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**“Economics of water supply and sanitation services:
towards a new institutional approach”**

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Abstract

This paper presents an unorthodox reconstruction of new institutional approach to environmental issues, clarifying and transforming its conceptual foundations so as to increase its potential for research on environmental governance. The paper argues that the new institutional approach has been from the outset characterised by two conceptual features that set it apart from neoclassical environmental economics. First, the paper shows how the new institutional analysis of environmental problems is based on the broader concept of interdependence instead of the neoclassical concept of externality. Secondly, new institutional economics admits positive transaction costs and the paper investigates its implications for research on environmental governance. The paper also argues that the new institutional approach has to accommodate a broader range of

behavioural motivations and to acknowledge limited cognitive capacity in order to be truly useful for research on environmental governance, and demonstrates how a provision can be made for them.

Keywords

New institutional economics, environmental governance, interdependence, transaction costs, pluralism, limited cognitive capacity

Introduction

Most economic research on the environment is based on neoclassical welfare economics. While the neoclassical approach has been popular, it has relative advantages in some areas of research and disadvantages in others. For example, it has difficulties to make sense of behaviour and institutional arrangements related to the environment. The neoclassical approach assumes costless transactions, unlimited cognitive capacity, perfect knowledge and pre-existing and stable preferences that are informed exclusively by welfarist values. Yet in environmental matters agents sometimes pursue goals that are not exhausted by their welfare, suffer from limited cognitive capacity, have to choose with imperfect knowledge, and their agency and alternatives are importantly shaped by transaction costs and institutional arrangements.

New institutional economics offers an alternative framework for analysis which is worth serious consideration. Perhaps ironically, the birth of new institutional economics has something to do with the environment. While Ronald Coase brought up the concept

of transaction costs – a concept of foundational importance for new institutional economics – already in 1937 in “The Nature of the Firm,” it was his critical response in “The Problem of Social Cost” (1960) to Arthur Pigou’s treatment of externalities – which are at the heart of neoclassical environmental economics – that launched new institutional economics as an intellectual program. Later in 1974 Coase assaulted in his “Lighthouse in Economics” the conventional theory of public goods, another cornerstone of neoclassical environmental economics. Only too fittingly, another founding father of new institutional economics, Guido Calabresi, worked on the allocation of risks (1961, 1970).

It thus seems possible that new institutional economics has had its own theory of environmental problems and policy from the outset. However, the genuinely new institutional approach to the environment was almost lost when new institutional economics (for overview, see Eggertsson, 1990) focused on industrial organisation (see Williamson, 1996), economic development (see Platteau, 2000), public choice (see e.g. Mueller, 1989), and economic history (see North, 1981; 1990). Indeed, new institutional economists have mostly ignored environmental issues, except for those who have examined how renewable natural resources are managed under common property institutions in developing countries (see Baland and Platteau, 1996; Bromley et al., 1992; Ostrom, 1990; Ostrom, Gardner and Walker, 1994).

I argue that the new institutional approach to local resource management under customary common property institutions offers a fruitful platform for research on environmental governance in general. By environmental governance I mean the management of all environmental resources, which include conventional renewable and

non-renewable natural resources such as forests, groundwater and minerals; newly discovered natural resources such as biodiversity, the ozone layer, and atmospheric sinks; and environmental quality, including the quality of air and water. Environmental governance is necessary to resolve environmental conflicts and it involves the establishment of governance institutions that facilitate the use of environmental resources and set constraints for it (see Young, 1994: 15). Governance institutions range from informal to formal, and their scale varies from local to national to international. Environmental governance may involve the creation of new agents (such as environmental agencies) to undertake governance activities, the delegation of authority to undertake governance activities to existing agents, or both. Finally, governance is what governments do. Sometimes – when resource users govern themselves under customary institutions, for example – government does not entail the presence of state, but at other times the state is intimately involved.ⁱ

This paper presents an unorthodox reconstruction of the new institutional approach, which clarifies and transforms its conceptual foundations so as to realise its potential in research on environmental governance. I argue that the new institutional approach has been from the outset characterised by two conceptual features that set it apart from neoclassical environmental economics. First, and more obviously, new institutional economics admits positive transaction costs (Coase, 1937, 1960). Secondly, and less obviously, new institutional analysis of environmental problems is based on the broader concept of interdependence instead of the neoclassical concept of externality (see below and Coase, 1960; Ostrom, 1990). I also argue that the new institutional approach has to accommodate a broader range of behavioural motivations than the neoclassical

approach, and to acknowledge limited cognitive capacity, in order to be truly useful for research on environmental governance.

