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Proximity analysis of inefficient practices and socio-spatial negligence: Evidence, evaluations and recommendations drawn from the construction of Chotiari reservoir in Pakistan

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ABSTRACT

In this study, we have used qualitative data from land-use conflicts for a development-related infrastructure project based on the case of Chotiari reservoir in Pakistan. Our results primarily highlight the networks of stakeholders involved in making the decisions for this project and their opposition to the desires of the local population, leading to significant tensions and conflicts due to the superposition of land-use expectations in the project area. Through this research, we have identified the key groups of actors and their logics, links and behaviors in terms of multi-level governance (from community level to international level) and territorial governance, thus revealing the positions of stakeholders and their relative social power. We show how public authorities have disregarded international rules and laws in undertaking a development project, and caused great damage to local populations and environmental resources. This article aims to provide useful information and insights for recommendations to help prevent and resolve land-use conflicts, principally on the basis of an analysis of proximity relations.

Introduction

Infrastructure projects in developing countries have displaced millions of lives (Mataram, 2008; Vainer, 2007; Cansen, 2004; Awakul and Ogunlana, 2002) due to a failure to consider the needs of indigenous populations (Lama, 2008; UNEP, 2004). Mostly, such projects are initiated in rural settings, where local people tend to lose their resources and livelihood. The growing current debate on their rights has given rise to reflections concerning the actual foundations of infrastructure projects, in terms of the legitimacy of the decisions made as well as studies concerning the reactions of local populations. Indeed, such decisions can lead to misunderstandings and problematic situations between various stakeholders and give rise to tensions and conflicts.

It is believed that such tensions and conflicts arise when social relations break down between the different stakeholders and institutions (O'Toole, 1997; Scott, 1991), or when their networks are asymmetrical and marked by power or corruption. Wall and Callister (1995) and Schelling (1960) reported that balanced relations enable stakeholders to find solutions by taking measures to alleviate tensions. These remarks remind us of the need for good governance structures and processes at the local level, in order to build local projects and to improve participation of the population in the planning of infrastructures that will affect their daily lives.

Therefore, the purpose of this article is to study in detail the types of decision related to infrastructure projects, as well as the socio-spatial disregard engendered by weak governance processes, and to classify the governance structure at various scales (from regional to international). It is assumed that the ignorance of socio-spatial laws in the case-study area has led to significant tensions and conflicts between various stakeholders, which have caused great damage to local populations and environmental resources. In our study, we wish to test the hypothesis that inefficient governance and socio-spatial disrespect lead to land-use conflicts in the execution of infrastructure projects. Expert data from project surveys, newspapers and available literature were all used to test the research hypothesis.

We selected the case of Chotiari reservoir in Pakistan, in order to highlight the land-use conflicts caused by the project context and

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governance follow-up structure. This is one of Pakistan's largest infrastructure projects, which is facing opposition in the country and is held up as an example of weak governance in the planning of new infrastructures in developing countries. In this regard, we felt that a study of multi-level governance in the area and a socio-spatial evaluation of Chotiari reservoir would be useful tools with a view to recommending concrete policy measures and strategies to prevent such conflicts of land use in future infrastructure projects in developing countries. In this case study, therefore, we have used networks of actors and proximity analyses.[1] Recent conceptual advances in network analysis (social, strategic, alliances, conflict networks, etc.) contribute significantly to gaining a better understanding in the field of interpersonal relations between actors of different types and origins. The use of proximity analysis enables us to analyze not only the level and nature of coordination by considering "situated actors or stakeholders",[2] but also the way in which these actors and stakeholders are linked in a local, national and/or international system through productive, commercial and innovative activities.

The rest of the article is divided into a number of sections, beginning with a description of the context of the study area and the data-collection and analytical methods used. The second section emphasizes the main findings, including problems of superposition of uses in the project and their effects on the structured networks of stakeholders involved in the project and their roles and responsibilities, thus demonstrating the multi-level governance system in place and the efficiencies thereof. This section also highlights the violations of rules and laws, based on a careful examination of conflict features as reported by the most prominent regional press and expert opinions. The third part of the paper is devoted to analysis of the situation in terms of geographical and organized proximity. The final section proposes a comprehensive strategy for avoiding land-use conflicts, including preventive policy recommendations that may be applied to similar infrastructure projects: these strategies are based on technical grounds or proximity-driven recommendations.

Study background and data collection

For the purposes of our study, we selected the case of the Chotiari reservoir project in Pakistan for its unique characteristics in terms of land-use conflicts and inefficiencies at various levels of management and governance. In this section, we describe the empirical background of our case study, the sources and means of data collection and the analytical methods used.

Case-study description

The Chotiari reservoir project (see Fig. 1) was designed and implemented in order to increase the storage capacity of the existing lakes in the Chotiari wetlands and enable the irrigation of more arable land in Pakistan. The project was initiated in 1992 by the Water and Power Development Authority (WAPDA) and was funded by donor agencies via the World Bank. The project area extends over 18,000 ha of entitled and unentitled land (Government of Pakistan, 1993). The Chotiari reservoir area was characterized as wetlands and included lakes, forest, swamps, irrigation channels, agricultural land, barren land and a rich ecosystem, which supported the livelihoods of the local population through fishing, agriculture, grazing and a range of other economic activities (WWF, 2008).

The Chotiari reservoir project has created opposition between the principal actors (fishermen, farmers, livestock herders and others) on the one hand, and stakeholders from the public administration (national and provincial ministries), local politicians and landlords on the other (Magsi and Torre, 2012; Nauman, 2003). More specifically, a number of factors have made the task of implementing this project more complicated and controversial: the public administration's highly bureaucratic approaches and mismanagement of construction and compensation funds; local politicians' misuse of position and power with regard to forced displacements; and local landlords' exercise of power over the local population. Furthermore, opposition grew when local populations were dispossessed of their livelihoods and ancestral properties without proper compensation. In spite of all these issues, the public authorities completed and inaugurated the reservoir in February 2003, five years later than anticipated (Iqbal, 2004).

