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► **To cite this version:**

Eric Brousseau, Tom Dedeurwaerdere. Global Public Goods: The Participatory Governance Challenges . Reflexive Governance for Global Public Goods, pp.21-36, 2012. hal-01492339

HAL Id: hal-01492339

<https://hal.science/hal-01492339>

Submitted on 18 Mar 2017

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Chapter 1

Global Public Goods: The Participatory Governance Challenges

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Status : Accepted for publication. This chapter can be cited as

Brousseau, E. and Dedeurwaerdere, T. (forthcoming). Global Public Goods: the Participatory Governance Challenges. In Brousseau, E., T. Dedeurwaerdere, and B. Siebenhüner, ed. *Reflexive Governance and Global Public Goods*, Cambridge (MA): MIT Press (accepted for publication). Online at www.cpd.r.ucl.ac.be/dedeurwaerdere.

This book addresses the topic of the governance of global public goods (GPGs). As explained in the introduction, the specific problem in the governance of GPGs is not only their multi-level character, due to the absence of a supreme global political constituency which shapes collective preferences and makes collective decisions. It is also the lack of clear-cut knowledge on collective preferences and solutions. This intricate combination of a collective-choice issue and a cognitive lack makes it worth discussing an analytical framework aimed at disentangling the various dimensions of the questions to be analyzed and debated.

It should not be forgotten that the concept of a global public good is questioned by many people. At first sight the idea that there are problems of concern for all humankind can be considered a heroic assumption, or the result of a set of moral beliefs and assumptions about the necessary solidarity among human beings in a global society that considers their mutual interests. It is worth noting that such concepts can lead to requests that would certainly not be acceptable to some groups. For instance, the developed North could request the South not to develop, so as to preserve biodiversity, slow the process of global warming, and avoid resource depletion. To avoid any criticism of moral (or immoral) bias, we show in this chapter that even if we accept a set of minimal assumptions — starting from self-interested individuals — problems of global concern are raised which should be governed by a combination of political and economic solutions. To put it another way, even if we ignore the potentially altruistic orientations of human beings, the coordination needs of individuals and the existence of biophysical interdependencies on a global scale enable us to identify several issues that have to be dealt with collectively. Among these is the provision of goods of concern for all, which requires mechanisms for collective decision making and the management of motivations so that contributions are guaranteed.

To demonstrate this, we assume a world of individuals who pursue their own ends, but who recognize that they belong to communities in which two types of social relationship are built. On the one hand, exchange is at the basis of many social interactions by which agents align their individual interests through bargaining, ending in *quid pro quo* transactions. On the other hand, the logic of gifts (without *quid pro quo* compensation) is at the basis of the social interactions by which agents align

their interests by recognizing a common interest encompassing and surpassing individual preferences. The definition of this 'collective interest' can be influenced by players who may push their own interests, but who nevertheless take the interests of other members of the community into account.

The argument presented here aims to provide a roadmap for the analysis of the various dimensions which contribute to the efficient and legitimate provision of GPGs. First we show how the two logics of social interaction generate different types of governance mechanisms that often interact and are hybridized in global governance. We then point out why, in the context of the provision of GPGs, bounded rationality and the global context combine to demand the generation of new knowledge. New knowledge is needed to identify the issues and their possible solutions, and stakeholders have to be made aware of the issues to be able to express meaningful preferences. We also highlight the fragmentation of today's global society into communities without clear hierarchies, and the inclusiveness necessary for processes resulting in compromises about the definition of goods of common and global concern. Finally, we discuss the potential of the principles of reflexive governance and their practical limits. The concluding section shows how the various dimensions of GPG governance analyzed in this chapter are further developed in the five parts of the book.

The Governance Issues Raised by the Many Features of Public Goods

To define the common background of the chapters in this volume, it is important to start with a brief reminder of the basic economics of public goods. We first recall the standard definition and then show how the conventional approach has to be reconceptualized and extended to take into account the multi-level and partially socially-constructed nature of global public goods. This explains why we then develop a theoretical framework aimed at pointing out the challenges raised by the governance of GPGs.