In what follows, I will first examine the most fundamental feature of new institutional approach – the concept of interdependence – that sets it apart from the neoclassical one. The second section discusses the significance of positive transaction costs. The third section investigates how non-welfarist goals can be integrated into the new institutional approach. The fourth section reviews the implications of limited cognitive capacity for the study of environmental governance. The conclusions will reflect on the pros and cons of the new institutional approach as a research strategy.

The Foundation of New Institutional Approach: Interdependence

Following Pigou (1920), neoclassical economics conceptualises environmental problems such as the pollution of air and water as unidirectional externalities (although sometimes the concepts of public goods and risks are used instead). Problems related to environmental quality are usually studied in static framework, while the use of renewable and non-renewable natural resources is examined in inter-temporal framework. At best, this has left the neoclassical approach to the environment fragmented. Below I will follow the externality reasoning, as it offers the best stepping stone to interdependence-based reasoning that characterises the new institutional approach.

In neoclassical welfare economics, externalities are understood as unidirectional physical effects between agents, for which no price is paid and no compensation is

received (Mishan, 1971). Simple partial equilibrium analysis indicates that efficient allocation of resources is not achieved in the presence of externalities. Pigou's suggestion was to impose a tax on negative externalities and to subsidise positive externalities in order to reach the efficient allocation of resources. A number of criticisms have been presented against this reasoning. The most fundamental criticism argues that Pigovian reasoning is illegitimate, because it assumes that allocative decisions can be detached from distributive ones. The Pigovian approach does so because it does not perceive the introduction of taxes or subsidies (or other policy instruments) as alteration of initial endowments and thus distribution of wealth and income (see Calabresi, 1991; Dragun and O'Connor, 1993; Varian, 1984; Vatn and Bromley, 1994). Another problem with the Pigovian reasoning is that it fails to understand that "externalities" are instances of a violation of one of the fundamental assumptions of conventional microeconomics: the assumption of independence of agents' choices. That is, externalities are examples of agents' interdependence and do not deserve independent conceptual status. Its granting by Pigou has muddled welfare-economic analysis throughout the 20th century.

Interdependence clearly lies behind the classic examples of externalities in economics. Factories belching smoke limit the ways in which laundries can dry their linen, but if the options of laundries are kept open those of factories must be limited. Similarly, sparking engines driven across the countryside mean that farmers' freedom from the risk of fires is compromised, and the elimination of these risks limits the freedom to operate engines as one pleases. The essence of these often used examples is that one agent's choice limits the range of choices available to another one – this an instance of interdependence. A classic is also Hardin's (1968) analysis of the

interdependence between the users of natural resources such as pastures and fisheries. Units of flows of these resources are rival in consumption, meaning that use by one agent precludes use by another. This interdependence may instigate a race for the appropriation of resource units which is individually rational but can decimate the resource.

Coase (1960) acknowledged interdependence – the reciprocal nature of relationships that underlie what are conventionally regarded as externalities – but did not take his analysis to its logical conclusions. Coase (1960) argued that when an interdependency exists, it is necessary to choose whose interests are to be protected. He argued that this could be done by assigning private property rights to one of the involved parties but he and others have recognised that there are also other ways of doing it, such as the introduction of environmental regulations (Bromley, 1991). Coase then proceeded to demonstrate that under Pigou's own assumption of costless transactions, the establishment of private property rights is all that is needed. The interdependent parties can reach the efficient allocation of resources through private bargaining, as soon as the initial endowments are defined. Coase *also* showed how the lesson changes when the costs of using the markets (transaction costs) are introduced. Now the initial assignment of rights influences (and sometimes determines) the allocation of resources. Moreover, he argued that regulation can be a less expensive response to interdependence in terms of transaction costs than private property rights and markets (Coase 1960, 17-18).

