitoring by monitors who are part of or accountable to the appropriators;
- Graduated sanctions for resource appropriators who violate local rules;
- Mechanisms of conflict resolution that are cheap and easy to access;
- Local self-determination recognized by higher-level authorities;
- In the case of larger common-pool resources, organization in the form of multiple layers of institutions, with small, local institutions at the base level.

Fisheries issues provide classic examples of common pool resource issues and of institutional responses. Thus, in a study of institutional arrangements in each of forty-four inshore fisheries, Schlager⁹ identified thirty three user groups that used multiple 'boundary conditions' to manage access to the resource. Unsurprisingly, the most frequent of these conditions was based on location: access was limited to those living in nearby communities. More interesting, however, was the finding that the second most frequent condition was a restriction that users adopt a particular type of technology. More interesting still was the lack of the use of quotas as a resource management tool, a finding confirmed in other studies of self-organised fishery management systems.

One source of the interest lies in the fact that restrictions on technology are often criticized by policy analysts trained in rational choice theory economics on the ground that such gear restrictions reduce economic efficiency in fishing (they tend to imply that a given level of aggregate 'take' from the common pool is not achieved at least cost). IE tends to be less hasty in its judgments here, on the basis that, hard though it may be for its advocates to accept, it is quite possible that, if an economic theory predicts that a widely adopted arrangement is inefficient (and hence there is a better way of doing things), it may be that it is the theory, and not the practice, that is wrong.

By taking into account of a wider range of contextual factors – and we repeat that standard theory tends to abstract from a large number of potentially relevant factors – IE shows how technology restrictions may have effects that, by less obvious means, improve the effectiveness

⁹ E. Schlager, "Property-Rights Regimes and Coastal Fisheries: An Empirical Analysis", in T. Anderson and R. Simmons, *The Political Economy of Customs and Culture: Informal Solutions to the Commons Problem*, 1993

of resource management in ways that more than counterbalance any inefficiencies associated with technology restrictions. Examples in the fisheries case include: gear restrictions may be easier to monitor and enforce (i.e. they might be associated with lower transactions costs) than, say, fish quotas; and, in conjunction with other 'rules' of the resource management system, they may serve to reduce conflicts and enhance the legitimacy of the relevant institutional arrangements (e.g. as when access to different fishing grounds is linked to use of different types of gear).

This is not to suggest that, for large scale resource management problems of the type that confront the UK and EU, quota-based approaches are inappropriate. It does, however, draw attention to the significance of factors that may also play some role in fine tuning system design, particularly in contexts where high-level policy is seeking to rely more on encouraging greater participation in the management of common pool resource of those whose livelihoods are heavily affected by that management. In these latter circumstances, lessons from smaller scale, participatory systems may come to have greater relevance.

(iii) Water quality and quantity

Water resource management gives rise to much the largest direct costs of Defra's regulatory activities, with costs to business estimated at about £2.15 billion (or 40% of the Defra total). There are a number of reasons why Defra regulates water quality and quantity, but the reason most relevant to the current discussion is that: *"Water needs to be shared between different uses and society requires rules for ensuring that is done equitably and fairly including a fair share for the environment."*

Water quality/quantity regulation therefore touches on two central issues in IE: (1) the sharing of common resources and (2) the definition and allocation of property rights. (Wherever it involves investments by businesses and individuals, it will also necessarily encompass opportunism/policy credibility issues.) We have already briefly introduced some of issues related to the sharing of common resources, but of particular relevance to the choice of regulatory strategies for water quality/quantity is the point that different approaches to the common pool issues depend upon transactions technologies and their costs. Since such costs are tending to decline over time in consequence of ICT developments, this suggests that institutional structures that favour greater participation and more decentralised decision making on matters relating to water resource management may be becoming a more feasible/appropriate regulatory strategy than has historically been the case. The increased Defra interest in such structures is consistent with this view.

The government is currently considering various reforms to the water sector, including on issues relating to the abstraction of water rights. It seems clear, that, whatever approach is taken, fundamental reform of property/usage rights will a major issue. It is therefore sensible to recognise at the outset that, in looking at different approaches, a large part of what is being assessed are alternative systems of property rights, and hence different institutional set-ups. It follows that it may be sensible, at an early stage, to explore the underlying issues of property rights and of institutional structures connected with strategic options such as (a) 'economic' charging for abstractions and (b) trading based around current allocations of abstraction rights. The case for explicit and early assessment of these matters is reinforced by the fact some of the

most influential work in IE suggests that better alternatives (than these classic, price vs quantities alternatives) may be available.

To illustrate the difficulties it can be noted that, under both price and quota systems, there has to be some clear definition of what the things being sold or traded actually are. That is a relatively clear specification of the relevant property rights is required. At the same time, there needs to be some reconciliation of what is sold or traded with the physical realities of the eco-systems from which water is abstracted and to which it is returned. It is this reconciliation (between social and physical systems) that lies at the heart of common pool resource system management, and the search for reconciliation is an exercise in institutional design.

The literature of IE provides examples of many types of arrangements that have been adopted in response to water management challenges, but there are also examples from other economic sectors. One such 'out-of-area' example is the set of access rules for energy networks, where varying demands for network usage interact with some quite subtle variations in the capacity of the systems themselves. Variations in network capacities are not unlike variations in fish stocks or variations in water availability in a particular area: in each case, the variations can make it difficult to match definitions of property rights with variations taking place within the physical systems. In the regulation of energy systems, the response has been the development of what are increasingly referred to as 'hybrid' institutions whose purpose it is to close any gaps between physical systems and socio-economic systems (of property rights). This considerably eases the burden of defining property rights, which, in the presence of a hybrid, can be made much simpler. Simpler definitions of property rights in turn reduce transactions cost, and thereby facilitate efficiency in resource allocation.

A typical institutional design for problems of the water abstraction type, therefore, involves:

- Definition of property rights that reflect, but not necessarily in a very precise way (because that would be excessively complex), the physical realities of particular physical systems. Thus, in water, rights might be defined in terms of *shares* of available resources at a particular time, rather than as a simple quantity (although we note that this leads to a further institutional design question: how can availability be determined and declared in a way that maintains the legitimacy and confidence necessary to sustain confidence in the stability of the property rights themselves?).
- A hybrid organisation entrusted with the task of adjusting actual holdings of rights (by water abstractors) to physical realities in those circumstances in which the aggregate of rights granted and being used moves significantly out of line with physical eco-systems (because of simplifications made in relation to the definition of rights).

Finally, we note that getting the institutional design right is crucial for policy success in this area. Crude property rights definition, whoever owns the initial entitlements (government or private interests), are likely to lead to inefficiency, and potentially to serious risks of regulatory failure. Smarter rights definitions – such as linking abstraction rights to river flows, water levels, etc – can be expected to help to some extent; but experience elsewhere indicates that one hundred per cent reliance on smart definitions of property rights would be risky too.

5. Concluding comments

This short paper has aimed to provide a general introduction to IE, and to highlight the potential relevance of this approach, in both a general way and in the more specific context of Defra's current approach to the development and implementation of policy. The discussion was therefore not intended to be an exhaustive summary of how IE might inform Defra's regulatory strategy. However, we hope that it provides sufficient basis for Defra seriously to consider examining how this way of approaching regulatory problems could potentially be developed and applied across the different areas that the Department regulates.