



Management practices to minimize land use conflicts on large infrastructure projects: examples of dams construction in Pakistan

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Abstract In this research two cases of infrastructure development (*Chotiari* and *Diamer Bhasha* Dams) from Pakistan were studied in terms of a superposition of land uses and their consequences. For this purpose, we obtained qualitative information from both primary as well as secondary sources. Primary data were collected through a partially developed questionnaire from pre-selected experts of various professional backgrounds. National and regional dailies along with other published literature were used as a secondary source of information. The findings have identified the key groups of stakeholders and their relative social power at different levels of governance. The results further highlight that unfair land acquisition, improper

displacement, mismanagement in compensation, etc., have caused negative impacts on local people and the surrounded environment. The article further emphasizes governance issues and conflicts among different actors due to the project. Finally, we recommend several actions to prevent strong opposition and conflicts in the infrastructural project in developing countries, like the enhancement of the capacities and the capabilities of the local population, the diffusion of information and the involvement of stakeholders, and the application of technical tools and devices.

Keywords Infrastructure · Conflict · Proximity relations · Superposition · Pakistan

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Introduction

Superposition of land use expectations and competition over land uses for different projects have produced conflicts, mainly due to ignorance of rights (physical or social), forceful displacement, and delayed justice (Magsi et al., 2017; Torre et al., 2014; Wehrmann, 2008). The large development projects especially the dams are directly proportionate to the increase in the population (demand); but, mainly affected agricultural lands (Ha et al., 2016), natural resources (Ostrom & Nagendra, 2006), which has

created frustrations in rural masses (Nüsser, 2003). Such oppositions encouraged them to unite and protest for their rights, through voice attitudes (in the sense of Hirschman, 1970), protestations, recourse to the tribunals, or violent oppositions.

Theoretically, the land use conflicts are the result of a lack of social justice and recognized rights in rural areas (Ostrom, 1990), such conflicts are sparked more when owners are forcibly dispossessed from natural resources, i.e., land, water, or forests (Ostrom & Nagendra, 2006; Tilt et al., 2009). According to the welfare economic aspects of land use conflicts (social welfare theory), the superposition of lands must not depend on from one use to another use, on its efficient distribution for the economic activities (Cheshire & Vermeulen, 2009).

For assured agriculture in developing countries like Pakistan, there is a need to store water; but, if the big projects like dams are based on faulty planning, they might generate social and environmental disputes (Baghel & Nüsser, 2010). Pakistan is an agricultural country, meanwhile, it is also classified as a water-scarce country, where water availability is less than 1000 cubic meters per person per year. In addition to water scarcity, the electricity shortage urged the authorities to focus on dam and reservoir projects (GoP, 2020). A lot of people are being affected socioeconomically by the land acquisition process related to these projects, although the importance of these dams and reservoirs cannot be ignored. The government claimed that such projects in the past raised the living standard of the people by providing employment opportunities and development of the affected area, but in fact, most of them led to low living standards, poverty, and social instability (Magsi & Torre, 2014). This raises a serious question over Pakistani authorities for construction of *Bhasha* Dam, the land acquisition of which is almost completed and there exists a lot of conflicts among stakeholders, badly affecting local people like projects in past (Sabir et al., 2017).

This study tries to give the understanding of factors responsible for the superposition and the competition of land uses for large development projects and the rural livelihood; particularly, it discusses the cases of *Chotiari* and *Bhasha* dams of Pakistan. The research is based on descriptive analysis where it points out the factors of significant importance after in-depth investigation of flawed projects related to the construction

of dams. The main objective of the current study is to find out the factors of controversies and to suggest preventive measures for upcoming land use conflicts in the country.

The first part of the article deals with the research methodology and the description of both case studies. The second one emphasizes the stakeholders' involvement, disagreements, and causes of the conflicts related to the superposition of lands for both projects. The third part accents the findings of both cases: including the involvement of stakeholders, their behaviors, the controversies, and conflicts created by the dams. In the final part, we recommend the actions to prevent strong opposition and conflicts in the infrastructural project in developing countries; likewise, enhancement of the capacities and capabilities of the local population, the diffusion of information, the involvement of stakeholders, and the application of technical tools and devices.