The concept of interdependence sets the new institutional approach apart from the neoclassical one. As the theoretical implications of interdependence have seldom been

worked out, they may appear somewhat surprising. The interdependence of agents that have incompatible interests in environmental resources results in environmental conflicts – this is the essence of environmental problems for the new institutional approach. Interdependence forces collective environmental choices upon us: we have to choose between conflicting interests in the environment by action or inaction. Environmental conflicts are resolved by affirming or redefining initial endowments by private property rights or by other kinds of rights, such as those created by environmental regulations (see Bromley, 1991). Affirmation or redefinition of initial endowments has simultaneously allocative and distributive consequences. As Coase has shown, allocative efficiency will be reached after initial endowments are defined. Thus, distributive consequences and governance outcomes must be seen as the most important dimensions of collective choices over environmental governance (Calabresi, 1991). The importance of distributive consequences and governance outcomes means that efficiency and welfare goals cannot be assumed: attention must be paid to what goals agents actually have with regard to environmental governance. As Coase (1960, 43) has said, "the choice among different social arrangements ... must ultimately dissolve into a study of aesthetics and morals."

As already indicated, interdependence explains the existence of institutional arrangements such as property rights and environmental regulations independently of any reference to transaction costs: institutions such as these are needed to resolve interest conflicts whether or not we grant the existence of transaction costs (see Bromley, 1991). As interdependence may involve varying number of agents and have different geographic scales, it directly influences the scope of appropriate institutional solutions. Local solutions appear fashionable today but they may not be adequate when

interdependence is national or global (yet it is, of course, better to have local solutions than none at all, a matter that will be taken up in the next section). Similarly, where interdependence is exclusively local, national solutions may be wasteful and dysfunctional. Finally, when interdependence is complex (see below for an example), governance may need to be carried out at multiple levels or through multiple governance institutions.

Water resources offer a good example of the implications of interdependence. Water resources are multiple-use resources and involve a number of conflicting interests, generating a set of interdependencies that have varying scales. Although governance solutions vary from place to place, it is not uncommon to have local arrangements for the governance of fisheries. Diversion, power generation, and waste disposal are usually governed by national institutions. In international rivers, conventions may create institutions that extend beyond national jurisdictions (see Bernauer and Moser, 1996). There often are private water rights that are transferable with riparian land, a governance solution that relies on markets and courts. At the same time, this governance solution is enveloped by a regulatory framework that limits many water uses. This is not to say that multiple governance institutions or multi-level governance are always desirable: sometimes they may be unfortunate and dysfunctional results of misjudgement, path dependence or rent-seeking.

To conclude, the concept of interdependence offers a foundation for a unified economic approach to environmental and natural resource use problems, without need to resort to separate externality, public goods and risk frameworks. The origin of interdependence is in the attributes of environmental resources or their users. Resource

attributes such as rival or non-rival use (and user attributes such as homogeneity or heterogeneity) structure interdependence differently and require different institutional responses. Research in and around new institutional economics has already developed a comprehensive view of the sources of interdependence and their implications, and thus offers concepts that help to analyse environmental problems and suitable institutional responses with a precision (see Ostrom, 1990; Schlager, Blomquist and Tang, 1994; Schmid, 1987).

I now turn to transaction costs, which should be understood in the context of interdependence in order to fully respect their implications.

