

**Managing the commons:
A conceptual framework for natural resource governance in development
projects**

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Abstract

Many problems of unsustainable management of natural resources worldwide are due to a limited number of basic governance shortcomings such as lack of property rights definitions leading to open access, or insufficient enforcement of existing rules. Often however, researchers and to an even greater extent practitioners in development cooperation focus on one single natural resource and tend to ignore the analogy of problems in related fields.

This practice is also endemic in the German Agency for Development Cooperation (GTZ). As a consequence, many insights gained in one field, e. g., with regard to irrigation or community forestry, are not shared with experts from related areas or discussed within a wider scope.

In this paper, a conceptual framework for analysing the governance problems behind unsustainable management of natural resources is proposed. The framework serves as a common theoretical background on which to analyse management problems, their causes, and interventions. To illustrate its potential, it is applied to several GTZ projects that deal with a variety of different resources.

The core of the framework draws on the Institutional Analysis and Design (IAD; e. g., Ostrom 1990, Thomson 1992). In addition, the proposed framework accounts for the peculiarities of development cooperation projects. Several modules are integrated which proved useful (i) to capture multi-actor relationships in resource management and (ii) to design and describe actual GTZ activities, interventions and the implementation of measures. The second, empirical part of the paper illustrates the potential and the application of the framework and presents a survey of case studies on resource management in developing

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countries. Based on this analysis, actual interventions and consulting activities with regard to common property issues are compared to the overarching objectives of development policy.

Key words: governance, natural resources management, development cooperation

1 Introduction

In international development contexts, natural resource management (NRM) is often seen from the (scientific) perspective of the individual expert in charge of the undertaking; economists analyse management problems from their economic point of view, geographers choose their respective viewpoints, as do engineers, foresters and social scientists. In addition, researchers and to an even greater extent practitioners in development cooperation often focus on one single natural resource such as water, or even more specific, irrigation or the provision of drinking water. This phenomenon is mirrored in the sectoral structure of NGOs such as WWF or federal enterprises, e. g., German Development Cooperation GTZ, that separate between resources based on their physical appearance. Administrative borders between projects add to this process of separation; each sectoral concept uses its own language and its own perspective. As a consequence, insights are seldom communicated between experts of different sectors and different backgrounds.

However, many problems of unsustainable management of natural resources are due to a limited number of basic governance shortcomings such as open access, lack of property rights definitions or an insufficient enforcement of existing rules. This holds for all natural resources, regardless whether water, forests, land, the atmosphere, or biodiversity are considered. Hence, experience could be shared and is, in principle, transferable between sectors. Yet, no common framework, theoretical basis or terminology seems to be easily available that facilitates an exchange of insights and expertise *between* resource sectors. Transaction costs of knowledge sharing are particularly high for experts in development cooperation involved in fieldworking. By these circumstances, GTZ experts are discouraged to share their experience and lessons learned with colleagues from other sectoral projects and with the international community. An immense pool of knowledge remains unused.

A framework which serves as a common denominator is thus needed to make experience with resource management in one field accessible to experts in other fields. On a common theoretical background, management problems, their causes and possible interventions might

be easier to analyse and to compare.¹ Jütting (2003 p. 36) emphasises the need for more exchange between case studies, but also notes that there might be a “trade-off between the need to zoom down to a specific case-study scenario where one has the possibility of identifying otherwise undetected links and the wish to generalise findings beyond the particular context”. This will be indeed a challenge such an approach will have to cope with.

This paper proposes a conceptual framework to analyse the governance problems behind unsustainable management of natural resources. In this paper governance is understood as defined by Huppert, Svendsen & Vermillion (2003 p. 8): *Governance* is the body of rules, enforcement mechanisms and corresponding interactive processes that coordinate and bring into line the activities of the involved persons with regard to a common goal.²

Since *rules*, i. e., institutions, and their *enforcement* are two of the core concepts of this definition, the proposed framework takes an institutionalist perspective. It focuses on the goods and services provided by natural resources rather than on the resource itself. It is thus applicable to all sorts of natural resources, regardless of their physical quality. As required by Jütting (2003, see above), the framework is open and comprehensive enough to allow for the peculiarities of the natural resources and, at the same time, facilitates an integrated view on NRM problems.

The remainder of the paper is structured as follows: Section 2 introduces the proposed framework, giving an overview of the components used in order to capture specific features of development cooperation projects. By means of a survey of case studies by GTZ, Section 3 illustrates the applicability of the model and its suitability to analyse and compare governance approaches to NRM.

2 A common framework

2.1 Overview

The following section outlines briefly the suggested procedure to explore resource management problems. The analytical framework is adapted from the Institutional Analysis and Design (IAD) model and draws heavily on Thomson (1992), Thomson & Schoonmaker

¹ The IFRI research program (e. g., Poteete & Ostrom 2003) is definitely an initiative with a very similar objective. However, it addresses only forestry resources, whereas the approach proposed here is meant to be applicable to all governance issues with regard to natural resource management.

² Other authors provide similar definitions: Governance is described as the body of “traditions and institutions by which authority in a country is exercised” (Kaufmann, Kraay & Mastruzzi 2003 p. 3), or, as the UNDP puts

Freudenberger (1997) and Ostrom (1990). These approaches offer a sound basis for an in-depth analysis of the status quo in situations of unsustainable resource management. In addition, they suggest ways to modify institutional incentives for more effective resource governance. However, this aspect gains considerably in importance in development cooperation practice where the implementation of incentive changes is crucial. In this context, the IAD framework hence needs a more elaborated second part that serves to describe actual cooperation activities.

Consequently, the IAD framework core is complemented by several components to account for the particularities of development cooperation. It consists of two main parts:

- (i) the first part which provides an instrument to analyse and describe the motives of the actual resource users' behaviour
- (ii) the second part which serves as a tool to design and to describe matching cooperation activities.

The framework can be used *ex post* to evaluate projects already undertaken, as an approach to the respective lessons learned, and to compare different projects. It also may be applied *ex ante* to plan and design adequate cooperation activities.