Table 1
Experts of diverse backgrounds.

Categories	Interviewees
Private organizations (NGOs and journalists)	10
Researchers and legal experts	9
Administration (water and irrigation sector)	7
Affected family heads and landlords	6
Total	32

Note: Expert opinion survey conducted in November and December 2010.

Data collection and analysis

In order to consider the incidences of land-use conflict and explore the situations of multi-level governance efficiency in the implementation of the Chotiari reservoir project, data were gathered from various primary and secondary sources. So as to gain a better understanding of public opinion before, during and after the completion of the reservoir, we undertook a qualitative survey in the form of 32 in-depth interviews with selected experts to obtain their perceptions and insights (see Table 1). These interviews were conducted using semi-planned questionnaires, where some questions were omitted according to the expert's position, situation and experiences, as not all the experts shared the same professional backgrounds. These interviews were conducted in order to collect data on a number of key variables, namely: (1) the pre-conflict situation of the area and the positions of the various actors; (2) the behavioral approaches of institutions regarding land acquisition and the compensation process; and (3) the consequences of the reservoir project.

In addition, secondary data were gathered from the regional and national daily press,[3] in order to obtain, as far as possible, an accurate picture of the tensions and conflicts at play as well as their causes and consequences. Although this data-collection technique is seldom used in general, it is a vital source of information in land-use conflict analyses in order to appreciate the public voice on situations before, during and after conflicts (Darly and Torre, 2013; Magsi and Torre, 2013; Torre et al., 2010; Awakul and Ogunlana, 2002; McCarthy et al., 1996; Rucht and Neidhardt, 1999). Due to the lack of digital libraries or online access to regional daily press, the offices of selected regional newspapers were visited in person,

[1] Proximity analysis came forth since the beginning of 1990s, when economists, sociologists as well as geographers have tried to understand the role of space in coordination with economic activities. After the foundation laid by French scholars, its scope has been broadened internationally, where numerous contributions have also appeared (Torre and Zuindeau, 2009).

[2] The position of actors and stakeholders which shows that how they are located in a geographical space or in a network.

[3] To review daily press we have selected 10 regional newspapers out of 21, which publishes in local languages and 6 national newspapers out of 30, which publishes in Urdu and English languages, since 1997 to 2011.

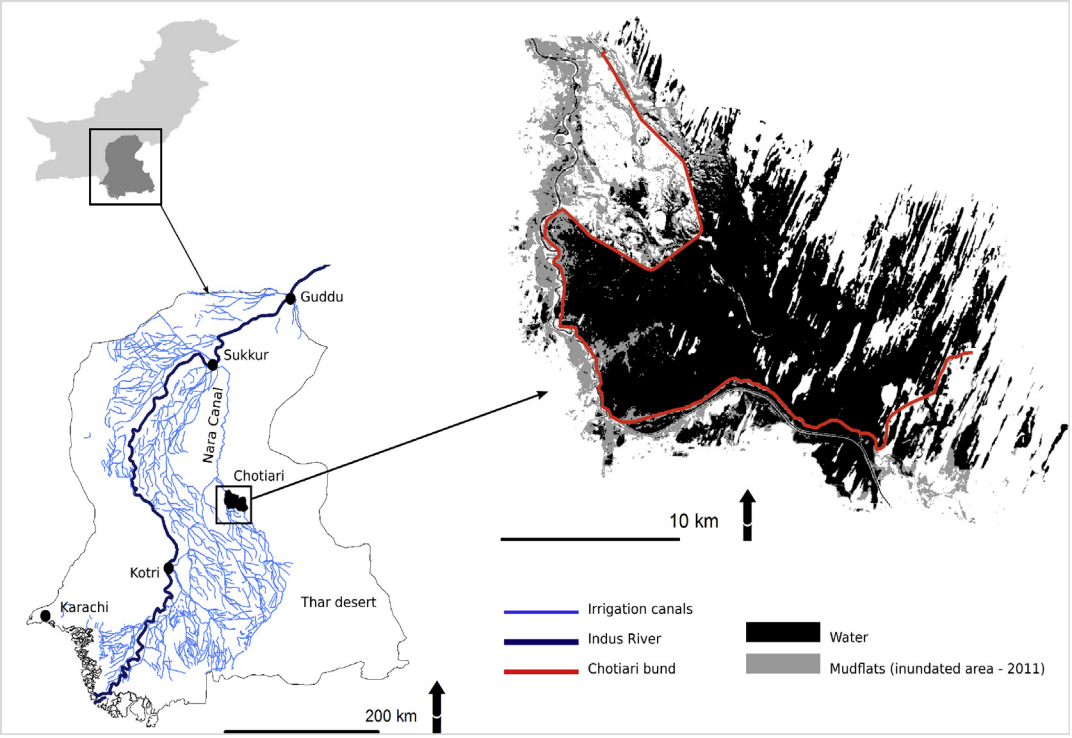

Fig. 1. Location of the Chotiari water reservoir.

and newspapers were also collected from the offices of local community-based organizations (CBOs). News items published in national dailies, on the other hand, were collected by downloading articles directly from online sources. Review work for the in-depth analysis of conflicts featured in these newspapers was conducted in the library of SAD-APT, INRA AgroParisTech. During the analysis, great care was taken to avoid unreliable information. Moreover, additional secondary data for the study were collected by analyzing published material from various public and private organizations. By cross-referencing these two sources (interviews and the daily press), we hope to have obtained balanced information and, as far as possible, avoided bias in the data selection.

Results and discussion

In this section, we highlight the problems caused by the Chotiari reservoir project and the attendant displacement of local inhabitants. Actions related to the decision to implement this new project have led to severe tensions and conflicts. Moreover, we also illustrate the ways in which international rules and laws (human, social, economic, cultural and environmental) have been violated in this project.