Methodological considerations

This section highlights the case studies, the sampling procedure, the data sources, and the analytical measures. It also encompasses the methodological options chosen in our research and provides some core information about the two study zones.

Descriptive evidence of the construction projects: *Chotiari* water reservoir and *Diamer Bhasha* dam projects

Two large constructions—*Chotiari* and *Diamer Bhasha* Dams—were selected for this research, because of their specific natures. The *Chotiari* Dam has already been constructed, where the *Diamer Bhasha* dam construction has recently started. The purpose of both case studies was to see the factors which are causing conflicts in large construction projects and how such factors can be managed to minimize the occurrence of future conflicts (Fig. 1).

Chotiari dam

The *Chotiari* reservoir project was constructed on over 18,000 hectares of land alongside the Indus Basin. It was planned to increase the storage capacity of existed lakes in the wetlands of *Chotiari*, aimed to store

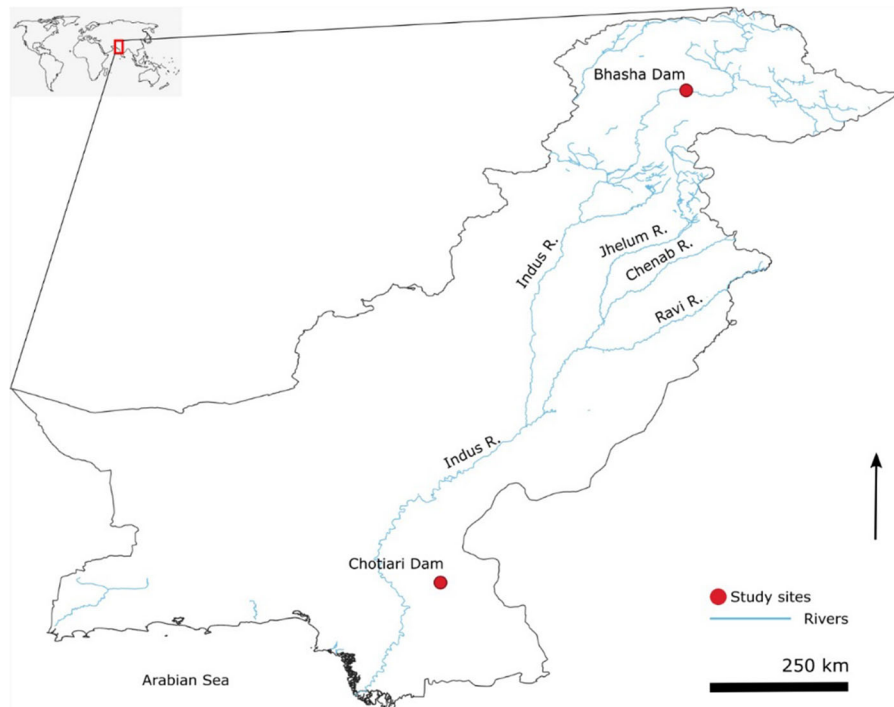


Fig. 1 Location of the *Bhasha* and the *Chotiari* dams. *Source:* Developed by the authors

monsoon water for agriculture (GoP, 1998). In this way, it could irrigate about 0.12 million hectares of land of three districts including *Sanghar*, *Shaheed Benazirabad*, and *Mirpur Khas*. The reservoir capacity was enhanced to 0.75 Million Acre Feet (MAF) which covers an area of approximately 160 square kilometers. The project cost escalated from US \$26.3 million to US \$105 million from its planned construction time i.e., 1997 to the actual start of construction i.e., 2002 due to inefficient planning and mismanagement (Iqbal, 2004).