GTZ projects do not necessarily feature community resource management. In many cases, several goods and services and a multitude of actors are involved at a time. In an attempt to account for these often complex circumstances, an approach to scrutinize institutional arrangements between actors involved in NRM (Huppert & Urban 1998; Huppert, Svendsen & Vermillion 2001) is added to the first part of the framework (see Fig. 1).

This component was adopted due to the need to deal with multiple actors in NRM. It helps to describe exchange relationships³ between actors involved in a particular resource use problem. Apart from the local community of persons who directly use the resource in question, typical actors are e. g., private companies, administrative bodies and maintenance associations. An understanding of relationships and the respective governance modes may lead to additional insights on incentives taking effect on particular actors. Often, incentives stemming from the characteristics of exchange relationships are not taken into consideration when IAD is applied, since the IAD approach focuses on the local community of resource users and neglects other stakeholders who might conflict with the local users.

The second part of the framework comprises

it: "Governance refers to the exercise of political, economic, and administrative authority in the management of a country's affairs at all levels".

- (a) a description of the goals of development cooperation
- (b) a typology of incentives (see e. g., OECD 1999) appropriate to change the behaviour of resource users, thus to perform governance
- (c) a typology of cooperation activities, e. g., of different assistance types.

Figure 1 illustrates the extended framework. The epistemological foundations such as methodological individualism, and general assumptions mentioned in Thomson (1992, p. 7 ff.), namely the bounded rationality of individual actions, apply also to the framework presented here.

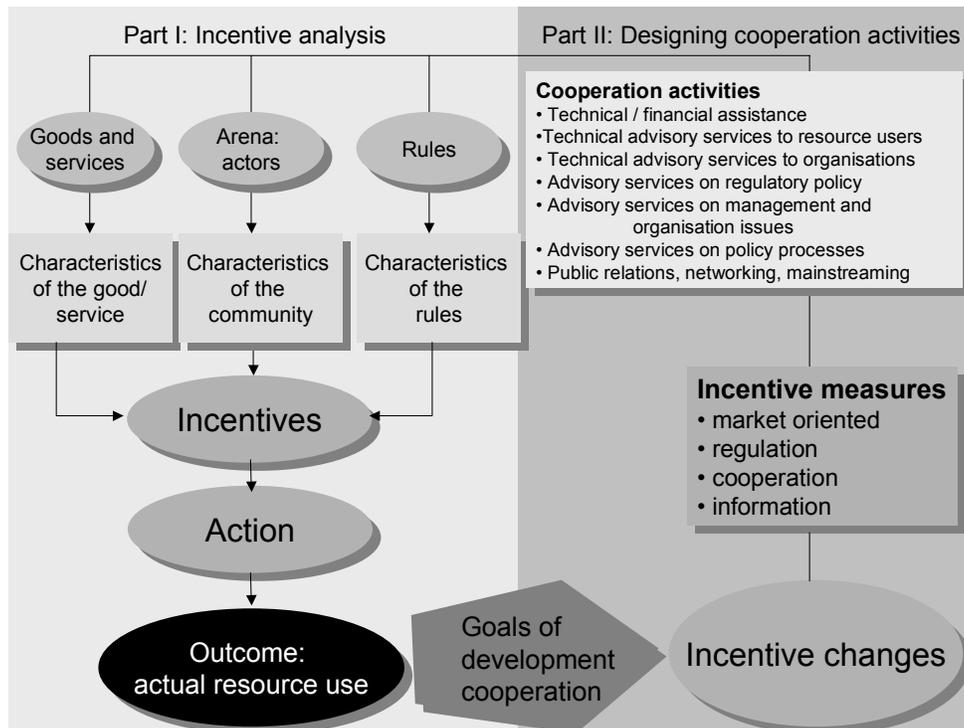


Fig. 1: A framework for analysing governance problems in natural resource management

Source: adapted from Thomson 1992; own considerations

Analysing actual problems of resource management and governance is a *process* which may be guided by the framework presented here. This process will be resumed in the following sections. However, since the IAD is a well established and widely known approach (e. g., Ostrom et al. 2002, Thomson & Schoonmaker Freudenberger 1997) the remainder of the paper focuses on those aspects which are either new or particularly relevant for actual development cooperation.

³ Exchange relationships exist between providers and recipients of goods and services.

The process of analysing resource management problems requires first of all an identification of the actual situation in question (for a comprehensive description see Thomson & Schoonmaker Freudenberg 1997). Why is the actual situation considered problematic? In which way resource management appears to be unsustainable?

In a second step, reasons, i. e., motives for the ongoing management problems have to be identified. These motives can be considered *incentives*. “An incentive is something that makes a person want to do something” (Thomson & Schoonmaker Freudenberg 1997 p. 4/1). Incentives are institutional arrangements and can take many forms (see Fig. 1). Classifying them from a formal, economic perspective, they might be regulative, market-based or relate to cooperation or information (see e. g., OECD 1999, see also 2.4).

For pragmatical reasons and to understand the actual situation, Thomson & Schoonmaker Freudenberg (1997) suggest to distinguish between three kinds of incentives including

- (i) incentives related to the characteristics of the goods and services in question
- (ii) incentives related to the characteristics of the community
- (iii) incentives related to the characteristics of the actual rules in the respective community (see Fig 1).

The following paragraphs elaborate on the identification of these incentives, starting with some considerations on the natural resource concept and arguing for an investigation of resource *outputs* and their characteristics, since natural resources in their manifoldness are rather complex and difficult to check for their economic characteristics.

2.2 Natural resources and their outputs

What is the subject matter of natural resources management? The term ‘natural resources’ seems to be so clear that no definition is needed. Most authors avoid giving a definition or describe natural resources in a negative way, i. e., excluding other types of resources such as labour and capital. A general definition such as *parts and components of nature which are of an economic or cultural value for humans* might help, though (see e. g., Geiser 2002).

