Technical Report

Climate Change Impacts and Adaptation in Balochistan

Awarding Agency:

Global Change Impact Studies Centre (GCISC)

Executing Agency:

Balochistan University of Information Technology, Engineering and Management Sciences (BUITEMS), Quetta

Benefit Cost Analysis of Water Supply from Pat-Feeder to Quetta

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1. Introduction

The Indus Waters Treaty was signed in 1960 between the representatives of Pakistan and India under the observation of World Bank (World Bank, 1960). The water treaty established water share of Pakistan secured from possible Indian water aggression. The Government of Pakistan then channelized water distribution among the four provinces of Pakistan. Baluchistan gets very lowest share at national level water distribution, despite the fact that most of the region of the province is barren and average rainfall accounts for less 200 mm for the last century (Arif & Bhatti, 2018). The provincial share of water is confined to selected districts, adjacent to Sindh province, of the Nasirabad division through Pat-Feeder canal system (ADB, 2015).

Quetta water supply project was announced by Government of Baluchistan to supply drinking water for the population of Quetta from Pat-Feeder canal (GoB, 2014/15). The Asian Development Bank reports that the proposed project involves huge financial, socio-economic, environmental, and other costs to ensure viable and consistent supply of drinking water from very low altitudes of Pat-Feeder canal (220 feet from the sea level) to the high altitudes of Quetta city (5000-5500 feet). Most of the stakeholders are not taken into account on making proper basis for the viability of the proposed irrigation water supply project for the purpose of drinking to very high altitude-placed citizens of the province. The feedback from farmers, common citizens, government officials like divisional/district management group, irrigation department, WAPDA, Publice Health Engineering Department, Agriculture department etc., Shareholders of the Par Feeder irrigation water, and other agro-based stakeholders has not been takenin order to devise a proper plan and strategy for the proposed Quetta Water Supply Project (ADB, 2015).

Moreover, the upstream water conflict among the provinces of Pakistan is mentioned by one of the study of International Union for Conservation of Nature (IUCN) that triggered the Indus Water Treaty between Pakistan and India. The water up-streaming and down-streaming conflict are not yet studied to bring forth the potential explanation of its effects among the low and up streams districts and between the low and high altitude areas in Pakistan, set aside such studies about the case of Baluchistan (IUCN, 2010; Arif & Bhatti, 2018).

The studies on Indus Water Accord (1991) also mention that up-stream water flow is one of the key issues among water storage, provincial share and flow of water, water issue between Sindh and Punjab, and water flow share of Baluchistan from Sindh in the contexts and perspective of Pakistan's water Economy and hydrology of Pakistan (Sharif, 2010; Brescoe & Qamar, 2005). Further, in one of the policy briefings by Aslam and Ahmed (2007) identifies that canal system of the province and its water flow face challenges of waterlogging, salinity, water discharge issues, and its proper usage for agriculture production. The briefing also identifies reliability and efficiency of water flow, its data, and proper usage for irrigation purposes that produces constraints to sustainable irrigated agriculture for improved agricultural productivity.

On the other hand of the spectrum, the Public Heath Engineering Department (PHED) of the province estimated that 75% of the rural Quetta is provided with drinking water through tubewells. The urban population has been severely facing drinking water supply problems and most of the urban population rely upon private sector water supply (water tanks, mineral water companies, private tube-wells) The PHED also predicted that guaranteeing the supply of drinking water could only retain population dwelling of the provincial city for business and commercial purposes (PHED, GoB, 2018).

The implications of the above cited studies lead us to properly analyze and study the Pat Feeder water supply to Quetta project. The analysis of Fat-Feeder canal system and its probability for water up-stream flow to Quetta city needs a sort of Cost and Benefit Analysis (C&BA) to get know-how and bring for the feedback from the main stakeholders of Fat-Feeder water project. Similarly, the point of views of policy makers and government officials are also necessary to know about the concerns and reports of national and international agencies working on water conservative environment (like, IUCN, ADB to mention a few) for this project of the province of Balochistan. The aboriginal stakeholders like those of farmers and water-owners are very necessary for bringing forth seriously their point of views and concerns about this very costly project to make known and explored for policy options to contribute to comprehensive strategy development for Quetta Greater Water Supply Project.