Chotiari reservoir project: decision and superposition

Land is not only a space for growing crops or running farms; it is also a space that is organized socially (agricultural unions, fishing communities, industrialists, local market unions, etc.) and spatially (areas for crops, fishing ponds, cattle ranches, agro-industries, warehouses, forestry, etc.), with socio-cultural heritages, values and emotional attachments. The appearance of the interests of outside actors on a given piece of land sometimes creates tensions and conflicts, with a resultant loss of social and cultural control over a territory. In the case of the Chotiari project, local actors and outside stakeholders had opposite aims and land-use objectives; the drivers of this situation led the project in a context of superposition (see Fig. 2). This type of representation commonly occurs with regard to common-pool resources (CPRs) in developing countries (Ostrom and Nagendra, 2006).

Fig. 2 shows that the construction of the reservoir has hindered traditional activities on the Chotiari lands and has also restricted access for local economic actors (Magsi and Torre, 2012). Generally, the local actors were the custodians of an ancient culture and were assimilated into the local environment; they used to manage productive activities on the land. However, the reservoir project introduced new types of uses (water storage) to the same areas and led to antagonism and opposition, and later to conflicts between different stakeholders.

Therefore, the project has brought with it the dynamics of land-use conflict, which has not only contributed to changes in the territoriality of actors but also disrupted certain socio-spatial practices. This interference with socio-spatial practices involves a reaction of discontent, which has sometimes been expressed aggressively (Iqbal, 2004). Moreover, public authorities have induced social and environmental problems by adversely

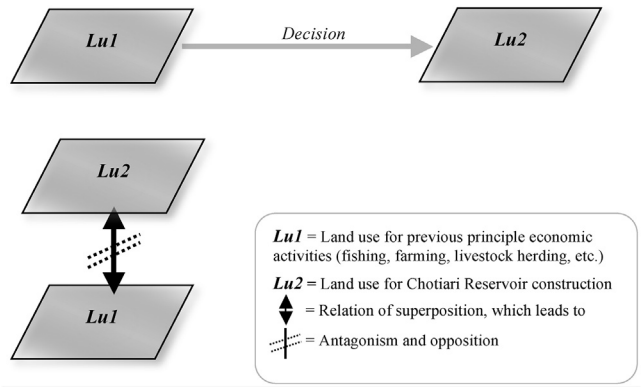

Fig. 2. Reservoir construction: decision and superposition of uses.

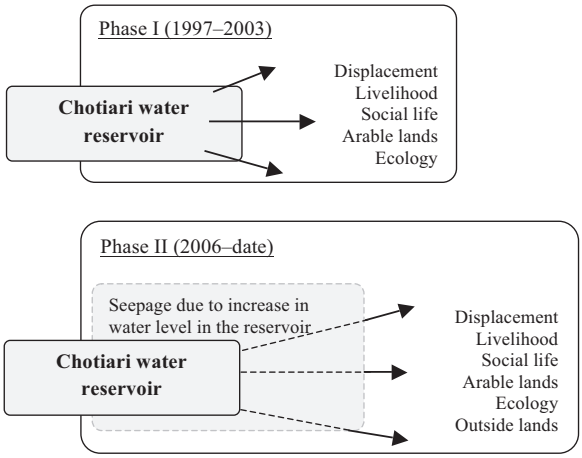

Fig. 3. Conflict dynamics of Chotiari reservoir.

affecting arable land, pastures, forests as well as through the cruel displacement of local populations. What is more, the increasing water level in the reservoir has created seepage, which is destroying adjacent agricultural land (see Fig. 3).

Network of actors and governance structure

The relationship of stakeholders at different levels (regional to international) forms the basis of hierarchies of decentralization, which reveal how strong governance is, or should be (Hill and Lynn, 2005), for a given infrastructure project in its initial stages. Through this complex maze of interwoven ties, actor–network theory provides information about their interactions and/or connections for disparate actions and activities (see, for example, Provan and Kenis, 2008; Hoff et al., 2002; Pattison and Robins, 2002; Wasserman and Faust, 1994; Grossetti, 1992; Scott, 1991; Granovetter, 1973). Here, we wish to use it to obtain a clearer picture of local populations' relationships and of public-sector behavior (see, for instance, Raab, 2002) with regard to subsequent conflict situations. When piecing together a network, the first step is to identify the links between the various actors, and then represent them graphically in order to visualize these relationships (Pattison and Robins, 2002). Sometimes, difficulties arise in the representation of multiple actors with many existing relationships, especially when they are not well defined socially or administratively (Provan and Kenis, 2008).

In order to understand conflict processes using networks, it is important to group the actors structurally according to time and space, as well as according to their inter-organizational relations (see, for example, O'Toole and Meier, 2004), as this will help to identify how they are linked to one another over time, and how their relationships change during confrontations. Essentially, networks should be structured on the basis of primary to secondary relations, e.g. neighborhood, administration, competition, confrontation (Grossetti, 1992). In this way, the model will facilitate understanding of the dynamics of the social relations at play.

From community to regional level

Here, we aim to provide temporal and spatial dimensions of various relations for the network of actors in our case study; it is subsequently possible to analyze the way in which "situated actors" build their representations and interdependent networks. We present schools of thought based on expert opinions, the daily press and interviews with affected households in the study area; this simple approach allows us to obtain social representations for the different categories of actors. The graphical representation that follows highlights the interactions and the spatial scale of the

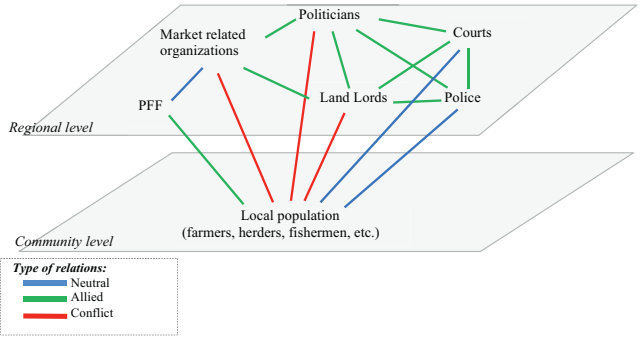

Fig. 4. Actor's network: before Chotiari reservoir.
Source: Authors realization based on expert opinions, field and literature survey.

actions of different actors before the announcement of the Chotiari reservoir project (see Fig. 4).