However, when it comes to a *classification* of natural resources, even less suitable definitions and categorisations can be found. Classifications often seem to be built ad-hoc in a pragmatical way and in an evolutionary process that, in the beginning, may have been appropriate, but after a while might turn out to impede cross-sectoral communication and optimal allocation of human resources. As mentioned above, the sectoral structure of NGOs or federal enterprises such as GTZ illustrates this phenomenon. GTZ’s internal structure

separates between resources based on their physical appearance and has established sectoral projects on biodiversity, climate, forests, water, energy, agricultural produce and environmental policy in general. As a matter of course, this list is not exhaustive, but it may illustrate the multitude of resource concepts that often collide with each other. Does agrobiodiversity belong to the agricultural or rather to the biodiversity sector? Where should a project on the Rio conventions be affiliated? Forests as well as agricultural land are not pure natural resources because labour and capital, i. e., cultivation and management play an important role. However, forest in particular is often considered a natural resource.

These examples underscore that the existing classifications of natural resources do not necessarily contribute to a clear understanding of related management problems. As will be shown in the following paragraphs, though, a coherent categorisation is not necessary for the proposed framework.

The first step of the proposed model consists in an examination of the management of natural resource outputs which is considered problematic. Changing the focus from natural resources as a whole to the outputs, i. e., on the goods and services a resource provides, may help to scrutinise governance problems much more precisely (see Thomson & Schoonmaker Freudenberger 1997).

In GTZ practice, single projects often address the management of a variety of goods and services that belong to one sector, e. g. agriculture or agro-forestry, but differ considerably with regard to their characteristics. Consequently, as a preliminary step these different goods and services should be identified and scrutinized separately for their attributes.

2.3 Incentive analysis

2.3.1 Characteristics of the goods and services

According to IAD and the model proposed by Thomson & Schoonmaker Freudenberger (1997), actual use of goods and services is motivated by incentives that derive from the characteristics of the *goods* and *services* themselves (see Fig. 1). These characteristics include (i) the feasibility of exclusion, i. e., the feasibility of access control and (ii) the nature of consumption, i. e., whether the consumption of a good or the use of a service is subtractive or joint (Ostrom 1990). Combining these characteristics, a widely used categorisation (see e. g., Ostrom 1990, Thomson & Schoonmaker Freudenberger 1997) classifies goods as private, common pool, club and public goods. Often, private and common pool goods are outcomes of the productive function of natural resources (see de Groot,

Wilson & Boumans 2002), whereas club (or toll) goods often belong to the ‘information’ category discussed above. Services provided by natural resources are often public goods and have regulation or habitat functions (see de Groot, Wilson & Boumans 2002).

2.3.2 Characteristics of the community

Thomson & Schoonmaker Freudenberger (1997) mention several characteristics of communities such as social cohesion and the homogeneity with regard to common goals that have an impact on the incentives (i) to cooperate, (ii) to obey resource management rules and (iii) to include the needs of future generations in resource management strategies. These aspects – since well elaborated in IAD literature – are not recapitulated here.

However, as mentioned above, GTZ case studies as well as examples in Thomson (1992) and Thomson & Schoonmaker Freudenberger (1997) show that it is often not only the local community of resource users who is involved in resource management problems. In many cases, other stakeholders also cause (and are affected by) the unsustainable use of natural resources.

However, the IAD model focuses exclusively on the local community and does not capture the different roles of multiple actors, their interactions and relationships. Hence it might be helpful to add a component which allows for multiple stakeholder interaction. Huppert (Huppert & Urban 1998; Huppert, Svendsen & Vermillion 2001) suggests an approach that makes use of cybernetic metaphors to describe exchange relationships between resource users. Huppert’s case studies deal with irrigation and water supply services. However, concepts are applicable to any other problem of resource management where more than one actor is involved. For each pair of actors, this approach requires a description of (i) the governance mode and (ii) the coordination mechanisms their relationship features. Governance modes are “overarching institutional arrangements in which a contractual arrangement is embedded” (Huppert, Svendsen & Vermillion 2001 p. 126 ff.), namely

- (i) markets
- (ii) administrative systems and hierarchies
- (iii) collective decision making based on elections and representations
- (iv) collective decision making in primary groups
- (v) collective bargaining
- (vi) charity systems.

Coordination mechanisms are types of interactions such as prices, laws and agreements that make an exchange relationship function. Huppert uses flow diagrams (see also e. g., Herder-Dorneich 1986) to depict networks and the respective governance modes and coordination mechanisms.

Integrated into the conceptual framework, this component seems particularly valuable to detect incomplete feedback loops. These are relationships that are not based on reciprocity, where an actor providing a service receives nothing in return, or where accountability and mandates are unclear. Open feedback loops might act as incentives to overexploit resources due to the lack of accountability and sanctioning. Correspondingly, closed loops and clearly defined coordination mechanisms, i.e., working rules (see 2.3.3), between actors are incentives to collaborate and to respect the rules.

2.3.3 Characteristics of the rules that prevail in the respective community

In addition to the attributes of the goods and services, the community and other stakeholders, *rules* with regard to NRM are also strong incentives (or disincentives) that motivate the way resources are used (see Fig. 1). Thomson & Schoonmaker Freudenberg (1997) distinguish between formal and non-formal and between working and non-working rules. In addition, they classify rules with regard to their content, i. e., whether they address operational, collective decision-making or constitutional issues.

An assessment of existing rules and their characteristics is particularly relevant to identify conflicting rules or rules that lack enforcement. In cases where actors cannot count on the enforcement of rules, incentives to obey these rules are low. Individuals might rather choose to maximise their own utility than to respect management rules which do not pay off immediately.

2.4 Setting incentives for sustainable management

2.4.1 Goals of development cooperation

Having examined the actual incentives that guide NRM, development cooperation activities, if required, may now be planned or analysed, respectively (see Fig. 1, part II). As mentioned above, this framework can be used to scrutinize interventions and measures retrospectively, but also to plan and to design future activities. The framework suggests an identification of institutional arrangements that appear suitable for improving resource management. In which way incentives have to be changed in order to motivate adequate behaviour?