Diamer Bhasha dam

Diamer Bhasha dam was planned to overcome the electricity and irrigation water shortages in the country. The project was named based on its geographic location which is on the boundary of two provinces “*Khyber Pakhtunkhwa*” (KPK) and “*Gilgit Baltistan*” (GB). *Diamer* is named after a district in GB, while *Bhasha* is a village in KPK. Water and Power Development Authority (WAPDA) is the main institution in Pakistan responsible for the construction of water reservoirs (with its other objectives). This

project was a part of its vision 2025. The feasibility of this project was started in 2001 as a priority (Dawn, 2006). After completion of the Engineering design in 2008, the cost of the project was estimated at US \$13.684 billion and approved in 2012. Initially, the World Bank and Asian Development Banks were approached for the funding requirements of this project, but no commitment has been received, either may be due to less interest or maybe due to political controversy between Pakistan and India. The project has completed its land acquisition phase aftermath of the China Pakistan Economic Corridor memorandum; therefore, it covers an area of 110 Km² (GoP, 2013).

Data sources and analytical measures

For this research, primary and secondary data were collected. The primary data was gathered through interviews from experts and other stakeholders of different backgrounds. They included administrators (irrigation and water sectors), researchers, private organizations, and legal experts to have their opinion on different issues of the *Chotiari* and *Bhasha* dam

projects. To cover the conflict information in all dimensions some directly affected households were also interviewed. Finally, fifty interviews from each project area were conducted (see Table 1).

The interviews were conducted with partially designed questionnaires, from which some questions were excluded to ask according to experts' professional backgrounds. The main questions included were: (1) situation before conflicts in the area and position of the actors, (2) behavior of different institutions in land acquisition and compensation decision, and (3) the consequences of the projects.

Data from national and regional dailies and other published literature on the selected projects were included, because different studies have already used such secondary sources for their data (see Awakul & Ogunlana, 2002; Mann & Jeanneaux, 2009; Mahato & Ogunlana, 2011; Torre et al., 2014) for the purpose of cross checking the information from various sources and ultimately better analysis (Deininger & Castagnini, 2006; McCarthy et al., 1996). In our cases, different newspapers at the regional and national levels were selected for identification of in-depth conflict roots.

These news articles were selected based on different socioeconomic issues and conflicts related to both projects from the period of 1997 to 2016. Regional dailies were collected through personal visits to regional press offices as well as specific news cuttings were collected from local community-based organization's (CBOs) offices. Whereas the national dailies were directly accessed through their websites. Deep analysis of these newspapers has been conducted along with the facts published by private and public organizations. In this way, we hope to have obtained nice information through different sources and avoided too many biases.

Results and discussion: conflict and governance failures

In this section, the findings of both cases are provided, which include the involvement of the various stakeholders and the behavior of the local population. The section further highlights the controversies and oppositions created by the projects, where the management flaws and governance system failures in both cases have been envisaged.

The stakeholders

Both Chotiari and Bhasha dams have displaced the local population at a large scale, while the people reside in rural areas either depending on agriculture or on fishing activities. Since both territories are laying on the *Indus* basin, so most of the people are depending on fishing, followed by grazing, agriculture, etc. (see Table 2). In case of Chotiari, the fishing communities were engaged with the ecology of the lakes, where fishes were trapped outside the dams. This kind of loss for the local fishing community was not satisfactorily estimated or addressed by the authorities.

The stakeholders keenly involved in both projects were identified and classified according to their stakes, e.g., local actors, personalities, market related agencies, and institutions (see Table 3). The institutions were operating from national to local levels, with different political interests and positions. Particularly, the instigators of the projects like Planning Commission, Ministry of Irrigation, WAPDA, SIDA, and local leaders were in coalition with the single objective, "to construct the reservoir".