The results indicated in Fig. 4 are based on opinions from and interviews with experts, in which we discovered that the local population's relationships before reservoir construction were limited to influential individuals (landlords and politicians) and their local markets. Our analysis thus reveals that these relationships between the local population and other stakeholders were based only on the survival of their livelihood, in order to carry on with their day-to-day life as normal (Iqbal, 2004). According to the experts, this limited network was probably due either to the fact that the local population lived far from the nearest city (around 35 km/20 miles away), scattered within the reservoir perimeter (mostly on sand dunes), or to their isolated way of life (illiteracy, unawareness, traditional culture and/or incomprehension).

Through this analysis, we discovered that influential local individuals had antagonistic relationships with the local population, mostly owing to different economic activities in the region, as the local population belongs to a rural, socially deprived class. Furthermore, on the edges of the Chotiari area, the market-related organizations were run either by influential individuals or by people who had the support of these individuals. These market-related organizations therefore had conflictual relations with the local population owing to unbalanced transactions, such as selling their products or buying stock for their small-scale business. Further results show that the majority of the local population belonged to the fishing community, which is why they have been supported only by the Pakistan Fisherfolk Forum (PFF) and other NGOs, with no interaction with local police or administrative courts.

From regional to international level

Due to collaborations between actors and different reputations in terms of credibility, it is difficult to categorize the position of the various actors at all stages of the project, from planning through to construction. For example, during the policy-making process, some actors were involved at regional to national level, while others were involved only temporarily and did not play an active role in the administration. In order to understand the dynamic process of the project, we have sought to adopt a relational approach to our analysis with the aim of obtaining information regarding social representations that correspond to a universe of interrelated elements. Following these in-depth analyses, we summarized the relationships, links and locations of the actors or stakeholders at different geographical scales (see Fig. 5).

The above figure shows that actors within the various categories have structured themselves in terms of defined strategies and have different behaviors. Most strikingly, actors involved in managerial and administrative activities have a different representation of the reservoir area, appearing unified (Government of Pakistan, 1993, 1998), but in reality not caring about natural elements such

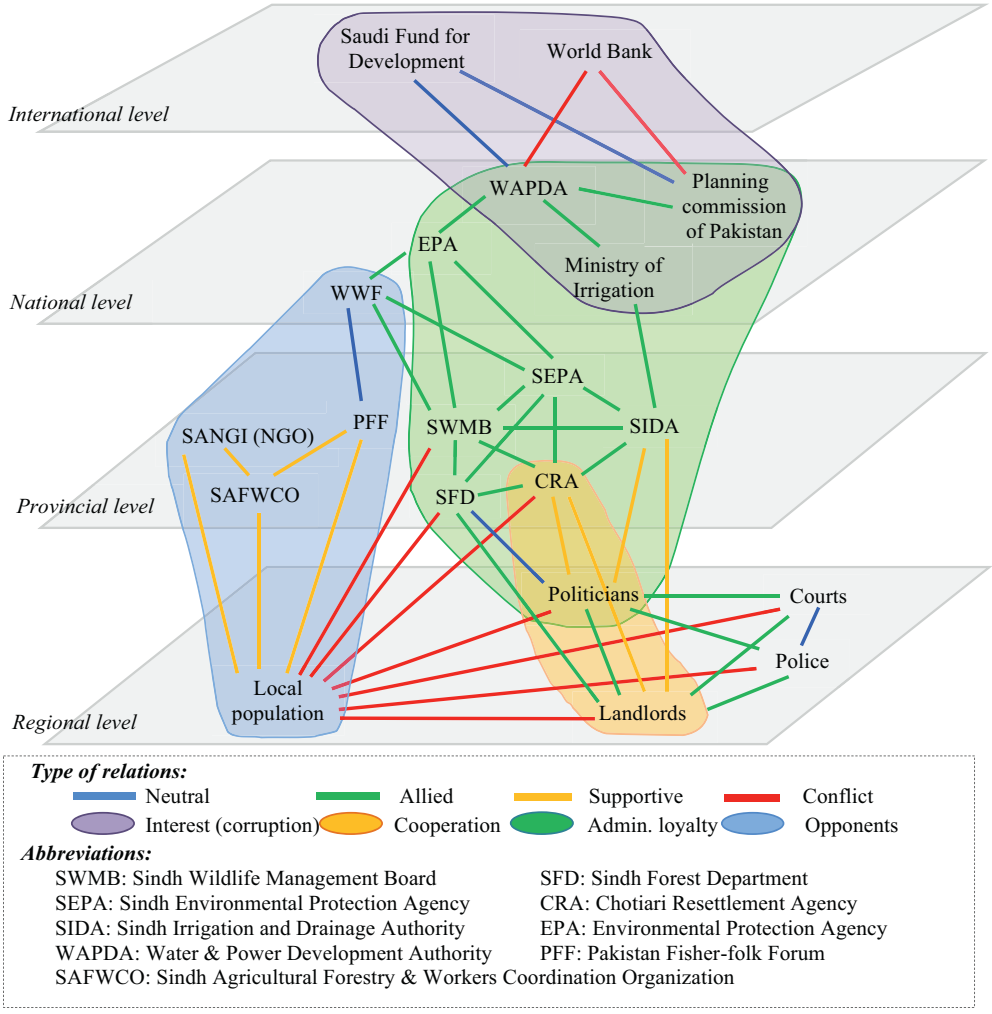

Fig. 5. Network of actors and stakeholders during the reservoir construction (1997-2003).
Source: Authors realization based on expert opinions, field and literature survey.

as wetlands, arable land, forests, flora and fauna; in other words, they are in alliance with local politicians and landlords, but have no positive relations with local actors up to grassroots level (Magsi and Torre, 2012). On the other hand, the local population, with the support of various NGOs, has opposed construction of the reservoir and protested in order to protect the natural resources of the precious wetlands of Chotiari. The limited support for, and coverage of, the local population's opposition, protests and mobilization has meant that their actions have not had conclusive results.