This question implies a normative aspect, namely the definition of goals governance aims at. The normative dimension of governance is subject of a heated debate (e. g., Messner & Nuscheler 2003; Ribot 2002; Tetzlaff 2003; Thierfelder & Walk 2003).

However, GTZ as the implementing organisation for technical co-operation of the German government is accountable to the corresponding federal ministry BMZ. As a consequence, objectives established by the BMZ have to be pursued. Sustainable development with its social, ecological, ecological and political dimensions has been declared the overarching goal of German development activities.⁴

In addition, incentive measures should also fulfil several administrative criteria (e. g., OECD 1999 p. 68) to ensure the practicability of their implementation:

- predictability of impacts
- conformity to the precautionary principle
- adaptability
- administrative feasibility.

2.4.2 Incentives to change resource use behaviour

As the proposed framework is meant to be applicable both *ex-post* and *ex-ante*, one may now ask for (i) the institutional changes that have been undertaken in a particular development cooperation project in the past or (ii) the institutional changes that should be undertaken in the future in order to reach the goals mentioned above.

A classification scheme might help to describe and compare incentive measures. Suitable classifications are provided e. g., by the OECD (1999). In this framework, a classification seems appropriate that differentiates between

- (i) market-based incentives
- (ii) regulation
- (iii) information
- (iv) cooperation (see Fig. 1).

Table 1 summarises measures that might act as incentives to govern resource management. The first category includes measures such as the creation of markets, the assignment of property rights, reform of adverse subsidies, subsidies that internalise externalities and compensation payments, fees and taxes, and the internal enforcement of contracts through

⁴ <http://www.bmz.de/en/topics/motive/Ansaeetze/index.html>

revenue sharing (see OECD 1999; Swallow & Bromley 1995 p. 109; Petersen & Sandhövel 2001 p. 42). The second category refers to access restrictions and legal regulations of resource management. Informational incentives might consist in an evaluation of non-market goods and the publication and communication of valuation results as well as in capacity building with regard to sustainable management techniques and external effects. Cooperation as an incentive is closely related to informational measures and refers to participatory methods that ensure public acceptance, equity and feasibility of institutional changes.

As a matter of course, “it is often difficult to design a single policy that will successfully provide the right incentives for the sustainable use (...) of the resources (...)” (OECD 1999 p. 12). Consequently, OECD recommends “to employ a range of incentive measures in order to address all the pressures and actors” (ibid. p. 12).

Why, though, should it be useful to categorise incentives measures to be implemented in cooperation projects?

First of all, prior analysis of incentives that take effect on resource users’ behaviour should consequently feed into the design of matching institutional arrangements suitable to change resource use patterns towards more sustainable practices. A detailed description of probable impacts and attributes of incentives (see Table 1) helps to check if measures are deduced in a sensible manner from the status-quo analysis.

In addition, a classification of incentive measures implemented by GTZ (or other agencies and donors) is an important precondition for an overview of these measures and thus the basis for a comparison of policy goals and actual activities (see 2.4.1). Hence, this framework component is essential to get a grip on the impacts of development policy: Does cooperation practice correspond to the objectives of the donor, in this case, the Federal Ministry of Economic Cooperation and Development? Section 3 addresses this question.

Category	Market based incentives economic incentives market oriented incentives	Regulations governmental interventions “command & control”	Cooperation	Information
Characteristics	decentralised	centralised		
Impacts	realise private use value (and contribute to a realisation of the value of the public good). connect prices to pollution or resource use <ul style="list-style-type: none"> • might change character of the goods and services • might alter characteristics of the rules that prevail in the community 	<ul style="list-style-type: none"> • might change character of the goods and services • might alter characteristics of the rules that prevail in the community 	framework building: reduction of uncertainty and increase of information <ul style="list-style-type: none"> • may have an impact on the heterogeneity of goals and information level within the community 	
Examples	fees, charges, taxes, tax exemptions,	development of organisations such as agencies that enforce regulations	capacity building	audits
	performance bonds	standards and best practice		
	assignment of property rights (incl. ITQs, tradable permits) market creation (incl. alternative markets e. g., tourism, commercialisation consistent with conservation) market protection	taxes (if not taken from resource users but from the general public → principle of the common burden)	conflict management	provision of information on external benefits and costs legal aspects, property rights etc.
	access to markets (incl. provision of infrastructure, see also subsidies)	access restrictions and restricted use incl. total allowable catch (TAC), moratoria, exclusion of particular user groups	cooperation management (roundtables etc.)	economic valuation, CBA
	reform/removal of adverse subsidies	finances, liability for damages	stakeholder involvement (elicitation of preferences,...)	
	subsidies (incl. subsidies to inputs/incremental costs → technical and financial cooperation) market support direct income support	management of common property through publicly financed agents		labelling, signalling, certificates
	revenue sharing (as an internal enforcement of contracts)	funds and public financing, e. g., of conservation or management measures (may involve compensation payments)		technology transfer
	compensation payments (PES)	tariff design		revalue non-monetary values

Source: own considerations taking into account OECD 1999; OECD 1996; Huppert pers. comm.; Swallow & Bromley 1995; Klarer 1999; Petersen & Sandhövel 2001; Brown 2000; Bizer et al. 1994

Table 1: Incentive measures

2.4.3 Activities to implement incentive changes

Incentives that foster sustainable resource management require not only a proper design. They need to be implemented to take effect. The expertise and the portfolio of GTZ, originally restricted to technical assistance, have shifted during the last 15 years or so towards consulting and advisory services. Nowadays, by far the most of its activities belong to this category. To evaluate GTZ cooperation activities a promising approach is to specify the type of consulting services. Does cooperation focus on policy issues, management and organisation or rather on technical advice? Who is the addressee of consulting activities – is it the local population or rather some public authority? Does the service type correspond to the actual situation, the prevailing and the planned incentives?