Mostly the different stakeholders, with their different stakes, were involved at different levels. For example, in the *Chotiari* reservoir situation, it was

Table 1 Experts interviewed

Categories	Interviewees	
	<i>Chotiari</i>	<i>Diamer Bhasha</i>
Affected family heads and landlords	10	10
Administration (water and irrigation sector)	10	10
Local leaders/representatives	10	10
Researchers and legal experts	10	10
NGOs and journalists	10	10
Total	50	50

Table 2 Descriptive statistics of the projects. *Source:* Extrcated from government published reports, and articles from news dailies

Damages	Chotiari dam	Bhasha dam
Location (province)	South (Sindh)	North (Gilgit Baltistan and Khyber Pakhtunkhwa)
<i>Displacement</i>		
Villages	47	32
Families	993	4228
Persons (directly affected)	8747	28,650
Main source of livelihood	Fishing	Agriculture/farming
Compensation	Less than market value	According to market value, but delay in payments
Literacy level of local population	Very low	Very low
Agricultural land submerged (acres)	11,564	2660
Submergence of forest/trees	Makhi forest (16 km ²)	50,000
Submergence of Prehistoric rock carvings (number)	–	33,000
<i>Projections during feasibility</i>		
Electricity generation	–	4500 MW
Irrigation	0.75 MAF (not achieved so far)	6.4 MAF live storage of annual surface water
Employment	Only during the construction of the project. Local people worked as labor	Specifically to locals and afterwards in Agriculture, industry and commercial sector

observed that the relations between stakeholders and local actors were not constructive, as local people (principal actors) were either living in remote areas or scattered in small tribes (GoP, 1998). However, they neither had adequate information about the reservoir construction, nor they were taken on board fully for commencement (Iqbal, 2004). Therefore, the local actors have opposed the reservoir construction decision; contrary, the public authorities (institutions) have seemed in association with local politicians, and the feudal had supported the decision. As a result of that, the implementation of the project became contentious and complicated.

In the case of *Bhasha* dam, various stakeholders were operating with different stakes, but most of them were interested in the compensation. Several issues were seen among different stakeholders during different project activities. First, land rate compensations were decided after a severe bloody clash between the government and affected people in which three people died (Sabir et al., 2017). However, most of the principal actors stated that this compensation amount was decided under fear to avoid another bloody clash with security forces. Local actors were ignored in

decision making in major project activities, along with resettlement and employment decisions which further turned into a source of tensions and conflicts.

Controversies and oppositions

Several development projects have created mistrust and opposition in the developing countries, as most of these projects lack the participation of local affected people in decision making (Magsi et al., 2017). The analysis of both selected case studies through primary and secondary sources brought up the below mentioned root causes of conflicts. Moreover, we also attempted to disclose the disputes among locals and authorities by analyzing the behavior of authorities during different phases of the project implementation. We also emphasize the unity of affected people against the project. These issues include corruption events, fewer land compensations, nonpayment of compensations, and the government's decision of compensation payments to the selected people. Regarding these issues, the affected people went for violent protests, several times (Table 4).

Table 3 The stakeholders involved in the projects

Stakeholders	<i>Chotiari</i> dam	<i>Bhasha</i> dam
Principle actors (local population)	Farmers Livestock herders Fishermen Others (Government servants, mechanics, plumbers, wood-cutters, poultry farmers, carpenters)	Farmers Livestock herders Social workers Others (skilled and unskilled workers, Government servants, Private businessmen)
<i>Institutions</i>		
National	Ministry of Irrigation Water and Power Development Authority (WAPDA) Planning commission of Pakistan—Pakistan Environmental Protection Agency	Planning Commission of Pakistan Water and Power Development Authority (WAPDA)
Provincial	Sindh Environmental Protection Agency (SEPA) Sindh Forest Department (SFD) Sindh Irrigation and Drainage Authority (SIDA) Sindh Wildlife Management Board	Journalists Private consultants for <i>Bhasha</i> dam and other related projects
Regional	World Wildlife Fund (WWF)-City government	City government
Local	District Administration Police <i>Chotiari</i> Resettlement Agency (CRA)	Legal advisors Police <i>Diamer</i> Poverty Alleviation Program (NGO) District Administration
Market related agencies	Local Agro-based Industries (fish, milk, cotton, & vegetable)	
Powerful personalities (interested for land grabbing)	Local politicians (Locally elected personalities) Local land-lords (Feudal)	Local land-lords (Feudal) Local politicians (Locally elected personalities)