According to the experts, local stakeholders' cooperation with administrative actors at national to international levels was based to a certain extent on corruption and favoritism. In general, the institutionalized consultation processes do not necessary lead to decisions, but instead aim to facilitate the acceptance of a development plan, such as the construction of a reservoir. In the case of Chotiari, the consulting firms *Euro Consultants* and *Sir McDonald and Partners Ltd.* and a Sri Lankan resettlement specialist were appointed to prepare the Environmental Impact Assessment (EIA) report for the project, and to coordinate policy and implementation issues, but the experts have expressed doubts concerning the results of this work.

On the other hand, influential actors (politicians and feudal lords), in cooperation with the Chotiari Resettlement Agency (CRA), forced local populations or individual family heads to accept the decision in favor of the reservoir. The result is that the reservoir (after its inauguration) has been occupied (illegally) by some of those influential actors, as displaced populations have not been allowed to access the reservoir to earn their livelihood by fishing, etc. As highlighted by Nauman (2003), this cooperative lobbying network has managed to direct over 80% of compensation disbursements to fictitious owners (individuals whom they support). Moreover, the government itself has accepted that there was massive corruption in the Chotiari reservoir project (Iqbal, 2004), but no accountability has been established to date. Here, we would like to quote a remarkable response from one of the experts, who reported that the "WAPDA has again initiated construction of the Diamer-Bhasha dam in the north of the country, which will also be financed by the World Bank; thus, if the World Bank has no problem giving more money for corruption and the displacement of rural lives, then our government should solve these conflicts and give money to local people."

While analyzing the land-use governance of Chotiari reservoir, we found that the reason for some stakeholders' presence in power relationships was their long involvement in the project. For example, from the management network's standpoint, we can distinguish two main subsets of stakeholders, namely the decision-making body and the advisory and technical committees. Furthermore, these subsets include multiple networks. The decision-making process is managed jointly by associations and international and state institutions, while the advisory and technical committees bring together representatives from associations, professional organizations, government agencies and

non-government agencies. Some actors have connections outside of the committees as public authorities, while others have been linked to the politicians and landlords. It is an interdependent network, especially as it includes only a few people. In general terms, all stakeholders could in theory come together and consult on the action to be taken in order to establish a given project, but this process can be disregarded in the case of Chotiari reservoir (Nauman et al., 2001). With this in mind, each and every space for dialog is a special place where multiple actors meet with divergent interests and with multiple roles, having been involved in all actions from construction to the displacement of local populations, and from filling the reservoir to waterlogging and seepage (see Fig. 3). In addition, the public authorities were obliged to monitor the management and resettlement plans in relation to both the physical aspects (maintenance of wetlands, ecological inventories, etc.) and human aspects (regulation of conflicts). Moreover, as the figure above shows, law-enforcement institutions (the courts and the police) are peripheral and seem to have more of a suppressive role rather than enjoying any particular influence on the administration. In this context, marginalized populations surely have no hope of conflict resolution.

On the basis of experiences from the Chotiari reservoir project, we suggest that there is a need to build a strong participatory, community capacity for consultation, negotiation and promotion in favor of collective action (Petit, 2002). Collective action has been widely recognized as a mechanism for allocating resources and as an effective alternative in the field of planning and decision-making, but it can also be a difficult, painstaking and time-consuming task, as it is only possible where the local institutions are strong enough (Yasmi et al., 2011). Furthermore, in order to conform to international regulations, there is a need to build a common condition or agenda, which should encourage the sharing of different interests and perspectives as well as build confidence and trust among the resource users. Throughout the analysis of this case study, we consistently found that the public authorities did not uphold international rules or laws for those affected by the project or to resolve disagreements among the local population and their collated networks. Rather, with regard to conflict resolution, the stakeholders have dictated to the local population throughout the implementation of the project.

An analysis in terms of proximity dynamics

The analysis of proximity relations (Boschma, 2005) proves to be a valuable field of research in various disciplines as well as for topics such as innovation and environmental relations, or land-use conflicts. We shall use it here to analyze the relations between different categories of stakeholders in the land-use conflict over the Chotiari reservoir.

Basic findings

We consider the distinction between two main categories of proximity – geographical proximity and organized proximity (Torre and Rallet, 2005) – in explaining the relation sets of stakeholders, boundaries, clusters, etc. These notions of proximity refer, above all, to potentialities given to individuals, groups and human actions in general, in their technical and institutional dimensions. These types of proximity have no moral value and their existence constitutes neither an advantage nor a disadvantage. It is activation through human action that gives this potential its significance and value.

Geographical proximity

Geographical proximity is above all about distance. In its simplest definition, it is the number of meters or kilometers that separate two entities. But it is relative in three ways:

- in terms of the morphological characteristics of the spaces in which activities take place;
- in terms of the availability of transport infrastructure;
- in terms of the financial resources of the individuals who use these transport infrastructures.

Geographical proximity is neutral in essence. It is the human actions and perceptions that give it a more or less positive or negative dimension as well as a certain usefulness. It is the way in which actors use it that matters. Thus, the fact that two actors are located in proximity to each other may or may not be a source of interaction: these two entities may remain indifferent to each other or they may choose to interact; in this latter case, we talk about a mobilization of the potentialities of geographical proximity.

Undesirable and desirable geographical proximity.. Land-use and neighborhood conflicts and tensions can be closely related to geographical proximity (Torre and Zuindeau, 2009). The approach here is based on a fundamental distinction between undesirable or unwelcome geographical proximity and desirable geographical proximity.