GTZ activities can be classified as follows (compare to Hamacher et al. 2001):

- (i) technical and/or financial assistance: equipment transfer
- (ii) technical advisory services to resource users
- (iii) technical advisory services to organisations
- (iv) advisory services on regulatory policy
- (v) advisory services on management and organisational issues
- (vi) advisory services on policy processes
- (vii) public relations, mainstreaming, networking

The first category comprises traditional technical and financial support such as the construction of cisterns, irrigation systems and other types of infrastructure. Technical advice is still an important category of GTZ services. It might be interesting to distinguish between advice that directly addresses resource users at a local level, and advice directed to organisations, which are likely to be located at the district or even national level. The former is a type of cooperation applied e. g., in community forestry projects (e. g., Thomson 1992; Kosmus, Birner & Uebelhör unpubl.). Many projects, in contrast, seem to address organisations, particularly public authorities, rather than the local population. It seems relevant to check whether this approach is in line with the GTZ concept of intermediaries and their influence on the target group (see Section 3).

Services (iv) to (vi) are also directed to organisations that govern resource management and address policy issues on different levels of abstraction.

Some projects, in contrast, are explicitly designed to link other actors, programmes or projects working in the same field, together. They concentrate on awareness raising and the dispersal of information rather than on direct consulting.

Other development agencies might employ additional types of services. If the proposed framework were applied to the activities of other agencies, it would have to be adapted to the respective conditions.

Even though actual cooperation activities often cannot be assigned to only one of these categories, but rather consist of a mixture of services (see Hamacher et al. 2001), a classification of actual activities might help to see the role of GTZ as an actor in development cooperation more clearly, and to evaluate this role taking into consideration the respective objectives and principles.

2.4.4 Feedback: the effectiveness of cooperation activities

As indicated in Fig.1, the implementation of these changes feed back to the operative incentives, and might or might not change the actual motivation for the population's behaviour with regard to NRM. An evaluation of the effectiveness (see e. g., Gottret & White 2003) of the intended institutional changes is the last step of the analysis procedure proposed in this paper. A thorough evaluation of impacts and effects is a very complex task and will not be discussed here. In any case, though, it seems to be essential to check whether the implemented incentive measures actually took effect on either the characteristics of the good, the community or the rules (see Tab. 2, 3rd row). If incentives have actually changed, does that have an impact on the users' behaviour and, eventually, on the outcome?

3 An application to GTZ case studies

3.1 Topics and questions

The scientific as well as the pragmatical relevance of the conceptual framework definitely consists in its potential to provide a basis for analysing actual projects and approaches in development cooperation, and to compare these on a common background, relating their strategies and outcomes to the goals of development and environmental policy.

Seen on this background, there are several highly relevant questions an application of the proposed framework could help answering such as;

- Are there any types of goods predominantly addressed by GTZ activities? Does GTZ focus on either public, common-pool, toll- or private goods? Are particular natural resources or certain functions more likely to be addressed than others?

- Are there similarities between governance problems in different sectors of NRM? Which?
- Is there any kind of incentive measures (see 2.4.2) predominantly applied?
- Which cooperation types are chosen to implement these measures?
- Do these procedures correspond to the objectives and principles set e. g., by the OECD, the FAO or the Federal Ministry of Economic Cooperation and Development (BMZ)? For example, if regulations by a central government are implemented, in which way does this contribute to a decentralisation of governance favoured by the BMZ?
- How many of these projects have been reported to have an actual impact? Is the effectiveness of a project dependent on particular factors such as the characteristics of the good, the community or the incentive measures implemented?

To provide precise figures on percentages and predominant attributes, measures and strategies, a complete assessment of GTZ activities in NRM would be necessary. The following **in-depth** analysis, though, is based on a relatively small sample (n=11) of projects. These were selected according to the availability of information on both project objectives and methodology, and the project progress. For various reasons, an evaluation of the total population appeared impossible.

3.2 Overview

3.2.1 Method

In Table 2, data on 11 current or recently terminated GTZ projects is summarised. To provide information of all three aspects

- (i) the *status quo* analysis (first part of the framework see Fig. 1)
- (ii) the design of appropriate measures
- (iii) project impacts and feed back on the incentives that govern resource management (second part of the framework see Fig. 1),

the following section takes an *ex post* perspective.

Information was drawn from project progress reviews, offers and debriefings dating from 2001 to 2004, and was made anonymous subsequently. It has to be noted that these documents were originally directed to different addressees, written for specific purposes. Each contains a selection of information dependent on the author's perspective.

The columns of Table 2 display the components of the framework presented above.⁵ The rather small convenience sample can be considered a preparatory step of a later analysis of a bigger sample. Six projects were situated in Latin American countries, four projects in African, and one project in a South-East-Asian country.

3.2.2 Status quo and incentives

Six projects addressed water as a natural resource, whilst three dealt with flora and fauna, two with land, and one with clean air. Two projects also addressed other resources or an unspecified mixture (No. 7). Some projects focused on more than one natural resource (e. g., No. 1), and many took charge of several goods and services provided by these resources (see Table 2, 2nd column, e. g., cases No. 1 and 9).

Water was the resource addressed by the majority of the projects. This is likely to be no artefact but symptomatic for the total population of projects, as water management is a very substantial issue due to its multiple facets such as irrigation, wastewater management, provision of drinking water und watershed management.

The blank spaces that can be found in Table 2 indicate that characteristics of the community and management rules were not a major issue in many of these projects. Four out of 11 project reports did not elaborate on resource management rules; and even 5 reports did not provide information on the characteristics of the target group. This observation does not necessarily imply that these aspects were not considered during the design phase of the project. It portends the minor relevance of these data for the authors of the reports, though.

Most projects (8 out of 11) dealt with *de facto* common-pool goods such as irrigation water or land, though it has to be noted that clear distinctions cannot always be made. As common-pool goods often feature problems of open access and thus are a typical subject of development cooperation, the fact that mostly common-pool resources are addressed is no surprise. Expectedly, most of these case studies provided at least some information on the community and its rules. Only one project dealing with common-pool goods appeared to ignore these aspects almost entirely (case No. 6).