Transaction costs

The recognition of transaction costs has been considered the hallmark of new institutional economics from its inception. Coase, who introduced the concept when trying to explain the existence of the firm, originally defined transaction costs as the costs of using the market system (Coase, 1937). Others have later clarified that these include the costs of seeking information, conducting negotiations, writing up contracts, and monitoring and enforcing compliance with them (see Dahlman, 1979; Barzel, 1985). The usual definitions emphasise the costs of using the markets because, despite the interest of Coase (e.g. 1937, 1974) in explaining the choice between market and non-market solutions, most research in new institutional economics has focused on contracting and bargaining in the markets. However, non-market transactions such as administrative ones (see Schmid, 1987) are arguably equally if not more important than

market transactions for environmental governance. Non-market transactions entail costs just like market transactions, because collecting information, making decisions, formulating (institutional and other) rules, monitoring compliance with these rules, and enforcing these rules are costly undertakings (see Paavola, 2002).

Transaction costs have been argued to exist because information is costly to obtain (see Dahlman, 1979; Barzel, 1985). While this explanation ties transaction costs with the basic set of neoclassical assumptions – interpreting them as a result of a deviation from the assumption of perfect knowledge – it leaves open the question what makes information costly to obtain? Without making any claim to exhaustiveness, I argue that at least five theoretically distinct sources of costly information can be identified:

1. Human cognitive capacity is limited as will be discussed later in greater detail. Because of limited cognitive capacity, more resources will be needed for gathering a certain amount of information.
2. The preferences and plans of other humans are difficult to learn, because self-interested agents do not have incentives to disclose information about them (see Arrow, 1986; Williamson, 1985).
3. Many objects of transactions such as durables and environmental resources have a complex set of characteristics (see Lancaster, 1966), some of which can only be learned over long period of time if at all.
4. The existence of real time – which is assumed away in the conventional neoclassical approach – translates into information costs. Unlike in conventional models where instantaneous adjustment is possible, in real world adjustments require learning, time and resources.

5. Institutions can make information gathering costly instead of economising on it. For example, multiple governance institutions may scatter information across governance regimes or deny or limit the authority of agents to obtain it.

When combined with interdependence, transaction costs have several important implications for research on environmental governance. First, because of positive transaction costs, governance institutions cannot be designed perfectly *ex ante*. The rights structure generated by governance institutions will omit some interdependencies and new ones not anticipated when governance institutions are established will emerge. When these interdependencies result in environmental conflicts, they will be addressed *ex post* in the courts or in other social arenas. If the transaction costs of acting collectively are not too high for those interest groups who are not served by the status quo, governance institutions may be changed.

Transaction costs also influence the effectiveness of governance institutions and governance outcomes. Attributes of environmental resources and their users constitute challenges for environmental governance. Many of these challenges such as the size of the resource, the number of its uses and users, and the rivalry or non-rivalry of resource uses can be addressed and analysed in transaction cost terms, which helps to generate expectations about the performance of all institutional alternatives. For example, governance of open seas is more costly than that of coastal fisheries because of the size of the open seas as a resource and the number of its users. For this reason, it will be more difficult to devise functioning governance solutions for marine fisheries than for the coastal ones. The same applies to regimes of water quality management. Because of the size of resource and the number and heterogeneity of involved parties, the quality of

international waters such as the Baltic Sea has been notoriously difficult to manage – although some of the parties to international conventions have been able to effectively manage the quality of their own water resources.

The relative effectiveness of governance solutions depends on at least two factors. First, do the governance institutions address the relevant interdependencies? A common reason for the ineffectiveness of governance institutions has been an omission (for whatever reason) of some important sources of interdependence. For example, the Clean Water Act in the United States did not originally establish rules for non-point sources, although they were responsible for a half of many pollutant loads. Second, when governance institutions do address the pertinent interdependencies, how do they do it? The way in which governance institutions formulate rules and rights and organise governance functions influences both the level and distribution of governance costs. Compare, for example, the difference between rules prohibiting just harmful discharges or all unauthorised discharges, and rules prescribing governmental monitoring or self-monitoring by the polluters. Also, while decentralized self-monitoring may be less costly than a centralized monitoring solution, decentralized enforcement by stakeholders is probably more costly than centralized enforcement. These and other transaction cost implications are considered in policy choices in order to obtain desired governance outcomes. For example, environmental charges have usually been formulated as theoretically inferior input fees because the measurement of effluents or emissions is costly and renders emission and effluent fees less attractive.