Geographical proximity is undesirable when different land users disagree as to what the land they occupy should be used for – for example, some wanting the land to be used for recreational purposes and others wanting to use it for production purposes. Geographical proximity can also be unwelcome when there are disagreements about what category (or categories) of users should or should not have access to a given area. It can result in a constraint of proximity due to three types of interference:

- *superposition*: two or more land users use, or wish to use, a piece of land for different purposes;
- *contiguity*: individuals or groups of individuals located side by side disagree as to where the boundary between their respective properties lies;
- *neighborhood*: situations in which the undesirable effects of certain activities are diffused by air, water or under the effect of gravity to actors located in proximity.

The other, opposite, situation discussed in literature is that of desirable or sought-after geographical proximity. In this case, land users seek proximity to other social or economic actors, or even to natural or artificial resources or to areas that present (human and spatial) characteristics associated with a low population density. It can be of two types depending whether one needs permanent or temporary proximity.

Geographical proximity can be activated or mobilized by the actions of economic and social actors. Depending on their strategies or strategic choices, or according to their perceptions of their environment, the behaviors and attitudes of these actors vary, and they mobilize Geographical Proximity differently.

Organized proximity

Organized proximity, too, is a potential that can be activated or mobilized. Organized proximity refers to the different ways of being close to other actors, regardless of the degree of geographical proximity between individuals, the qualifier “organized” referring to the arranged nature of human activities (and not to the fact that one

may belong to any organization in particular[4]). Organized proximity is based on two main logics, which do not necessarily contradict each other, and which we shall call the "logic of belonging" and the "logic of similarity".

The logic of *belonging* refers to the fact that two or more actors belong to the same relationship graph or even to the same social network, whether their relation is direct or intermediated. It can depend on the sector in which they are operating; in this case, they share common creative or innovation capital. It can be measured in terms of degrees of connectivity, reflecting greater or lesser degrees of organized proximity and therefore a greater or lesser potential for interaction or common action. The development of interactions between two actors will be facilitated by their belonging to the same tennis club, for instance, or Internet knowledge network. Similarly, cooperation will, a priori, develop more easily between researchers and engineers who belong to the same firm, the same technological consortium or the same innovation network. This includes the common organizational culture among the members of a team, for example.

The logic of *similarity* corresponds to a mental adherence to common categories; it manifests itself in small cognitive distances between certain individuals. They may be people who are connected to one another through common projects, or who share the same cultural or religious (etc.) values or symbols. Social norms and common languages, for instance, partake of this organized proximity. It may also, however, correspond to a bond that sometimes emerges between individuals without them having had to talk in order to get to know one another. It facilitates interactions between people who did not know one another before but who share similar references. Thus, collaboration is all the easier when it involves individuals who share the same culture. Similarly, researchers who belong to the same scientific community are likely to cooperate more easily because they share not only the same language, but also the same system of interpretation of texts and results.

Just like geographical proximity, organized proximity refers to a potential that is neutral in essence. It is the perceptions and actions of individuals that give it a more or less positive or negative dimension, and therefore a certain usefulness. Being connected by a logic of belonging is not a guarantee that interactions will occur, and even less a guarantee of the quality of these interactions. In terms of the logic of similarity, a common project has as much chance of leading to a shared success as of ending in failure, resulting in heavy losses for the parties involved. Finally, the logics of similarity and of belonging can also facilitate collaborations that might be immoral in their motivations. For example, mafia organizations often feed on both the logic of similarity (ethnic origins) and on the logic of belonging (strong connection within a network of actors), which may be considered ethically immoral.

Proximity dynamics in the case of Chotiari reservoir

Proximity analysis is a valuable tool for qualifying the different dynamics at stake in the land-use conflict process. It helps in identifying the main groups of actors, their logics and their links, as well as the basis of their cooperative or opposed behaviors. Moreover, it provides helpful insights and information for recommendations in terms of land-use conflict prevention and resolution.

Geographical proximity

In the case of Chotiari reservoir, we quickly found that geographical proximity played a core role in the conflict processes, in two different ways. First, with regard to unwanted proximity interactions, it is obvious that geographical proximity between various local stakeholders (local population, landlords, and public authorities) has led to conflictual relationships and misunderstandings. Moreover, we identified a case of superposition of uses, which led to tensions and ultimately to conflicts after the displacement of the local population of farmers and fishermen. Clearly, a proportion of the traditional occupants wished to use the land for productive activities, whereas other stakeholders (landlords and public authorities) wished to use it for water storage or other, more profitable goals. In this respect, this brings us back to the general situation where using a piece of land for different purposes proves difficult or even impossible because of incompatible land-use expectations (Magsi and Torre, 2012).

Second, geographical proximity also played a role in the setting-up of local networks of opponents. The traditional users of the Chotiari land (farmers, fishermen, herders and others), when displaced, used to collaborate in order to protest against this new land use and to demand remediation in the courts and before the public authorities. From our interviews and our consultation of the local press, we deduced that the context and dynamics of these networks of local opponents were based upon their previous location and their common roots in local land and territories.

Organized proximity

The lack of generalized organized proximity is one of the main causes of the Chotiari disaster. These events should never have occurred in a case where generalized organized proximity relations existed between local stakeholders, as local public authorities or feudal landlords should not be in a position to act against the vital interests of the local population. They should have been forced to discuss with them and jointly establish local arrangements, instead of taking action at the expense of local farmers and fishermen.

However, intra-group organized proximity played a key role in the setting-up and structuring of networks. As Fig. 5 shows, it is obvious that most of the networks of opponents extend beyond the local level. Such networks can even grow to national or international level, and are all based on organized proximity relations. To be more precise, the logic of similarity is at stake in most of the networks: the opponents belong to the same community of people, they share the same values, or they belong to the same families or ethnic groups. This is particularly true in the case of local populations of displaced people, or in the Baradari (or Bîradrî) system, both of which are based on strongly rooted organized proximities. But it is also true for networks at local to regional or national level which transcend the geographical logic, such as the "administrative" network, involving people from different origins, but who are all linked by their adherence to common administrative rules and know-how. The logic of belonging has also played an increasingly important role during the different stages of the conflict: people started to take joint action on the basis of interactive exchanges, and continued to build relationships with one another on this basis. Over time, the links became stronger within and between different groups of opponents. They learned to work together, and cooperative and trust-based relationships developed among groups of opponents, on the basis of these existing, successful interrelationships.