Four projects included private goods. It can be hypothesized that in cases that involve private goods, attributes of the community and the rules are of lesser relevance. Indeed, in cases

⁵ Even though a table might be a quite unflexible and static way to illustrate the analysis of projects by means of the framework, it seems adequate to provide a basis for a comparison of cases and a discussion of the findings.

where mainly private goods were considered, these attributes were not elaborated on (see No. 4). However, case No. 1 shows that attributes of the community can be a very relevant issue when it comes to the circulation of information and the impact of networks.

Only one project (No. 2) addressed a good that can be considered a typical public good. In this case, the lack of technically adequate rules and their enforcement were considered one of the main obstacles to sustainable resource management.

Surprisingly, case study No. 4 mentioned exclusively private goods such as timber and non-timber forest products. These goods were the property of long-term-licensees. One could expect that with private goods, strong incentives for the licensees exist to manage their property in a sustainable way. Why, then, should non-profit development cooperation offer extra support for the sustainable management of private goods? This seems to make sense only if the licensees' behaviour causes externalities for the public, in other words, if additional goods and services such as regulation and habitat functions are affected. However, these goods and services were not mentioned at all in the project report.

Table 2 does not capture *relationships between actors* as described in Section 2.3.2. Often, though, GTZ projects involve several actors; a target group, intermediaries and some responsible body. In general, target groups are equivalent to the local community of resource users. As intermediaries may be defined e. g., public authorities, public utilities, user associations or NGOs. Normally, the role of the responsible body is taken by a ministry.

On the background of the original IAD framework, one would expect development projects to directly address local communities (see Section 2). In reality, though, many, particularly the more recent projects focused on intermediaries. In some extreme cases, the local population was not involved at all (e. g., case No. 10). Intermediaries were believed to transfer project impacts to the population. However, sometimes the relationship between intermediaries and target group was not taken into consideration at all. Other projects explicitly addressed various actors as a concentration on only one partner was considered too high a risk (case No. 9).

3.2.3 Incentive measures and cooperation activities

With regard to the second part of the framework (see Fig. 1), a closer view on the *planned incentive measures* (see Table 2) reveals that all projects included a combination of measures as recommended by OECD (1999; see 2.4.2). Consequently, there is no evidence of any hidden agenda or biased development policy. By far the most projects involved

informational incentives such as databases that facilitate resource management and the enforcement of rules, awareness raising and capacity building through environmental education.

Advice on management and organisational issues (n=9) and technical advice to organisations (n=8) were obviously preferred among *activity types*, and frequently combined. Six projects directly offered technical advice to resource users. One single project provided technical equipment (no. 6), although another one (No. 5) also had an emphasis on technical issues (cistern construction). In former times the main task of GTZ, technical assistance apparently has lost importance. It has to be noted, though, that a great deal of activities still involved technical advice.⁶

However, as mentioned above, most projects were directed to intermediaries rather than to the local population. In only a few cases, though, advice on policy processes (n=1) and on regulatory policy (n=2) was offered. In case No. 5 the focus on technical topics was due to the preferences of the government that explicitly did not want policy advice.

3.2.4 Goals and project impacts

The majority of projects explicitly aimed at a more sustainable management of natural resources (see Table 2, column 6). Enhanced efficiency of resource use was another major goal.

In four cases (No. 3, 4, 8, 9), actual impacts were limited due to the political and economic instability of the respective country. In another four cases (2, 6, 7, 10), impacts tended to be positive, but evaluations had not been completed so far. Case study No. 2 identified additional incentives to be implemented in a second project phase. Three case studies (No. 1, 5, 11) reported a successful implementation of incentive measures. However, in case No. 5 the sustainability of the changed water management can be doubted, as water consumption raised and prices decreased – two observations that might indicate an overexploitation of water resources. Case study No. 11 featured a bundle of measures that turned a wild animal, endangered by overexploitation due to high market prices, into a farm animal suitable for husbandry. The project's success depended entirely on high prices on the regional markets. Luckily, saturation effects or epidemic diseases did not occur so far, but the concentration on one single bundle of measures – market-based incentives accompanied by matching

information and cooperation – makes the goal to secure rural livelihoods susceptible to market changes.

3.3 Discussion

This survey of case studies checks and illustrates the applicability of the proposed framework. In general, this framework proved suitable to analyse projects with regard to (i) the incentives that motivate actual resource use and (ii) the governance approaches applied to change this behaviour. Due to the need to reduce complexity in order to compare case studies, many details that might be relevant in the field are not considered here. However, the framework seems to capture the main facets and characteristics of the projects. Relevant insights included the following aspects

- (i) ‘blank spaces’, i. e., missing information on the community and its management rules reveals the perceived relevance of this information (see 3.2.2)
- (ii) in contrast to the original scope of the IAD framework, GTZ projects do not exclusively address resource users; in many cases activities focus on intermediaries (see 3.2.2). The framework presented in this paper accounts for this characteristic of actual development projects
- (iii) plans to change incentives for resource use do not appear to be biased in an implicit way, e. g., favouring regulatory measures (see 3.2.3)
- (iv) technical assistance in the sense of equipment transfer is no longer one of GTZ’s main activities. It is rather technical advice to resource users, to organisations and advice on management and organisational issues that constitutes GTZ’s work (see 3.2.3)
- (v) a comparison of project objectives and actual impacts suggests that the relationships between actors and incentives for their interaction are crucial for successful cooperation activities. Often, these relationships are assumed to work perfectly with regard to the ‘trickling down’ of advisory services. This assumption, however, does not always hold, and assistance given to intermediaries in many cases does not lead to the desired effects on resource users (see 3.2.4)

⁶ Note that the latest GTZ policy requires to report project impacts rather than cooperation activities. This shift from action- to outcome-orientation makes it difficult to get information on the actual activities carried out in the field.