Objectives of the Study

The objective of the study is to undertake the Cost and Benefit Analysis (C&BA) of Quetta Greater Water Supply Project from Fat Feeder to Quetta city.

1. To evaluate the costs and benefits analysis of the Quetta Greater Water Supply Project
2. To know the point of views of main stakeholders of the Quetta Greater Water Supply Project
3. To estimate the Willing to Pay of households of Quetta city for the drinking water supply of Quetta Greater Water Supply Project

2. Literature Review

Balochistan is one of the largest provinces as it constitutes around 44% of the geographical area of Pakistan. Yet, its population is less than 6% of the total national population (Population Census, 2017). The province has both high altitudes geographic areas including Quetta city and low altitudes plains of Southern areas including the districts of Jaffar Abad, from where the water of Fad Feeder Canal are projected to be supplied to Quetta city. The administrative set-ups of the province constitute upon six divisional administrative divisions and 32 districts with diversified variants of socio-economic features of mostly lower levels as compared to the rest of the country. The shortfall of rains, draughts, and sever water depletion by the tube wells for agriculture purposes at the uplands of the province have faced the uphill inhabitants to face severe water shortages for drinking and sewerage purposes including Quetta city, which is the provincial and economic hub of the province.

Greater Water Supply Project from Fat Feeder to Quetta city was proposed by government of Balochistan to solve the water insolvency problem of the provincial capital. The mega project is yet to be explored on various grounds from almost all areas of experts and academic disciplines to know the true picture for the viability of this project.

To follow the convention of decent literature review, the following studies are quoted for getting initiations to build the case for literature analysis, defining proposed research methodology, data collection surveys, tools of data collection, and other methodological prerequisites for getting the main objectives of this research project.

As a reference for water related studies in Pakistan, The Indus Waters Treaty which was signed in 1960 between Pakistan and India under the observation of World Bank (World Bank, 1960) is

essential to start with. The water treaty established water share of both the countries and guaranteed to settle any future water aggression upon the commencement of violation of the water treaty text and contradictory practices against the treaty obligations.

The channelized water distribution among the four provinces of Pakistan remained the sole responsibility of Government of Pakistan. Baluchistan gets very lowest share at national level water distribution, despite the fact that most of the region of the province is barren and average rainfall accounts for less 200 mm for the last century (Arif & Bhatti, 2018). The provincial share of water is confined to selected districts, adjacent to Sindh province, of the Nasirabad division through Pat-Feeder canal system (ADB, 2015).

Worldwide distribution and availability of drinking water statistics show that 10 to 12% of the global population has no access to safe drinking water. Drinking water is considered one of the most important resources for nutrition for the world population across the globe. The situations in most of the developing countries of the world are miserable for providing safe and reliable drinking water to their mass population (WHO 2012).

Pond and Pedley (2011) show that both the developing countries and rural communities of the developed world are also faced with the provision of safe drinking water from low altitudes areas to high altitude and uphill areas communities in most of the countries that face drinking water crises.

It is estimated that around 65% of cities in USA are facilitated with safe drinking water from watersheds and one-third of the total water supply to big cities like Tokyo in Japan and Melbourne in Australia from forest watersheds. The statistics of water provision from lower altitude places to higher uphill cities of the world are very less in number (Bladon et al 2014). One of the most water

supply projects (i.e. Southern Rockies Watershed Project) is cited here to inform policy options for Quetta greater water project in areas of its management, water flow, its costs and benefit analysis, and generate information from the aspects of socio-economic costs and benefits (Southern Rockies Watershed Project n.d.). Similarly, the Nature Conservancy (2011) has highlighted and pilot projected the land rights, forest services, and drinking water indices for the safe supply of quality and safe drinking water to Denvor in USA. The costs in multiple aspects of this drinking water projects opens ways and avenues for designing water supply projects in both the developing and developed economies of the world.