Land-use conflict prevention recommendations in developing countries

On the basis of our case-study analyses, we shall now propose a number of recommendations for preventing land-use conflicts with regard to infrastructure development projects in developing countries. Moreover, in the following subsections, we shall elaborate upon the different possibilities for land use around Chotiari

[4] One may be organized or one may organize an activity without necessarily refer to or belong to an organization, in the strict sense of the term.

reservoir in order to resolve conflicts and ensure economic development; these solutions are principally based on the mobilization of proximity relations, be they geographical or organized.

Land-use conflict resolution measures: case study

It is obvious that not all strategies are suitable for resolving all conflicts, nor can conflicts always be resolved using a single resolution strategy (Young et al., 2005). So far, the conflicts created by Chotiari reservoir have been deeply rooted in inefficiencies in governance, legal institutions and local power configurations, such as corruption and mismanagement of funds, and the forced displacement of local populations. These movements of local populations have exacerbated tensions and led to conflict following the credible commitment (legal action, violence, media coverage, and access restrictions) of the actors who feel threatened or disadvantaged. To improve the management structure of the Chotiari reservoir project and prevent conflicts relating to its use, we propose the following measures, based on an analysis of networks and proximity relations.

Consultation and follow-up procedure

One of the challenges of the consultation process is regulating objections so that projects can succeed and be accepted by most of the actors involved. This process of participatory democracy gives indigenous people the right to express their wishes and needs. The cooperation and involvement of all stakeholders in the implementation of the project can help change and adapt the project according to the interests of all. This does not mean obtaining unanimous agreement, but rather ensuring that everyone has the opportunity to be heard. In general, unanticipated objections may arise during the procedure; these help to stimulate discussion. The consultation procedures therefore generally last several years and sometimes lead to unexpected results in terms of the regulation of conflicts.

The findings of this research explore the fact that the attitudes of the project stakeholders toward the principal actors set them apart from the other groups and created tensions and conflicts. The stakeholders' negative attitudes are shown clearly in Figs. 2 and 3. In light of this, one of the options for resolving conflicts in large infrastructure projects is therefore to pay attention to the voice of reason (i.e. the local population). Consequently, it is vital to be aware of the impacts of development projects on social and environmental norms. In this regard, good governance with follow-up procedures during the project construction phase characterizes the social and environmental needs of the project area. In particular, the environmental impact assessment (EIA) can be a crucial tool for achieving environmental sustainability. Although, in the case of Chotiari reservoir, this tool has not been followed up, the EIA for this project was at least carried out (Government of Pakistan, 1993); from this, we can conclude that the process needs to be administered more efficiently and in a more systematic fashion. All stakeholders, especially the local population, should have the right to participate in the follow-up procedures of planning, decision-making and construction operations. Moreover, the involvement of local populations can be based upon the mobilization of the proximity logics of belonging – joint expectations shared by people belonging to the same ethnic, family or situated groups – or of similarity – people belonging to the same networks of workers or professional relations.

Expropriation, compensation and accountability

The resettlement and relocation of the local population is an inescapable companion of infrastructure development projects like Chotiari reservoir. Almost all the use of land for project construction entails the expropriation of homes, businesses and other productive resources. During a project's initiation phase, local people must be counseled by the management authorities, whether they agree with the construction and voluntarily displacement or not; however, this was not the case with the Chotiari reservoir project (Iqbal, 2004). The involuntary resettlement and its impacts on local inhabitants have become the most contentious of the socio-economic and environmental issues at stake. The question of resettling and relocating local populations should be given paramount importance.

With this in mind, a system to redress grievances related to land acquisition, compensation and resettlement should clearly be established and made known publicly. The compensation and resettlement offered should ensure that those affected will regain the same or improved standards of living. We recommend that representatives of the affected population be selected as members of the compensation evaluation committee in order to help resolve conflicts. Giving compensation money to the affected families alone would not suffice; instead, consideration should be given to providing them with alternative employment, housing and amenities. A realistic action plan should be prepared so as to give those affected an opportunity to become physically established and economically self-sustaining within the shortest possible period of time. Its success, however, will always depend on efficient implementation.

Different possible land-use options, other than a reservoir

There is no doubt that land-use change can be economically viable and socially feasible if it is based on the concept of economic returns from present and alternative activities on the land in question (Segerson et al., 2006). For this, we need to know what the experts suggest in terms of alternative options in order to resolve the land-use conflict in the case of Chotiari reservoir. Accordingly, in the context of our research, we asked the experts the following questions: What are the options available for this land, and which of these options would ensure social and economic viability through collective interests? Few of the experts were found to be in support of the reservoir, and the majority of them were of the opinion that the land could still be used for other activities than the reservoir (see Table 2).

Table 2 indicates the possible options for land use on the Chotiari reservoir site. According to the experts, no significant changes

Table 2
Land use options other than Chotiari reservoir: suggestions from the experts.