- (vi) in the same vein, the *severity of conflicts* between stakeholders tends to be not adequately reflected in the model
- (vii) in addition, it is often the unstable political and economic conditions that jeopardise project success (see e. g., Kosmus, Birner & Uebelhör unpublished).

We may conclude that

- (a) the proposed integration of incentives deriving from stakeholder interaction into the framework appears helpful in order to account for real-world complex networks of actors in NRM, and the role of incentives that motivate conflictive resource use should gain even more importance within the framework
- (b) incentives often are not static, and incentive measures implemented through cooperation should account for these dynamics and provide back-ups to reduce dependency on single actors or policy features .

Here, the framework served as a basis of an *ex post* evaluation. However, it is also an appropriate instrument to plan and design cooperation projects. Although the framework is adapted to the needs and activities of GTZ, it can easily be applied to development cooperation projects conducted by other organisations. The results underscore the importance of a thorough *ex ante* analysis of the characteristics of the community and its rules, and the relationships between actors, to help foresee problems that may occur when, e. g., resource users and authorities interact. The proposed framework might thus contribute to an improved design of cooperation projects.

4 Conclusions

This paper sketches a conceptual framework that allows an integrated view on governance problems with regard to natural resource management. It offers a common theoretical background to analyse these problems regardless of the nature of the resource and thus fosters an exchange of insights, knowledge and experience between experts in the respective fields.

Section 3 presents a survey of case studies from development cooperation. This survey illustrates that the proposed framework could serve as a reference point to compare development projects with each other, on an international level, and with regard to their objectives. Comparability is achieved e. g., by classifications of goods and services and of

incentive measures which have proved suitable to reduce the complexity of the case studies, and which are compatible to the categories used on an international level. The proposed framework thus can help generating valuable insights on the actual practice of governance and resource management, and contribute to an improved design of cooperation activities.

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Table 2: Overview of GTZ projects

	Good/Service	Characteristics of the good	Characteristics of the community		Characteristics of the rules		Goals	Planned incentive measures				Activity	Success ?	Feedback
			social cohesion	shared values?	formal?	enforced?		market-based	regulation	co-operation	information			
1	Water for irrigation	common pool	good, intact social networking, trust, but less willingness to take the initiative	yes (peasant community)	yes, but technically outdated	yes	more efficient use of water		technical modification of rules WUA: improved management		intro-duc-ing new rules	AM&O to WUA; TAO to WUA	yes	Improved cooperation, new rules appreciated and widely accepted
	Productive function of land	private			not specified (private goods)	self-sufficient livelihoods, sustainable	gain access to new markets	net-working	peasant intermediaries present new markets, cash crops etc.	TAU	yes	Market oriented peasant livelihoods, stable income		
2	(urban) air	public	urban population → unknown	unknown	formal	insufficient	improved air quality (transport sector)	foster public transport	enforcement of existing rules; staff training (air quality control)		updating databases, environmental education	AM&O to ministries, INFO	limited	Still lacking: updated laws and rules (technically outdated)
3	Land for agricultural use	de facto: common pool (open access) De jure: private (king is owner)	high migration rate, squatters, strong competition: soils over-exploited	conflicting systems: monarchy and chief systems vs. centralised government Rules exist, but enforcement lacks coordination		sustainable land-management	privatisation	Land Act, decentralisation, LIS supported land allocation		decentralised land registers, awareness raising, LIS	AM&O, APP, AR + TAO to commission; INFO to population	limitedly positive, in progress	lacks collaboration with public authorities/ ministries	
4	Timber, NTFP	private	unknown		sustainable forest management	multiple use of resource		design a management plan	project region → transfer Education, training	TAO TAU to companies	positive, but long-term impacts uncertain	tertiary sector too small, lack of political support		

5	Drinking water	common pool	strong gender differences, women tend to share responsibility				sustainable water supply	micro-credits for cisterns		financial and technical support of women CBOs		TAU; AM&O to CBO	Yes (but term 'sustainable' remains unclear)	Water consumption increased, costs reduced – sustainability??
6	Productive function of water and land	common pool, private (land)	unknown		only partly → uncertainty	efficient and sustainable use of water and land	financial support of improved irrigation techniques access to markets through higher production rates	more detailed rules	design of measure; own contributions; Training; conflict management and project design	technical advice; 'best practice' contests; training of WUA → enforcement of new rules Water-Register	TAO + AM&O to WUA TAU ET	yes	Improved reliability of water provision → more efficient use; ecological impacts so far unknown, presumably positive	
7	Natural resources in general	common pool, private (not specified)	low (migration from the altiplano)	few rules, unknown to population (not autochthonal)	no, ineffective administration	sustainable use of natural resources	promotion of green manure, silos, alternative sources of income		„participation“ not specified	radio shows; database (land register) training administration	TAU INFO TAO	Measures implemented impacts unknown		
8	Drinking water	common pool/private? unspecified		non existent for e. g., sanitation, public utilities	public utility: high fluctuation of personnel (due to political changes)	efficient, responsible water management		rules + enforcement: less fluctuation, less late payments		education on sanitation	TAO + AM&O to public utility INFO	Limited	political situation unstable	
9	Fish, mangrove habitat, freshwater (irrigation etc.)	common pool	fishermen: lack trust in government, many small groups, 'paternalistic mentality'	un-specified	water canals not maintained	renaturation of lagoon; improved socio-economic situation	-	protected areas: Ramsar, Biosphere; fishing quotas; improved administration	agenda común, local offices	Information centre in administrative buildings; training; databases; guidelines	TAO + AM&O to public authority INFO	Very limited	Too many impacts not controllable: climate, political conflicts	

10	Regulation function of ground-water: sink	common pool	not specified	almost no rules with regard to waste and water waste management	new waste and water waste policy → clean ground water	financing of landfills	waste laws; waste water policy	participation of population in EIA	Awareness raising, surveys, training, education	AR, AM&O, TAO to local and central authorities	Partly successful partly not yet known
11	Agouti rodents as a source of household income	common pool	overall economic situation is poor; high market prices of agouti animals	formal ban on hunting not enforced, no informal rules on hunting, no taboos on agouti as human food	secure livelihoods; poverty alleviation + support women	Agouti husbandry → private good; support market development + micro-financing		breeders association	Training, contests on husbandry techniques, upvaluation of entrepreneurship Peer-to-peer training	AM & O TAU INFO	Successful: changed attributes of the good (now: private good) Risks: big drop in agouti prices, agouti diseases