Appiah (2016) stated that most of projects of safe drinking water from watersheds in USA are completed without costs and benefits analysis from economic perspectives. To encompass the economic aspects of costs and benefits, the projects evaluation not only broaden information of water supply projects but also get access to know the stakeholders understanding and concerns for the proposed water supply projects. This C&BA of the water supply projects implies to increase the likelihood of water reliability, quality, efficiency, project management strategies, consumers' willingness and many more benefits for the sustainability of the water supply projects.

The water resource mechanisms are well studies by exploring its three aspects namely: economic value, complete socio-economic valuation of water supply, and affiliated ecosystem services by any water supply project (Canadian Council of Ministers of the Environment, 2010). It implies that complete analysis in these three parameters are necessary to be explored for devising an efficient and sustainable water supply channels that would emerge from the proposed Quetta Greater Water Supply Project.

Water supply for drinking purpose is an economic value and its economic assessment is multifaceted attributable to highlight many other aspects of water management, water supply surety, regulating water as a commodity, water supply and demand, water property rights, dissecting water usage between drinking purposes and agriculture requirements, and many more economic aspects (UN, 2012). The above cited text implies that costs and benefits analysis of the proposed Quetta Greater Water Supply Project needs to be explored and evaluated by suitable methods inclusively for getting the above mentioned legal and economic purposes of the proposed project for the main stakeholders of this project at both the cities of Quetta and Jaffarabad.

3. Methodology

This study was undertaken in two districts namely Quetta and Jaffarabad.

Data collection

Primary and secondary data sources will be used to assess the benefit cost analysis of the proposed project.

Primary data

Key informant interviews (KII) will be used to collect the primary data. KII will be undertaken with different stakeholders in Quetta and Jaffarabad districts to get the required information. The interview schedule will be used to conduct KIS. The key informants will include knowledgeable stakeholders including farmers of Pat Feeder, officials of different government departments, and others. For the purpose, an interview checklist will be designed to collect the required information from the key informants. For the survey, teams of researchers from BUITEMS Quetta will visit the area to collect data from the relevant stakeholders (farmers of Pat-feeder, irrigation, WAPDA, Agriculture, PHE, and others) through interviews. The data enumerators will be properly briefed and trained prior to field work and data collection. The data collection process will also include interviews with relevant stakeholders of Pat-Feeder canal system. Some of them are listed below:

1. Provincial Agriculture, Irrigation, Public Health Engineering (PHE) and WASA, and Water and Power Development Authority (WAPDA), Indus River System Authority.

Secondary data

The following sources will be used for secondary data

- Existing assessment reports (i.e. assessment carried out by PHE, BID, WASA, WAPDA, and NGO assessment reports).
- Government of Pakistan Websites
- Previous UN project reports (all agencies)
- District profiles (UNICEF Atlas, IUCN integrated district development vision, Balochistan conservation strategy, etc.)
- Development plans and investment figures; risk assessment reports

Expected output:

- Mapping of area.
- Economic model
- A detailed report on the benefit cost analysis of the Indus Water Supply to Quetta

Data analysis techniques

The quantitative data will be analyzed by using different descriptive statistics (such as measures of central tendency, measures of dispersion, frequency percentages etc.) and inferential statistics such as (student's t test, chi square test etc., correlation analysis, regression analysis etc.) will be used. Moreover, GIS techniques will be used for preparation of maps.

4. Some preliminary findings drawn from the stakeholder's survey

Self-administered interviews were conducted from the diverse stakeholders which included farmers, politicians, academia and government officers. The sample were collected from both Quetta and Nasir Abad District. Survey include questions related to the feasibility of this project from the perspective of each stake holder. It was shocking to see that all the stakeholders have many reservations on this project at various level for e.g. technical, security and distribution.

According to survey, we can broadly divide the views of all stakeholders into categories; for and against. The supply of water from Pat-feeder to Quetta has many dimensions so far this project has been evaluated from the side of people of Quetta city. After visiting and meeting people of Nasirabad district, we were able to grasp various deep rooted issues that can create hindrance to the success of this project.