Option	Explanation
Fish farming	The reservoir can be used for fish farming, as the lakes were used for fishing to local communities before the reservoir construction
Industry	Tourism: can be promoted in the Chotiari area, as the region is naturally beautiful and characterized as home of crocodiles Hotels: by following tourism the demand for hotels and marriage halls for public use on rent will increase, which will give a sufficient livelihood to local population Milk industry: before reservoir there was a milk processing factory which is now closed due to reduced size of herds (milk). Thus the land can be used for manufacturing and processing units of milk and milk products, by increasing grazing grounds on the fringes of the lakes
National park	Land can be reserved as national park by domesticating the damaged fauna and floras, restoration of natural forest life and crocodiles
Others	Agriculture, grazing and hunting (despite of increasing water level there is less possibility to use the land for agriculture, but the fringes of the reservoir and the dunes can be use as grazing grounds to promote cattle farming)

Source: Expert opinion survey end of 2010.

would be required to extend the agricultural land around the reservoir. This is because the authorities cannot store more water because of the poor quality of the earthworks in constructing its embankments (Nauman, 2003). However, arable land inside the reservoir perimeter has been flooded, and arable land outside this perimeter has been damaged by waterlogging and seepage. The experts also argue that if the government were to consider the above options, the change in land use could ensure prosperity in the region.

Recommendations for preventing land-use conflicts in infrastructure projects in developing countries

The unpredictable and risky nature of land-use conflict resolution is what has motivated the search for prevention solutions. Land-use conflict prevention can be a valuable tool for reducing future tensions and preventing the emergence of conflicts relating to divergent uses or anticipated uses of land. The Chotiari case shows that it is vital to be aware of conflict prevention concepts (Bercivitch and Jackson, 2009; Burton, 1993) and that certain actions have to be implemented before new projects are initiated, otherwise underlying characteristics could create difficulties (Mann and Jeanneaux, 2009).

Therefore, on the basis of the results obtained in our case study, we propose that the following measures be applied in order to help prevent land-use conflicts in infrastructure projects in developing countries. These measures are partly based on the mobilization of existing proximities between actors, be they geographical or organized.

How to mobilize virtuous proximities and avoid negative effects

First, we recommend enforcing and following up a statutory requirement that all new development project proposals and constructions should be preceded by an assessment of the local context, perspectives and applicable rights by a carefully selected multidisciplinary team. This should be followed by an open and flexible process with meaningful public participation, directed at developing a long-term, shared vision for the project area in question that involves the local population. We also recommend that a social safeguard policy be implemented, that rights be guaranteed to a minimum standard within the core mandate of the projects, and that key performance indicators be established for monitoring authorities; such indicators were not formulated in the case of Chotiari reservoir (Magsi and Torre, 2012) and other infrastructure projects (Mataram, 2008; Awakul and Ogunlana, 2002).

These assessments must first of all evaluate the geographical proximity between local stakeholders, which can be at the cause of land-use conflicts, whether in terms of superposition of uses, contiguity or neighborhood. Next, the participation and involvement of the local population must be ensured by mobilizing organized proximities, in particular via the logic of belonging: local stakeholders, especially the poorest and most active day-to-day users of the land and natural resources (herders, fishermen, and farmers), have to be informed and included in the decision-making process, on the basis of their common interests and future expectations. Finally, a successful process of territorial governance should lead to the building of solid networks of local and non-local actors of various origins. The sharing of common goals in terms of territorial development should, in this situation, be based on the interactive building of proximity logics of belonging.

Second, we identified the need to establish a governance body for the protection of natural resources, which should provide possible forms of mediation between socio-economic and ecological objectives. While it should be the authorities' aim to be recognized as a prime entity in the management of livelihoods and biodiversity through mutually beneficial cooperation with local communities and other stakeholders, this task would need to be undertaken by a neutral party, not just during the initial planning process but also in the long term.

The mobilization of both types of proximities should be sought during this process. Desired and undesired proximities of natural resources such as lakes, forests and rich soils on the one hand, and polluted areas and infertile land on the other hand, must be assessed in order to map and define the perimeters of protected or exploitable resource areas, with regard to the needs of local populations. Then, those in charge of the governance structure should try to develop organized proximities between various local stakeholders, from different communities, in order to help them build common projects and future prospects together.

Technical tools and measures

Large construction projects are responsible for land-use changes where location is a key factor for development. The project location should be determined according to social, economic and technical criteria, as well as environmental considerations, in contexts where careful land-use planning is necessary to avoid conflicts between land users. The use of local historical records, benchmarking procedures, territorial diagnoses, interviews and peer-group meetings is strongly recommended.

We should also like to emphasize the necessity to guarantee, for each community, access to and the exercise of legal rights through a state-sponsored body, in order to overcome the asymmetries of power that typically prevail and to ensure opportunities for their optimized gainful employment. These are basic rules which may entail implementing virtuous governance processes at the territorial level and fulfilling the minimum requirements of the local population (Torre and Traversac, 2011).

Conclusion

This research concerns multi-level governance and socio-spatial evaluations of the Chotiari reservoir project in Pakistan. The project has affected and damaged economic, social and environmental resources. In terms of results, the divergences in land-use objectives between public and private decision-makers on the one hand and local populations on the other have generated various conflicts among stakeholders in the area. In the course of this research, we have explored the dynamics of stakeholders' relationships at scales ranging from the local community to international level, first using an approach based on networks of actors, and then in terms of proximity analysis, both geographical and organized. Both of these methods highlighted the lack of appropriate territorial governance, which should have played a crucial role in anticipating and/or mitigating land-use conflicts. Through multilevel governance analyses, we have exposed institutional powers and behaviors to the indigenous populations, as well as revealing management practices implemented in Pakistan.

The results show how the public authorities have ignored international laws, as well as the local populations' rights, in undertaking a major development project. This is seen as part of a trend in territorial decision-making in developing countries today, but we claim that this situation could be changed by mobilizing different proximities to encourage territorial development in less sensitive areas. Reconciling the conflicting relationships between project stakeholders is a major challenge in Pakistan, but this is a matter which requires extensive debate in other developing countries as well. Strong governance is essential to the conflict prevention process, particularly in terms of building capacity for strong negotiations between key stakeholders in order to obtain commitments to sustainable and equitable natural resource use and ecosystem management. Thus, on the basis of our case-study analysis, we

have suggested comprehensive strategies for developing policy recommendations to prevent conflict that can be applied to similar situations in other developing countries.

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