Pure and Impure Public Goods

Public goods are goods of common concern, more appropriately called 'collective goods' (Sandler 2004). They are characterized by the properties of non-rivalry in consumption of the good (their use by one individual does not diminish the possibility of their use by another) and non-excludability (it is costly and sometimes impossible to exclude a user from access to, or use of, the good). Pure public goods are both non-rival and non-excludable. Other types of public goods have only one of these properties: common-pool resources (land, water, livestock, etc.) are partially rival and non-excludable, and club goods (e.g. encrypted TV programs or intellectual property rights) are non-rival but excludable.

Partial rivalry can arise when additional users detract in some way from the benefits available to others, through crowding/congestion costs. Partial rivalry in common-pool resources has been extensively dealt with in the literature on the new

commons. For example, in the new globally distributed digital commons (such as the Internet), collective action problems related to partial rivalry (such as a conflict of priorities, overuse and congestion) have been increasingly recognized (Hess and Ostrom 2007). Similar problems of rivalry have been the focus of analyses of the global environmental commons (such as biodiversity and carbon sequestration), because localization and geographical scope brings unequal benefits and costs to stakeholders (Dolsak and Ostrom 2003). Public goods with global and non-exclusive, but partially rival, benefits, thus raise coordination issues that go beyond the problems of free riding and undersupply (see Carraro 2003 for a discussion of global environmental agreements).

In terms of provision, club goods do not pose major collective-action problems, as they can be efficiently supplied by members of the club, financed through tolls or user fees. However, as has been shown for scholarly publications, club goods raise delivery issues (Boyle 2007). The artificial transformation of pure public goods into club goods through the use of (digital, in the case of publication) fences, can produce a major decrease in social welfare. There is therefore a trade-off between the loss of social welfare resulting from the reduced availability of a non-exclusive resource, and the benefits in terms of a reduction in free-riding which increases the contributions to provision.

Heterogeneity in Consumption and Contribution

Other important issues around the provision of public goods are linked to the heterogeneity of benefits and contributions among the various stakeholders. Some goods benefit different actors in different ways. For example a preserved natural area benefits the local inhabitants, but also visitors who come to enjoy the scenery. The area can be used for recreational purposes or it can be managed so that it contributes to the global conservation of biodiversity. In such a context, the nature of the governance solution may impact upon the weighting attached to alternative users' preferences. For instance, pseudo-market solutions may favor wealthy urbanites to the detriment of farmers; 'democratic' mechanisms may mean that local interests prevail over more global or distant stakeholders.

The heterogeneity of contributions leads us to consider the issue of aggregation technology. This refers to how individual contributions to the collective good determine the quality of the goods available for consumption (Hirschleifer 1983; Cornes and Sandler 1984). With summation goods, each unit contributed to the public good adds identically and cumulatively to the overall level of the good available for consumption. For example, any reduction in the emission of greenhouse gases corresponds to the aggregate (summed) cutbacks of the polluter countries. Other important types of aggregation technologies are weakest-link public goods, (where the smallest contribution fixes the quantity of the public good for the entire group, as in pest control), best-shot public goods (for which the overall level of the public good equals the largest single individual provision level e.g. finding a cure for a disease), and weighted-sum public goods (where different contributions can have

different impacts, as in the cleanup of polluted sites). The main message of this research is that aggregation technologies other than summation often provide hopeful signposts to feasible collective action to produce the collective good where no state (or alternative coordinator of a large population of individuals) has control, so as to ensure an efficient level of contribution by all (Sandler 2004). In the case of knowledge it is often better to focus efforts on gathering the contributions of the most efficient providers, even when the end product remains freely available to all, as has been shown for free software communities (Nguyen and Pénard, 2007).