According to survey we can broadly divide these issues faced by the inhabitants of Nasirabad (Pat-feeder area) district into three categories.

1. Siltation and carrying capacity: Currently the canal is only capable of supplying around half of the designated water share of Balochistan. The reason behind such a poor supply of water is siltation and damaged canal due to severe flood of the year 2010. The water overflows if the full share of the province is supplied from the Gaddo Barraj. Visible cracks can be seen along the canal's boundary wall. Since the flooding occurred the proper rehabilitation of the canal is not done, nor is the routine cleaning undertaken.

2. Failed projects in the past: the three water supply schemes for Bhag-Nari are the Sanni, Kachhi and Shoran projects. However, there are problems with all of these schemes and they cannot cater to the needs of about 70,000 people living in these areas. Some of these projects remain incomplete while others can't supply water due to electricity load shedding and low voltage. Bhag town has an elevation level of only 70 Feet from DM Jamali whereas Quetta's elevation level is 5280 Feet. The water supply lines to Bagh are broken and open to all the contamination. According to some respondents every 3rd person in DM Jamali is exposed to Hepatitis.

3. Shortage of Water: The district of DM Jamali is already facing shortage of water. Even the city is in severe water crisis. Some of the politicians clearly said that it would go to any extent to oppose this project because neither their people are facilitated to safe drinking water nor farmers are provided timely water supply to have good income from their crop. As they are only receiving one-fourth water of their share of Balochistan which is insufficient to their need. "If government is

capable of supplying whole share of their province then it would be an option for them to allow such projects" said one of the farmer.

Appendix A: Questionnaire on Willingness to pay for improved Water Supply

1. Would you be willing to pay for better water supply?

Yes No (*if No go to Q2, otherwise go to Q4*)

2. If you are not willing to pay, would you like to participate for better water management?

Yes No

3. If you are not willing to pay anything, explain why not?

a. You are satisfied with existing water supply b. You cannot afford

c. it is government responsibility d. Other, Specify _____

4. Would you be willing to pay Rs 800 /month for improved water supply?

Yes No *Yes __* (*Go to Q 5*) *No__* (*Go to Q 6*)

5. (a) If yes, would you then pay Rs 1200/month?

Yes _____ (*finished; go to Q. b*)

No _____ (*finished; go to Q. d*)

(b) If for the same services, the service provider asks for a higher amount like Rs 1600/month. Would you be willing to pay?

Yes _____ (*finished; go to Q. e)*

No _____ (*finished; go to Q. c*)

(c) If No, would you then pay Rs 1500/month? _____ (*go to Q. e*)

(d) The services cannot be provided with the amount you mentioned by the service provider, then would you pay Rs. 1200/month?

Yes No

(e) What is your Maximum Willingness to Pay? Rs._____/ month

Name of the interviewer_____, Date_____

Age_____, Location_____. Profession: _____

6. Source of drinking water

a. WASA b. own tubewell c. water takner d. Mutiple source (specify please)

(If No. a go to Q2, if c go to Q4)

7. How much you pay per month to WASA? Rs._____/month.

8. Are you satisfied with the quality of water? (yes/No)

9. If no, specify the reason_____

10. How many water tankers you use per month?_____Number

11. What price you pay per tanker? Rs._____

Appendix B: Stakeholders Interview schedule (Pat-Feeder Water Supply)

1. Do you know that our Govt. is interested in supplying drinking water to Quetta from Pat-Feeder Canal?

(Yes/NO)

Do you think it is a good idea?

_____

_____

_____

2. Do you think it is financially feasible or not?

_____

_____

_____

3. What are the social benefits and costs associated with this project?

_____

_____

_____

4. What are the Economics Costs & Benefits (for Technical Respondents only).

_____

_____

_____

_____

5. What are the hurdles associated with this project?

6. Who are the stakeholders?

7. What can be the Alternatives to this project?

8. Your Suggestions if any.