During the *Chotiari* project, wrongdoings were found in resettlement plans, land acquisition, and the compensation process. The compensation was either below the market values of the resource losses, or it was delayed. The project has also affected the natural resources around. For example, deforestation of *Makhi* forest and enhancing stress on fauna and flora of the area. Almost half of the land was unentitled while the rest was entitled (private property), thus the question of land compensation from the government remains unsolved on such lands. This led local people to unite for their causes. No CBOs were present in the area before the start of the project. They arise because of controversies in the project (Abro, 2001), like mismanagement in compensation, relocation as well as in construction funds, environmental problems like water logging, and risk to wildlife in the area.

Like in many rural areas of Pakistan the property is being fragmented from ancestors in the *Diamer*

Bhasha dam locality. Thus, most of the households did not have property papers to avail the compensation of the resource loss as initially announced by the government. The system of land management is in the hands of land administrators called *Patwaris*,¹ who were authorized by the government to prepare and manage all the land records. Most of the area of *Bhasha* dam is tribal, without the existence of the land record and registration of market transactions were unwritten. Based on our interviews with *Diamer Bhasha* dam affectees, most of the conflicts were linked with wrong measurement, elements of corruption, mismanagement, and cronyism. Corruption and unofficial changes in the land record are common due to the lack of access and reliability of land records of *Patwaris*. While taking advantage of this, a few

¹ Local land administrator/government official who keeps the record of land ownerships.

Table 4 Conflicts highlighted by the daily regional press. *Source:* Extrcattion from regional dailies

Land use conflicts (linked with social, economic and environment)	<i>Chotiari</i> water reservoir	<i>Diamer Bhasha</i> Dam
<i>Land use dimensions</i>		
Land acquisition	✓	✓
Water logging	✓	–
Poor compensation of land values	✓	✓
High cost of resettlement as compared to compensation amount	–	✓
Regional boundary issues	–	✓
Land ownership conflict among different groups of local population	–	✓
<i>Social dimensions</i>		
Relocation/resettlement	✓	✓
Clash between police and local population	✓	✓
Fraud property dealing	–	✓
Delay in compensation payment	✓	✓
Biasness in employment opportunities and ineffective employment plans	✓	✓
Insufficient public consultation	✓	✓
Conflict due to impact on local culture	–	✓
<i>Environmental dimensions</i>		
Land degradation due to water logging	✓	✓
Stress on flora and fauna	✓	–
Deforestation	✓	✓
Damage to prehistoric rock carvings	–	✓

outside stakeholders have submitted fraudulent property papers for land compensation. Another noticeable conflict between the government and local affected people is related to the category of land to be acquired at some places. To provide compensation, the government has categorized lands as cultivated, cultivable and barren. Local people complained about manipulation of categories by the government from cultivable to barren lands might be done to reduce the amount of compensation.

Governance failures

In big infrastructural projects like dams, the proper information dissemination of all reports at the public level is an important and significant step right from the start of the project to avoid the conflicts (Nolte, 2020). In Pakistan, the capability of institutions for planning, implementation, and monitoring to safeguard the public interests is highly questionable (Nauman, 2003). In the *Chotiari* reservoir case, access to information was not given to local people and their

participation was discouraged at most of the stages of the project. On the other hand, the monetary and non-monetary benefits from the project highlighted the corruption and cronyism of bureaucrats and politicians. Experts in the local area pointed out the failure of bureaucrats and politicians in safeguarding the public interests as they never stood by the side of local people.