Public Goods as Societal Issues

Public good provision is a social issue which raises social challenges. Provision is a social issue because dealing with GPGs is not just a technical/natural problem. Fundamental social choices include the definition of the boundaries of communities and the nature of the social contract, in particular the recognition of social groups within those boundaries. Public goods raise social challenges because the way to deal with them depends upon the design of adequate governance structures, in at least two distinct ways. First, the provision of public goods in general, and of GPGs in particular, raises the question of coordination among different communities and authorities. This is the central issue dealt with by fiscal federalism (see Oates, 1999). However, what is specific to GPGs is that there is no global government to coordinate the various authorities and communities involved in their production. Moreover, the jurisdictions involved in the production of GPGs are of various kinds. There are governments (at all levels), and self-regulated communities of many kinds (from rural communities to international business associations). The specificity of incompletely hierarchized coordination among heterogeneous providers is a true challenge for the social sciences. Second, it is important to stress that many of the properties of rivalry and excludability, and the aggregation technology, are neither absolute nor natural. They partly depend upon processes of social construction. For instance, rivalry in consumption of a good is directly related to population density, and the notion of exclusion is socially constructed and can evolve with the development of new technologies.

A Framework for Analyzing Collective Governance

To understand the properties of alternative models of governance, we need to take into account how complex individuals interact in a society and the logic of alternative governance principles in that perspective. This is why we first highlight a double logic in individual interactions, before pointing out the existence of four basic models of social interaction. These clearly refer to different logics, but in practice they co-exist and are blended in varying proportions in different societies.

Self-interested and Boundedly Rational Individuals

To present our argument, we use an analytical framework derived from new institutional economics (initiated by Coase, North and Williamson; see Brousseau and Glachant 2008 for an overview). We consider global society as a collection of individuals embedded in social structures, who are characterized by individual preferences (which can be collectively built). These individuals have bounded rationality (as defined by Simon 1978, 1986), and more precisely, procedural rationality. Individuals and collectivities are nevertheless repositories of knowledge. Individuals know how to solve problems (including learning procedures for solving new problems, which is the idea behind the notion of procedural rationality). They also have a social capability to interact with other individuals who can help them to solve problems. The unit of analysis is therefore a collection of individuals, who are both stakeholders and knowledge-holders. They have their own interests, and they also have personal capabilities to solve problems, to learn and to interact with other knowledge-holders.

Individuals have their own set of preferences and ranking among them, depending on their history, beliefs, societal position, etc. These preferences are ordinal and subjective. They therefore cannot be weighted and aggregated to yield a collective preference function (May, 1954; Savage, 1954). An individual's system of preferences is incomplete and therefore unstable. Since their rationality is bounded, individuals can discover new options and therefore revise their whole system of preferences (Simon 1957, 1983, 1986; Selten 1990).

Self-interested individuals are concerned, above all, with the realization of their own ends (according to their own system of preferences). They know that this realization depends upon successful coordination with the other individuals in society. Individuals do not, however, always spontaneously recognize themselves as being members of a local, national or global society that encompasses all living individuals, or even all the individuals living in a common territory, or belonging to the same group. To be consistent with the idea that individuals have bounded rationality, idiosyncratic hierarchies of preferences, and specific beliefs, it must be recognized that the concept of society is subjective and has little chance of being implemented consistently in every individual's set of preferences. To put it another way, not everyone has the same vision of what society is, and not everyone shares the idea that humankind *per se* is a society. This raises the issue of the definition of problems of global concern (see below). While recognizing this, we assume nevertheless that people are social beings. They know that they belong to collectivities. Collectivities are characterized by the existence of common rules of behavior, drawn from the convergent beliefs of members with shared interests, which justify constraints in the name of collective action. These collectivities can be labeled 'communities', to point out their subjective aspect and its consequences.

In such a context, governance is not just a question of designing techniques to aggregate preferences (so as to manage collective choices) and implementing incentives to harmonize individual behavior. It also involves producing and sharing

information to allow individuals to establish and modify their preferences. Furthermore, governance is about innovating and enhancing the collective capability to influence behavior so that individuals can discover and share new beliefs, more effective ways of resolving issues, and better techniques for confronting problems of collective action.