To conclude, while the nature of interdependence sets basic requirements for governance institutions, transaction costs influence the choice of institutional responses.

Plain interdependence reasoning may replicate an old public finance argument according to which interdependencies (externalities) should for efficiency reasons be addressed by their own governance system that has a jurisdiction matching the extent of the interdependence. Yet this kind of governance systems may entail high governance costs (which consist of transaction costs and are ignored in conventional economic frameworks) because they do not enjoy economies of scale and scope. This is especially pertinent to the choice of the level of environmental governance. The modern state with its effective administrative organisations may, for better or worse, have rendered many (but by no means all) smaller-scale and special-jurisdiction governance systems obsolete. Conversely, the ineffectiveness of states in developing world may confine the range of available governance solutions to those that are based on local organisations and institutional alternatives. While local solutions are obviously better than no effective governance at all, they remain vulnerable if the interdependence extends outside their jurisdiction. It is no wonder that co-management has evolved into a new catchword (see e.g. Abdullah, Kuperan and Pomeroy, 1998; Sekhar 2000) – it promises to combine local relative advantages with the relative advantages of the state in environmental governance. It is also noteworthy that the thickening network of international environmental conventions enables international organisations such as the Global Environmental Facility to achieve portfolios and levels of activity that make them both more effective and likely to accumulate more governance activities in the future. The thickening of international relations also offers new tools for the enforcement of conventions – non-compliance may be denied benefits of cooperation in other fronts and complaints may be rewarded in other fronts as well.

The next section will examine the ways to expand the range of behavioural motivations that are acknowledged in new institutional approach..

Motivations for Environmental Governance

Neoclassical environmental economics assumes that agents are motivated exclusively by the improvement of their personal welfare or utility. Yet even contingent valuation surveys encounter behaviour which is inconsistent with conventional economic assumptions (see Jorgensen et al., 1999; Spash and Hanley, 1995; Stevens et al., 1991). Indeed, behavioural norms based on cultural expectations may widely differ from welfare-centred individualism both in developing countries (see Platteau, 2000) and in the developed ones. Thus, although in the main new institutional economics has shared the behavioural assumptions of neoclassical environmental economics, studies of customary resource management have sometimes assumed or argued that local resource users and managers are informed by stewardship or conservation motives. While this kind of ad hoc relaxation of conventional behavioural assumptions may be necessary and fruitful in particular studies, the more general theoretical justification and accommodation of wider range of behavioural motivations is long overdue.

Again we need to start from the conventional assumptions in order to understand how the new institutional framework can be modified to accommodate a wider range of motivations and governance goals. Neoclassical economics assumes that individuals are motivated either by the improvement of their personal welfare or the satisfaction of their preferences. These assumptions are frequently and mistakenly treated as the same, because the satisfaction of agents' preferences is thought to result to the maximization

of their welfare. The idea that individuals are motivated by their personal welfare originates to the late 19th century notions of “utility” as pleasure and usefulness. Pleasure was associated with psychological satisfaction and usefulness with what materially enhanced the agent’s well-being.ⁱⁱ While the proponents of pleasure and usefulness notions of utility disagreed on the possibility of interpersonal comparisons (see Cooter and Rappoport, 1984; Georgescu-Roegen, 1968; Sen, 1991), both notions had a clear relationship to individuals’ welfare. However, there is no such relationship between the satisfaction of preferences – and the contemporary definition identifies utility with the degree of preference satisfaction (see Hicks and Allen, 1934) – and individuals’ welfare. Preference utilitarianism allows preferences which do not have any relationship to the agent's personal welfare. As a consequence, the notion of "utility" does not have any substantial meaning and cannot be identified with individuals’ welfare.