In the case of the *Diamer Bhasha* dam project, poor governance has affected the socioeconomics of the local population directly and indirectly. Mismanagement and favoritism were observed in different land acquisition activities, like fewer land measurements, land allotment to favored persons, and manipulation in land categories. Several groups of people were discouraged to participate in the project activities and benefit from the project because of ethnicity. Further, several misconducts from governing bodies put a negative impact on affected people. Some project managers (government nominees) bought the land in the project area before start of the construction and thereafter they sold it to the government at much

higher rates. Many developmental projects including schools, hospitals were approved for the locally affected area but executed in non-affected areas of their own interest. Resettlement was delayed due to disputed land for model villages and the construction plan of these villages was not according to local culture. Capacity building programs for employment arranged by government authorities are poorly interesting for local people due to their lower category job nature, short training period, and less stipend. Contrary, the local people preferred cash compensation rather trainings etc.

Moreover, besides compensating the local population, the transboundary issue between two provinces, i.e., *Gilgit Baltistan* and *Khyber Pakhtunkhwa*, was also highlighted. In fact, before the declaration of the *Diamer Bhasha Dam* project, the area was under the control of the *Gilgit Baltistan* government and mostly used as pastures and meadows. After the decision of this project, the territory was claimed by the *Khyber Pakhtunkhwa* government. However, many experts and stakeholders pointed out that this problem was mainly generated because of the compensation from its seven kilometers long territory and royalty from electricity generation.

In summary, it is reasonable to say that governance failures came to exist, as there was no planning and participation of local people in the land acquisition process, employment and resettlement plans, and compensation decisions or lack of democratic control over the planning and executing agencies of the project.

Land use conflict prevention recommendations for infrastructural projects in developing countries like Pakistan

The risky and destructive nature of land conflicts needs early prevention solutions, be there in Pakistan or other developing countries. This step of conflicts prevention could prove a valuable tool to limit future tensions and the generation of conflicts that are linked to the opposition of interests of different stakeholders in the use of land. Below mentioned recommendations came from the results obtained from selected case studies, but they can be useful for conflict resolution in the construction of big projects like dams and water

reservoirs especially in developing countries like Pakistan.

Enhance the capacity and capabilities of the local population

Our research points-out weaknesses in reaction of the local population; especially, the problems related to misinformation or lack of involvement are linked to the low level of education of the local population and their poor knowledge about public and institutional mechanisms. In fact, developing skills among local people is required: they could be helpful to understand the pros and cons of the project, to give their opinion and to negotiate their rights about land and other resources with government, other public representatives, and big firms. Several agencies might be helpful in this regard including mainly NGOs and donor agencies like Asian Development Bank. Moreover, the involvement of local people in project activities and public debate along with NGOs and media can further help to make the project transparent. It can protect the rights of affected people related to the provision of compensations especially natural compensations, resettlement, and employment opportunities according to their culture, local traditions, and skills.

Improving the capabilities of local people through education is an important step that gives them more individualistic foundations so as they feel free to choose from a wide variety of different opportunities given to them through their environment and enhance social justice (Sen, 1999). But empowerment approaches are above all, in the sense of improving the competencies and capabilities among affected people to enhance the social linkages and experience-based learning. These training and skill development programs would enable them to take part in project activities, to be informed at every stage, and be active in setting new developmental plans (Scudder, 2005).

How to mobilize virtuous of proximities and to avoid negative effects

We suggest that there is need to follow the legal requirements in the sense that all the upcoming proposals of the infrastructural projects and their construction must pass through scrutiny under local context and perspectives by a multidisciplinary team. Following this, an open and unbiased procedure of

participation of all stakeholders must be encouraged with the ambition of the development of the area based on common ideas and desires. Further, we also recommend bringing in socioeconomic and environmental measures to protect the social policy, to ensure the rights of locals at least at a minimum level according to the mandate of the project, and formulate the main parameters for monitoring authorities which were absent in case of Chotiari and Diamer Bhasha dam projects (Magsi et al., 2017; Nolte, 2020; Nüsser & Baghel, 2017).