Four Articulated Models of Social Interactions

Individuals recognize that the realization of their ends necessitates interactions with other members of their communities. At this stage of our reasoning let us consider interactions among individuals in a given community, rather than interactions among communities. Interactions among individuals within a community can be based upon two alternative principles (trade/compensation or sharing/compromise) that are implemented in different ways. According to the trade/compensation principle, an individual agrees to renounce something (the benefit of a good, a right, or even having to make an effort) if and only if he or she is compensated by the provision of a good or service that balances the loss of satisfaction entailed by the renouncement. The sharing/compromise principle states that individuals, while recognizing their individual ends, use the community as a tool for reaching these ends. Individuals contribute to the realization of the ends of the other members of the community and (expect to) benefit in return from the community's contribution to their own ends. Of course free-riding is an issue, but it is not always the best individual strategy and mechanisms can be implemented to control it. Here there are no transactions but only gifts (with the social consequences highlighted by Mauss 1924). Both these principles can be implemented either centrally (by means of collective decision mechanisms encompassing all the members of the community at the same time) or by bilateral negotiations between individuals.

This leads to four models of collective interaction, which have long been recognized and analyzed in the social sciences, and which are characterized in Table 1.1:

- The (neo-classical) social-planner model indicates a situation in which an entity is in charge of optimizing the performance of the social system. This entity should act as a neutral engineer. There is no collective interest *per se*, but individual interests can be summed. The social planner overcomes coordination difficulties due to information costs, indivisibilities, etc. and thereby allows the maximization of each individual's welfare. It applies a Pareto principle and can organize compensation among individuals *à la* Hicks-Kaldor to reach a Pareto-improving situation that may harm some members of the society.
- The market model describes a situation in which a central, neutral agent cannot emerge, or cannot perform the social-planning task to the benefit of all. All social interactions are organized on a *quid-pro-quo* basis. Market failures may exist, but alternative ways of organizing transactions also have drawbacks.

- The communism/family model represents the situation in which an elite governs the society for the benefit of all, either because it is enlightened or because it has been consensually chosen. Its aim is to provide goods to each member of the society as a function of their needs, and to request contributions proportional to everyone’s means. There is therefore no perfect match for individuals between what they give and what they get, and constraints are required to manage this *de facto* redistribution. The redistribution can be justified in various ways (ethical principles, political need to strengthen the collectivity or maintain its consistency, economic need to invest in collective resources benefiting everybody, etc.).
- The social-networks model refers to settings in which individuals freely choose to contribute to a collective venture without expecting compensation proportional to their contribution. The word ‘community’ is often applied to such an arrangement (for example, open-source software communities or local communities).

Table 1.1. Four models of social interaction

	Transaction (trade/compensation) <i>Relationships among individuals are based on exclusive (individual) interests</i>	Gift (sharing/compromise) <i>Relationships among individuals are based on inclusive (common) interests</i>
Centralized (collective decisions) <i>Relationships among individuals are organized, because this increases the efficiency of managing interdependences</i>	(Neo-classical) social planner	Communism/family/non-profit organizations
Decentralized (bilateral negotiations) <i>Relationships among individuals are spontaneous</i>	Market	Social networks (gift/counter-gift)

Of course, none of the pure principles illustrated by the boxes fully characterizes any real society; while some societies are essentially based on market interactions, others exemplify collective compromises. The principles apply to various degrees in any society/community. This has an impact on the motivations for individuals' actions. It also has an impact, of course, on the logic of governance, which is different in each of the four modes of social interaction.

Disentangling the Logic and the Mechanisms of Coordination

Our goal in this section is to clarify the drivers of individual social behavior. The dominant vision is to contrast two facets of human psychology: selfishness and altruism. The first is a core assumption in economics, and leads to a vision of society in which central coordination is useless (or completely neutral). The second is a core assumption in ethics (and politics). Our analysis shows that both types of interests can be dealt with within either centralized or decentralized institutional systems. This allows us to disentangle the logic of coordination (driven by individual or collective interest) from the mechanism of coordination (which refers to how collective decisions are made). This is useful in understanding the properties of alternative governance mechanisms and institutional architectures.