Both conventional behavioural assumptions are problematic in their own ways. The notion of utility as personal welfare is too restrictive as an exclusive behavioural assumption: it does not admit motivations that most of us find intuitively reasonable in certain situations, such as the regard for the welfare of others or the respect for certain behaviours without regard to their consequences. Preference utilitarianism in turn does not help to understand the relationships between particular motivations, preferences, and choice. Preference utilitarianism commensurates all behavioural motivations, although different motivations would be in conflict with each other and could possibly be incommensurable. One solution to these problems is to disassemble preference utilitarianism by investigating what kind of values can inform preferences and by examining the implications of plural motivations for choice. This solution is as

anthropocentric as the conventional economic approach: it treats all value as originating from valuing humans. Yet it does not have difficulty in dealing with claims of intrinsic value or environmental rights. It treats these claims exactly as what they are: as claims human agents make about the moral status of the environment.

The unpacking of preference utilitarianism translates to accommodating both intrapersonal and interpersonal pluralism. *Intrapersonal pluralism* means that an agent simultaneously holds a multitude of values, which could all inform her choice. The agent thus has to choose which values are to inform her preferences when confronted by a decision. Kavka (1991, 1993) has argued that for this reason the complications of social choice indicated by “impossibility theorems” must also be attributed to individual choice. *Interpersonal pluralism* in turn means that individuals may be informed by different values in the same choice situation, and arrive at same or different choices.

The admission of motivational pluralism has several implications for new institutional approach to environmental governance. If we grant that there are welfarist, non-utilitarian consequentialist and deontological foundations for preferences,ⁱⁱⁱ we have to admit that preferences are not and cannot be revealed by choices (see Bromley and Paavola, 2002). For example, knowing that an individual has chosen to observe a vegetarian diet does not reveal the motivations that led her to choose vegetarianism. She may have chosen vegetarianism so as to improve her own personal welfare, but there are also other possible explanations. She may have chosen vegetarianism because of concerns for the welfare of other humans or animals. Alternatively, she may have concluded that animals should not be killed because their life is intrinsically valuable. Finally, she may have considered that being a vegetarian is simply the right or virtuous

thing to do. It is important to entertain the possibility of all of these motivations, because they entail different choice behavior. For example, changes in food production systems could give a reason for self-regarding and other-regarding welfarists to abandon vegetarianism. However, such changes would be unlikely to persuade vegetarians informed by non-utilitarian consequentialist and deontological motivations.

Secondly, when agents make judgements about the environment that are based on formally different ethical foundations, it may be impossible to find a common metric for these judgements. This denies the idea of “optimal” social choices but not the possibility of social choices. Rules of political decision making lay down aggregation rules that enable simple majorities or supermajorities to translate those values that muster most support into institutional rules. This means that environmental governance institutions exist to resolve conflicts so as to realise those values that are deemed most pertinent in the context of the conflict. As a result, some environmental governance institutions are geared to improve conventional notions of human welfare, while others seek to realise goals that have little to do with human welfare.

Finally, values are embedded in and perpetuated through institutional rules. For example, welfarism is embedded in market institutions while non-welfarist values often find expression in rules that confine the operation of market logic and demarcate a realm for other decision-making logics (Bromley and Paavola, 2002; Radin, 1996). Institutions are thus carriers of values and influence on which values individuals will base their preferences, choices and actions, and ultimately what outcomes are generated (see e.g. Titmuss, 1970).

To return to the example of water resources, riparian law institutes a governance system which mainly responds to market incentives (see Paavola, forthcoming). However, riparian law or other legal institutions that establish private water rights are practically everywhere surrounded by legal and regulatory rules that set constraints to the operation of market signals. These constraints are informed by, for example, public health and environmental goals that may have little to do with the improvement of any unambiguous notion of social welfare. For example, while public-health based regulations concerning water quality may sometimes reflect what is economically warranted, they also reflect (to a lesser or greater extent) intrinsic values associated with human health and deontological concerns for the rights of individuals to bodily integrity. Similarly, constraints that seek to protect important ecological functions may be motivated by the economic value of these functions – for example, widely shared and economically important interests in recreational use of water resources may not find adequate expression through the markets and may need to be protected by regulatory constraints. However, all such environmental constraints need not be motivated by economic concerns. For example, regulations that seek to ensure continued runs of endangered stocks of migratory fish may reflect intrinsic value placed on the existence of such stocks, without regard to the economic implications of retaining these stocks. All these goals are legitimate and mixed in actual policies. Any legitimate ex ante or ex post assessment of these policies would need to acknowledge the plurality of underlying goals and take them into consideration.