Abbreviations: 'activities'

ET	technical assistance: equipment transfer
TAU	technical advisory services to resource users
TAO	technical advisory services to organisations
AR	advisory services on regulatory policy
AM&O	advisory services on management and organisational issues
APP	advisory services on policy processes
INFO	public relations, mainstreaming, networking

Other abbreviations:

WUA	water user association
LIS	land information system
EIA	environmental impact assessment
CBO	community based organisations
NTFP	non timber forest products

References

- Bizer, K. et al. (1994) : Pollution prevention through market based incentives: two case studies on Thailand. GTZ 402-94-e PVI. – Wiesbaden: Universum.
- Bromley, D. (1992): The commons, common property, and environmental policy. *Environmental and Resource Economics* 2: 1-17.
- Brown, G. M. (2000): Renewable natural resources: management and use with and without markets. *Journal of Economic Literature* 38: 875-914.
- Geiser, U. (2002): Knowledge, knowledge management, and sustainable natural resource use: An introduction. In: Flury, M., Geiser, U. (eds.): *Local Environmental Management in a North-South Perspective. Issues of Participation and Knowledge Management*. Zürich: vdf.
- Gottret, M. V. & White, D. (2003): Assessing the impact of integrated natural resource management: challenges and experiences. In: Campbell, B. & Sayer, J. (eds.): *Integrated natural resource management*. – Wallingford: CAB International.
- De Groot, R.; Wilson, M. & Boumans, R. (2002) : A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics* 41: 393-408.
- Hamacher, W.; Heidbrink, K. & Paulus, S. (2001): *Umwelt – Politik – Beratung*. - Wiesbaden: Universum
- Harrison, J. & Matson, P. (2001): The atmospheric commons. In: Burger, J.; Ostrom, E.; Norgaard, R.; Policansky, D. & Goldstein, B. (eds.): *Protecting the commons – a framework for resource management in the Americas*. – Washington: Island Press.
- Heltberg, R. (2002): Property rights and natural resources management in developing countries. – *Journal of Economic Surveys* 16:190-214.
- Herder-Dorneich, P. (1986) *Theorie der sozialen Steuerung*. – Baden-Baden: Nomos.
- Huppert, W.; Svendsen, M. & Vermillion, D. (2001): *Governing Maintenance Provision in Irrigation – A Guide to Institutionally Viable Maintenance Strategies*. – Wiesbaden: Universum.
- Huppert, W.; Svendsen, M. & Vermillion, D. (2003): Maintenance in Irrigation: Multiple actors, multiple contexts, multiple strategies. – *Irrigation and Drainage Systems* 17: 5-22.
- Huppert, W. & Urban, K. (1998): *Analysing Service Provision*. – Wiesbaden: Universum.

- Jütting, J. (2003): Institutions and development: a critical review. Technical Papers no. 210. – Paris: OECD Publications.
- Kaufmann, D.; Kraay, A. & Mastruzzi, M. (2003): Governance matters III: Governance indicators for 1996-2002 www.worldbank.org/wbi/governance/pdf/govmatters3.pdf
- Klarer, J. (1999): Economic instruments and environmental funds for environmental policy in central and eastern Europe. In: Schlegelmilch, K. (ed.): Green budget reform in Europe – countries at the forefront. – Berlin: Springer.
- Kosmus, M.; Birner, R. & Uebelhör, K. (unpubl., 2002): Potentials and constraints of participation for sustainable forest management in Gualaco, Olancho, Honduras. Unpublished paper.
- Messner, D. & Nuscheler, F. (2003): Reformfelder zur Weiterentwicklung des internationalen Systems – Global Governance als Königsweg? Nord-Süd aktuell 17: 423-439.
- OECD (1996): Saving biological diversity: economic incentives. – Paris: OECD publications.
- OECD (1999): Handbook of incentive measures for biodiversity – design and implementation. – Paris: OECD publications.
- Ostrom, E. (1990): Governing the commons: the evolution of institutions for collective action. – Cambridge: Cambridge University Press.
- Ostrom, E. & Gardner, R. (1993): Coping with asymmetries in the commons: self-governing irrigation systems can work. – Journal of Economic Perspectives 7:93-112.
- Ostrom, E.; Gibson, C.; Shivakumar, S. & Andersson, K. (2002): Aid, incentives, and sustainability. – Gothenburg: Elanders Novum.
- Petersen, L. & Sandhövel, A. (2001): Forestry policy reform and the role of incentives in Tanzania. – Forest Policy and Economics 2:39-55.
- Poteete, A. & Ostrom, E. (2003): In pursuit of comparable concepts and data about collective action. CaPRI working paper No. 29. – Washington DC: IFPRI. Available: www.capri.cgiar.org
- Ribot, J. (2002): Democratic decentralization of natural resources: institutionalizing popular participation. – Washington: World Resources Institute.
- Swallow, B. & Bromley, D. (1995): Institutions, governance and incentives. – Environmental and Resource Economics 6: 99-118.

- Tetzlaff, R. (2003): Good Governance und Neopatrimonialismus in Afrika südlich der Sahara – ein Widerspruch? Nord-Süd aktuell 17: 478-486.
- Thomson, J. (1992): A framework for analyzing institutional incentives in community forestry. – Rome: FAO.
- Thomson, J. & Schoonmaker Freudenberger, K. (1997): Crafting institutional arrangements for community forestry. FAO community forestry field manual. – Rome: FAO.
- Thierfelder, B. & Walk, H. (2003): Die Governance-Diskussion im Spiegelbild unterschiedlicher Interessen. Nord-Süd aktuell 17: 440-445.