The first column of Table 1.1 refers to a cost/benefit analysis (managed either at the individual or the collective level), in which collective action is based on the logic of exchange. The second column refers to a universe of ability to influence the behavior of others in which collective action is based on social constraints and conviction. In brief, the first column refers to economics, the second to politics. Since individuals do not perceive the world as either a purely economic or a purely political entity, they understand that the realization of their individual ends relies on both mechanisms.

This results in complex motivations. Individuals have both what are usually called individualistic preferences (which in our nomenclature are economic preferences linked to the logic of transactions) and collective preferences (in our terminology, political preferences linked to the logic of sharing and compromise). Obviously these preferences differ from one individual to another, and are balanced in different ways for different purposes within individuals. However, individuals clearly have complex motivations because they simultaneously take into account their immediate interest — let us say their individual wealth — and a broader collective interest. They know that the wealth of the community/society impacts on their individual situation. To put it another way, individuals have both exclusive interests (they decide in terms of their own situation) and inclusive interests (they consider the impact of their actions/decisions on other stakeholders in the society and have their own preferences for that society).

Governance in such a framework consists first and foremost of the choice of a social interaction model for a given domain of collective life. Sets of individuals have to agree on the respective domains of self-interest and collectivity in a given society,

and on the scope of collective coordination in each of these domains. Then of course, actual governance mechanisms have to be implemented and operated.

Public Goods in a World of Bounded Rationality

There are two categories of problems that individuals have to solve, that, by definition, are collective. The first is the provision of an infrastructure to manage the interactions between them (from a common language to market places, and including the institutional framework in the sense defined by Coase (1988) and North (1990)). The second is methods of managing external effects. External effects occur when, for some reason, the use of an asset by one individual impacts (positively or negatively) on the utility of a non-user of that asset, and it is either technically impossible, or prohibitively expensive, to confine the use of that asset to a particular person or group. What Samuelson (1954) called a public good is simply an extreme case of an externality. A service is automatically provided to everybody, but this provision does not deprive anybody of the benefits of the service.

As even economists of the Austrian school, such as Hayek (1979), recognized, the pure logic of decentralized trade fails to provide these goods because of the free riding which generates the 'tragedy of the commons'. This does not mean that the provision of these goods should rely on an organization called the state. It does, however, mean that there should be a mechanism to force individuals to contribute, either through social constraints or conviction, which applies to all the members of the community who benefit from the good.

It has been well documented, by Ostrom (1990) in particular, that compulsion can emerge spontaneously at the local level. Local communities can control the behavior of their members due to the stability of groups, the repetition of interactions, the high cost of exclusion through ostracism, and the easy diffusion of information on the behavior of members that sustains reputation effects. Spontaneous 'cooperation' therefore flourishes in small, stable groups. However, as well demonstrated and argued by Milgrom, North and Weingast (1990), the larger the group, the more formal and institutionalized the coercion mechanisms must be. In any case, collective goods raise the issue of how the provision of a service which is available to everybody on the basis of mandatory contributions is to be organized.

While the acceptance of formal or more informal means of coercion allows public goods to be provided, the problem of how to select among the many potential public goods those that will actually be provided (assuming that scarcity prevents the provision of all of them) remains. There is also the question of how they should be supplied. In a world of perfectly rational agents (in Savage's (1954) sense) each individual has a complete and stable set of preferences. Individuals are therefore able to value each potential public good, and a benevolent and costless social planner can implement a revelation scheme so that individuals show their preferences in a way — their propensity to pay — that allows their individual preferences to be aggregated.

In a world where agents do not have perfect rationality, however, two problems occur. First, bounded rationality means that agents are unable to value their individual utility for each possible public good according to a common currency. Even if they were able to rank their preferences (which presupposes knowledge of the complete list of potential public goods), in the absence of common currency, a social planner would be unable to aggregate their preferences because the Condorcet-Arrow paradox of social choice would apply (Arrow, 1950). Second, bounded rationality could result in agents ignoring the complete list of potential public goods. In that case, it would be impossible for any social planner to decide which projects should be undertaken on the basis of individual wishes. In such a world, the transaction/trade/compensation model cannot be used to decide the amount and type of public goods to be provided.