I will now take up the assumptions concerning cognitive capacity and their implications for economics of environmental governance.

Limited Cognitive Capacity

As already discussed briefly in the second section, limited cognitive capacity is one reason for imperfect and costly information. However, in what follows, it will be argued that there are good reasons to maintain the distinction between limited cognitive capacity and imperfect knowledge. Empirical research in psychology on cognitive capacity and decision making has documented a number of deviations from the conventional economic assumptions. These deviations include the use of rule of thumbs when making decisions, preference reversals, the influence of frames of reference and irrelevant alternatives on choice, and asymmetric valuation of gains and losses (Bell, Raiffa and Tversky, 1989; van den Bergh et al. 2000; Simon, 1986; Sunstein, 2000; Thaler, 1994; Tversky and Kahneman, 1986).

Simon (1955; 1978; 1986) has proposed procedural rationality and satisficing as the central implications of limited cognitive capacity for choice behaviour. The conventional notion of rationality in economics sets a substantive requirement for rational choices of actually maximizing the welfare or utility of the choosing agent. For Simon (1978), procedural rationality refers to the compatibility of decision making procedure with the decision task at hand. Simon argues that agents often have multiple goals, use these goals to eliminate alternatives in order to make choice more manageable, and satisfy their goals rather than maximise their welfare or utility (Simon, 1955). Amos Tversky (1972) has similarly argued that individuals use aspects of alternatives to reduce the choice set and to simplify choice problems. Simon argues that when agents sequence their choices in order to establish structure to and economise on their decision making, they learn sequentially about alternatives and may revise their

level of ambition (Simon, 1955). One consequence of this is that choice may depend on the order in which alternatives are encountered and learned about.

To recast Simon's arguments, agents refine their preferences while learning about the alternatives, and the path followed in the decision making process influences preferences and choice. This strategy may result in "substantially rational" choices when agents know what they expect from the alternatives, can eliminate unsatisfactory ones, and concentrate on the most promising ones. However, when agents learn and revise their preferences, they either have to restart from a wide set of alternatives or to choose from a narrow set of alternatives that may not realise their revised preferences. The first solution may fail to economise on decision making and the second one may compromise substantial rationality. This underlines that decision-making is not trivial in the real world.

Heiner (1983) has proposed that a gap between our cognitive capability and the challenges posed by choice problems forces us to resort to a limited set of rules concerning decision making and behaviour, instead of us being able to pick up flexibly the optimal choice or behaviour from a wide range of alternatives. He argues that the uncertainty originating from the gap between cognitive capacity and environmental challenges explains many social institutions. Earlier I identified interest conflicts as a reason for the existence of institutions. Interest conflicts result from the interdependence of incompatible interests and often pose a collective choice problem akin to a Prisoner's Dilemma. Heiner's explanation for the existence of institutions refers to solving internal or inter-personal coordination problems (for the symmetry of intrapersonal and

interpersonal problems, see Kavka, 1991; 1993), which often share the features of assurance games (see Schelling, 1978; Kreps, 1990).

Setting limited cognitive capacity into the context of motivational pluralism yields a few additional observations. When agents can play several moral games – of which the maximisation of personal welfare is but one example – and their capability to decipher what games other agents are playing is limited, signalling one’s intentions becomes a means to elicit reciprocal behaviour from other agents. Axelrod’s (1984) observation on the good performance of “tit for tat” strategy attests this. Many experiments also document the importance of fairness for choice behaviour (see Kahneman, Knetsch and Thaler, 1986). The detection of “fraudulent” signals and an ability to demonstrate one’s sincerity also become important in the world of plural motivations and limited cognitive capacity. Robert Frank (1988) and others (Elster 1998; Loewenstein, 2000) argue that this is where emotions play a role.