The formulation of the project must also evaluate the geographical proximity among different stakeholders which is the main component in land conflict generation in different ways, including superposition of interests, contiguity, and close neighborhood. After that to mobilize the organized proximity particularly the logic of belonging (Magsi & Torre, 2014). The participation of local people is necessary, especially the involvement of the poorest and day to day users of land and natural resources (fishermen, farmers, and herders) in the decision-making process based on their desires and expectations. Then a better and successful territorial governance could result in a network of directly and indirectly affected people, which could lead to socioeconomic and territorial development by activating the organized proximity.

We also recognize the necessity of a governing body for natural resources protection, which could give different forms of mediation for socioeconomic development. As it is the duty of the government authorities to manage and enhance the protection of livelihood as well as biodiversity by taking on board the local communities and stakeholders, a neutral party would carry out this task in a better way not only from the start of the project but also on later stages.

Proximities of both types during this process should be mobilized. Assessment of wanted and unwanted proximities is necessary to differentiate the protectable and exploitable resources whether they are forests, lakes or rich soils, or polluted areas and unfertile grounds respectively according to the desires of local people. After that, the leading governing bodies should enhance the organized proximity among various stakeholders from within the community to build combined projects and future goals.

Technical tools and devices

A big project like dam brings major changes in land use, selecting geographic location is the main element in the construction process of big infrastructural projects. It needs careful planning during the selection of the location of the project by taking care of socioeconomic and environmental criteria to avoid the conflicts. In this regard territorial analysis, benchmarking procedures, interviews, and group meetings are required. We also recommend the need to reduce asymmetry of power and guarantee attainable employment opportunities. Such ground level rules are necessary for the setting of good governance processes at the territorial level and safeguard the least possible requirements of the local population (Torre & Traversac, 2011).

The importance of developing technical solutions to the problems faced by the implementation of major infrastructure projects, particularly in the phases of discussion with the population, must also be emphasized. Thus, the existence of semi-desired infrastructures (Torre et al., 2015) refers to situations in which it is both necessary to find a solution to economic problems but also to respond to the objections raised by these projects. In order to remove reservations and objections, it is also necessary to find technical solutions. For example, in the case of dams, to ensure the quality of the resettlement, to guarantee the availability of land in other locations or to move remarkable sites for example. At this price, large-scale projects become more acceptable by populations who also perceive their interest in economic and welfare terms.

Conclusion

Infrastructural conflicts take an increasing place in many developing countries like Pakistan, related to the setting of big infrastructures devoted to the requirements and welfare of the local populations, but sometimes in contradiction with their concrete wills. In this paper, two cases of infrastructure development (*Chotiari* and *Diamer Bhasha Dams*) from Pakistan were studied in terms of superposition and oppositions of land use expectations with their several elements of conflict among various actors over territory and resources.

The qualitative data collected from both primary and secondary sources show that the conflicts are

mainly linked to the construction of the projects and various economic, social, and environmental issues. Both projects have hampered socioeconomics and damaged natural resources, where such management practices are being implemented in Pakistan for a long. The livelihood of local populations was affected by mismanagement, corruption, and favoritism of payment of the compensation. It is concluded that the difference of opinion of the local population with the public and private body in the process of decision making created several conflicts among different stakeholders from the local level to the national level.

Therefore, it was observed a lack of meaningful territorial governance, which would have played a vital part in forecasting and/or alleviating land use conflicts. This seems like a trend in the decision-making process of many developing countries; however, we do claim that the situation would be otherwise radically different if various proximities i.e., geographical, and organized, are mobilized. Settling the conflicting relationships among different stakeholders related to the project is a great challenge in Pakistan, but this matter needs a lot of debate in other parts of the developing world as well. Strong governance is also linked to strong negotiations among main stakeholders, which requires capacity building so that a sustainable and balanced natural resource use and ecosystem must be managed. It is also linked with the capabilities and the empowerment of the local population to ensure their effective participation. Thus, results of our cases studies suggested comprehensive devices for developing policy recommendations to avoid conflicts which can, in the same way, be applied to other cases of the global south.

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