In addition, in a world of bounded rationality, the scope of the community concerned by the provision of a public good remains an open question. The very notion of public good carries with it the notion of community. There are two conditions for the existence of a public good in this respect. The members of a community should recognize themselves as such (whatever the purpose/nature and boundaries of the community). In addition, they should recognize that a given good is a public (or collective) resource. The first condition leads each member to accept the legitimacy of constraints placed on him or her by the group. The second one legitimates the constraints that are actually implemented in the provision of a given good.

Thus, in a world of bounded rationality, the provision of a public good necessarily entails mechanisms of governance pertaining to the logic of collective cooperation (column two in Table 1.1), since the aggregation of individual preferences is neither possible nor the only issue.

Public Goods in a Global Context

One of the topics this book seeks to address is the mechanisms by which human beings recognize the existence of global public goods and agree on priorities and on ways to provide them. There are two main topics to be dealt with. First, agents have to recognize the existence of goods of common concern at the global level, which means that they must recognize the existence of a global community (i.e. a community encompassing all (present and future) human beings). We have already mentioned this issue and we will return to it below. Second, agents have to establish a collective hierarchy of preferences for any particular GPG and between this GPG and alternative public (i.e. local public) and private goods. In a world of scarcity there is always competition among the various goods that could potentially be provided. This second topic requires an understanding of two sets of intertwined questions. First, the relationships among (the alternative ways to provide) the various GPGs have to be understood, since if these goods are not independent of each other (i.e. there are complementarities and/or substitutabilities between them), this has to be considered when establishing the hierarchy of preferences. Second, the

cost of provision of a GPG, which is in competition with the provision of other goods, is not independent of the establishment of the hierarchy of preferences. Agents have to know the costs (in terms of renouncing the provision of alternative goods) of providing GPGs, in order to take production constraints and the possible interdependencies amongst GPGs into account.

Since we assume that our individuals do not have perfect knowledge, we see any agreement on the type of global public goods to be produced and the way to achieve this end as being not only a problem of the revelation and aggregation of preferences, but also a problem of discovering issues and ways to deal with them. Put another way, while we acknowledge that the alignment of individual interests and the building of compromises is an issue, we also claim that the development of knowledge to identify GPGs, to understand the complex web of causal relationships that link them, and to discover how they can be delivered is another requirement.

Our analysis therefore covers the need to consider mechanisms for building the collective interest in the context of global governance. Beyond multi-stakeholder governance, the issue is to define how compromises, and the definition and hierarchization of GPGs, can be achieved in a world without an entity which can ultimately arbitrate among citizens' interest and settle conflicts among their agents (governments, organizations, political groups, etc.). Governance of GPGs necessarily leads to the logic of the gift exchange contained in the bottom right box of Table 1.1.

The Role of Knowledge Communities in Global Governance

Inspired by the new institutional economics (NIE) approach, we feel that it is unnecessary to analyze alternative institutional frameworks from scratch. We are not working in the framework of 'Nirvana economics' (Demsetz 1969). While we recognize that the notion of communities is linked to individual beliefs, we also recognize that individuals participate in pre-existing communities that are organized on the basis of either jurisdiction or shared interests. Thinking about governance issues should therefore start from the fact that individuals are already grouped into communities, although the global community is not yet fully organized. There are therefore various types of sub-global community in which individuals develop their strategies to have an impact on the provision of public goods in general and global ones in particular.

For the purpose of our analysis, we can distinguish between two types of such communities. First there are those organized on a socio-political basis by a geographically delimited jurisdiction. These communities, which are essentially linked by spatial proximity, are generally made up of individuals with highly heterogeneous preferences. They usually already have formal institutional frameworks to manage this heterogeneity, while providing their members with a set of services. They therefore often benefit from (constitutional) collective decision-making mechanisms aimed at governing the community and providing it with an infrastructure for interacting (i.e. a legal and political order). Other communities are organized on the basis of mutually shared interests and/or proximities of preferences.