The implications of combining the assumptions of motivational pluralism and limited cognitive capacity reach beyond individual agents’ behaviour. As Heiner (1983) has suggested, institutions are established in part to increase the predictability of behaviour. In the context of plural motivations this means that institutions are used to demarcate “fields of action” where different rules of the game are supposed to apply (for similar arguments, see Walzer 1983; Radin 1996). For example, we may choose different behavioural strategies when acting on the market, in the polity, or among family and friends. That is, agents not only read behavioural cues from each other, they also read them from the institutional context of their actions. Yet institutions do not determine behaviour although they influence it: agents can deviate from rules within

certain bounds. For example, markets allow other-regarding behaviour and self- and welfare-centred behaviour occurs in polities. Finally, social units may have varying degrees of moral consensus concerning “proper rules of behaviour” and compliance with them in different contexts. High degree of consensus on rules and compliance translates to high predictability of behaviour. When this predictability serves well interpersonal relationships, we consider that the amount of social capital in that social unit is high.

These observations have a bearing on environmental issues. For example, the responses to international environmental problems oftentimes involve the establishment of learning processes such as the Intergovernmental Panel for Climate Change (IPCC). These processes are responses to limited cognitive capacity and they are calculated to assist us in understanding the range of alternatives we face and to form preferences over them. Different coalitions also have different views of the rules of the game that should apply in negotiations on international responses. Risk-averse strategies emphasising precautionary principle, welfarist strategies and strategies protesting against globalisation and its perceived adverse effects manifest how diverse the politics on international environmental problems are.

Conclusions

Although new institutional economics has not been particularly keen on environmental research, it offers an approach that overcomes many problems associated with neoclassical environmental economics. As discussed above, the new institutional

approach is based on the concepts of interdependence and positive transaction costs and it can also accommodate motivational pluralism and recognise limited cognitive capacity. This conceptual foundation is applicable to a wide range of environmental issues from the management of renewable natural resources at the local level to the management of environmental quality and atmospheric resources at the international level.

One strength of the new institutional approach to environmental governance is that it is at the same time sensitive to contextuality and yet offers ways to transfer lessons from one context or level of environmental governance to another. Using Clifford Geertz's (1975) words, the four key concepts of the new institutional approach enable "thick description" of situations at hand. Yet at the same time, the concepts allow to reason out how particularities of the situation alter our conclusions in comparison to some other situations. For example, we can transfer lessons from one level or context of environmental governance to other ones when we have a grip on the context and can account for changes in it.

The new institutional approach also allows to pay more attention to institutional arrangements and designs than the conventional approach. It enables us to characterise existing institutional arrangements in much more nuanced way and to reason out their distributive and other consequences in conceptual and contextual terms. This is important for institutional reforms: we need to know what alterations in governance institutions would be likely to produce sought-after outcomes. That is, the new institutional approach may enhance the resolution of both our observations and recommendations.

Finally, the last but not least of the advantages of the new institutional approach is that it can foster interdisciplinary and multidisciplinary research as well as methodological and methodical pluralism. The conceptual foundations of the new institutional approach provide an adequately loose theoretical frame of reference which enables open-ended empirical research. This research can be based on qualitative or quantitative strategies and it also offers a route to formalisation for those who wish to pursue it. Already the research on the management of natural resources under common property has demonstrated that the approach can facilitate interdisciplinary research among economists, sociologists, anthropologists, political scientists, and interdisciplinary scholars in geography, environmental studies and development studies.

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- i By arguing that governance is what governments do I mean that governance implies the existence of government. I understand that part of the fascination with self-government stems from the apparent absence of the government. However, as the term self-government literally discloses, government is materially present. The important contribution of the governance approach has been to widen the scope of institutional solutions for governance. Some governance solutions entail self-governance, others entail the presence of the state. Other solutions could be imagined.
 - ii The introduction of Marshall's Principles of Economics (1890) offers a good example of the recognition of the two notions of utility as pleasure and usefulness.
 - iii I find it convenient to divide behavioural motivations to welfarist, non-utilitarian consequentialist and deontological motivations.