They group individuals on the basis of the realization of a common end, which can be the advancement of knowledge, the promotion of beliefs, the wealth of the members, etc. While such communities might be very formally organized, they tend to rely more on informal coordination mechanisms since they have to manage less tension linked to divergences and differences among their members.

Since there is no established global community recognized as such by all its members, the designation of a good as a GPG does not result from any agreement among all human beings or from any process of aggregation of their will or consent. Some goods are claimed as GPGs by communities that, on the one hand, consider the externalities among existing communities, but on the other hand have strategies to promote their own interests. Indeed, they can seek to benefit from the contribution of others to providing a good that primarily benefits their community. They can also promote the production of the public good they prefer. One consequence of the subjective nature of GPGs, is that their qualification as global, and the ranking of preferences for them, will always remain open to challenge.

In this context, generating knowledge should allow human beings to benefit from more information about the interdependencies among individual interests through the provision of goods. The more knowledge, the more individual interests will be included in collective choices, and therefore the better the nature and hierarchy of GPGs will be recognized, and the more efficiently they will be produced. In turn, the identification of interdependencies should allow each individual to express more informed preferences, since everyone will have a better understanding of the links between their own and the collective interest. Thus the more knowledge, the more complete the set of individual preferences, which will impact positively on the formation and expression of collective preferences.

Reflexive Governance for Collective Learning about the Provision of GPGs

Since there are no established collective preferences or solutions for the provision of GPGs, the design, choice and implementation of the most appropriate rules should result from a reflexive governance process where multiple actors are involved. The importance of reflexive governance has repeatedly been demonstrated in debates on participatory governance in domestic, regional and local contexts. Numerous approaches have shown the applicability of deliberative formats for solving collective issues, with the inclusion of various stakeholder and citizen groups. Examples include planning cells, citizen juries and consensus conferences. These participatory procedures not only diffuse information, allow for consultation, and support sharing in anticipation of the future; they also support the coordination of different forms and fields of knowledge, and the co-production of solutions, and social learning. While the existing literature has shown that participatory approaches are particularly suitable for integrating various bodies and forms of knowledge, concerns have been raised about their limited legitimacy. The need for direct interaction restricts the number of individuals who can be involved. The representation of different stakeholder groups and their knowledge and interests is

possible, but the representation of larger fractions of the population cannot be guaranteed by these procedures. What needs to be further explored, therefore, is whether and how far these and other reflexive governance approaches can play a role in addressing the complex collective choice and cognitive problems involved in the provision of GPGs.

There are two aspects of reflexive governance processes: social and cognitive reflexivity. The first is the dynamic adjustment of collective beliefs among a variety of social actors. For instance, some collective rules result in the involvement of new groups and citizens, and this process transforms and builds new collective preferences. In such a perspective, a mode of governance can be considered as reflexive if it aims at including the perspectives, values and norms of a variety of actors. The second aspect concerns the revision of the cognitive framing; i.e. the representation of the issue and of the governance problem at hand. The issue is to delineate the problems and decisions to be considered. New knowledge can change the vision of the world, the issues to address, the hierarchy of problems to solve, etc., as illustrated by the issue of global warming or the precautionary principle in life sciences.

In general, what seems needed for the legitimate and efficient governance of global public goods is the broadening of our categories of public debate, both through deliberation in international organizations, and through more local forms of participatory governance and the involvement of communities and citizens in collective learning on GPG issues. This does not mean that traditional representative democracy will not be needed in the final decision-making phase, or that markets and hierarchies are not needed in the implementation phase. The implementation of reflexive governance also depends on a variety of mechanisms including regulation, incentive mechanisms and information-based mechanisms. In essence, from our perspective, the appropriate provision of global public goods will require a combination of public ordering, market exchange, public debate and the diffusion of information and knowledge to everybody.