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The Socioeconomic Impact of Simly Dam on Local Communities in Islamabad, Pakistan

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ABSTRACT

Water is the main element for life. There is numerous number of small dams around the word. The issue of water scarcity is increasing throughout the world. Along the world, Pakistan is also going on the same scenario crisis of water scarcity. The Small Dam Organization has been constructed 57 small dams in the region of Potohar. Potohar region consist on four districts Attock, Jhelum, Chakwal and Rawalpindi. Potohar is the Rain fed area and usually Small dams are constructed there for meet the water availability for rural properties including irrigation, Aquaculture, livelihood and livestock development. The main objective of this research is to assess the socio-economic development of community through small dam. Small dams play significant role towards economy, agriculture sector, Eco-friendly environment, tourism, crop production and employment opportunities for community. This research design was Mix Method Research. The methods used during data collection in the fields were Observation, In-Depth Interviews, Focus Group Discussion. The tools were used interview Guide and Questionnaire. Sampling technique was Simple Random Sampling (SRM). Besides providing a general level of the safety of a dam, it also helps to prioritize actions of maintenance, allowing the small dam's manager to optimize time and financial.

Keywords: *Small Dams, Water Scarcity, Climate Change, Sustainability, Livelihood.*

1. INTRODUCTION

Water is essential element for all lives. The use of water is also important. Every country has small and larger dams according to their requirement. Dams are used to store water. Dams are the reservoirs that store water in rainy season and especially in flood situations. Dams are also providing habitat to fishes and water living organisms. Every country built small and large dams according to their requirements. The influence of large dams is more on the basis of their subjectivity. And same as the influence of small dams is also important. Small dams play role in community development at the rural level (Guven & Aydemir, 2020).

Dams are structured or reservoir constructed by human to store water. There are two types of dams terms introduced. Small dams and large dams. Dams size define it is small or large dams. Small dams can be constructed anywhere according to need of community. Construction of dams required a favorable geology, topography and hydrology. The international Commission of dams the definitions of large dams and small dams. Large dams must be high 20-25 meters if it falls between 15 meters high then it will consider as medium dams or small dams (Duflo et al., 2007).

Community is the geographical area where people live together and shared their norms, behavior, interest and characteristics with each other's. Community development is the holistic approach where community members take collective cation on certain issue for that is important in their community. Community development may be happening it many forms like Asserts –Based Community Development, strength Based and Collective based. Asserts based included physical resources that are pre sent in the community (Carlen, 2021).

Dams play significant role in human settlement and also in technological innovation. Dams reduced flood in the rainy season, store water for household consummation and also for farming. In the 19th and 20th century work had started on dams construction for the control of flood water ,production of hydroelectricity, irrigation for agriculture and also for drinking purposes (Poff & Hart, 2002).

Small dams play significant role in community development including drinking purpose, irrigation for agriculture, fishing and mini hydropower generation smalls dams has integral role in agriculture in developing countries. In developing countries people of rural areas totally rely on agriculture. Infact Agriculture is an engine for rural growth, livelihood and poverty reduction in rural areas. Because majority of people or unemployed at the rural areas. Small dams at the rural level allows farmers to grow off season crops by the use of dam's water and also hold their livestock watering at all times (Moran et al., 2018).

Simly Dam, located near Islamabad, is a key water reservoir supplying drinking water to the city and irrigation water to surrounding rural areas. Built to address water scarcity and support agricultural activities, the dam plays an important role in local resource management. This study focuses on understanding how the presence of Simly Dam has affected the socioeconomic conditions of nearby communities, looking at livelihoods, income, access to resources, and overall community development.

Tarbela dam is the main water reservoir in Pakistan. It was constructed in 1964 to 1974. It was constructed on Indus water reservoir. The main provision of the dam is to irrigation, power generation and flood control in the rainy season. Reservoir Optimization Simulation with Sediment Evacuation (ROSSE). Also Tarbela dam provide the employment chances to that areas and fishing practice for employment and also enhance the tourism activities (Khan & Tingsanchali, 2008).

Pakistan is the 6th most populous country in the world (Zahir, 2023). Agriculture is the back bone of Pakistan's economy. Agriculture sector contributes around 24% to the country's GDP and 40% in labor force (Raza *et al.*, 2023). But the contribution has decreased due to many reasons including climate change, unpredictable weather patterns, drought, floods and famine as well as human activities.

2. MATERIAL AND METHODS

This study analyzed the research design, methodology, tools, methods, sampling technique that was used in research. Small dams play significance role in community development that occur at local level.

2.1 Study Area:

This research has conducted in Potohar, Punjab, Pakistan. This study has been investigating, the small dam and community Development in the region. This research has been compared the performance of small dams that are located at the different location. Pakistan has the most significant economic sector is still agriculture. Although over the past few decades, its GDP contribution has decreased to 19.3%. The Small Dams Organization has constructed 57 small dams in the rain-fed region of Potohar, Punjab in Pakistan. Simly dam was chosed for the study because of resource limitations and time constrains.

2.2 Geographical location of dam

Islamabad has two main dams one is Rawal dam and another dam is Simly dam. Rawal dam is located in Islamabad Capital Territory, Pakistan, specifically within the Islamabad region. This Dam known as Rawal

Lake and serves as a major water reservoir for the city and is also famous for its tourism, scenic surroundings and recreational opportunities including Lakeview park.

Simly Dam is situated in Capital territory Islamabad and it is also known for its beauty, calmness, and green surroundings, and it also features a rest house. There are a lot of villages (Karore, Ban Karore, Biah, Chawan, Kiah, Kallan, Basand, Iryare, Bissah) nearby Simly dam.

2.3 Research Design

The following work was a Mix Method Research Design (MMR), utilizing in-depth interviews, observation and focus group discussions as tools for data collection. Thematic analysis was used for analysis of data. The sample size was 40. Simple Random Sampling (SRS) techniques were used. All respondents were farmers.

2.4 Focus Group Discussion

Focus group discussion is the tool that used in qualitative study or research. A focus group discussion involves a small group of people (usually 6-12 participants) discussing a specific topic, facilitated by a moderator. The goal is to gather a range of views, experiences, and reactions (Nyumba, Wilson, Derrick, & Mukherjee, 2018).

2.5 Participant observation

Participant observation is a method where the researcher immerses themselves in the daily lives or activities of the research subjects, observing their behaviors and interactions in a natural setting.

2.6 Questionnair

A questionnaire is a set of written or printed questions used for quantitative or qualitative research. Participants complete the questionnaire on their own (self-administered) or with the help of a researcher. It is generally more structured than an interview guide.

2.7 Sampling Techniques

Here I have used the Purposive sampling. Purposive sampling is known as Non-probability sampling in which selected portion based on specific purposive. Participants have selected based on specific purposive or purposive relevant to the research. (Nanjundeswaraswamy & Divakar , 2021). Data from respondents collecting through simple Random sampling. It is helpful to collect data according to requirement.

2.8 Statistical Analysis

Statistical Package for the Social Sciences (SPSS) software was used for analysis of data.

3 RESULTS AND DISCUSSION

The results of interviews, observation and focus group discussions were compiled as source data and statistically analyzed for identification of small dams and community development. This study demonstrates that small dams significantly enhance agricultural productivity, water availability, and livelihoods in the Potohar region, supporting broader findings in the rural development literature. However, environmental and social issues indicate a need for integrated water resource management. To sustain these benefits, long-term strategies must prioritize infrastructure upkeep, conflict resolution, and participatory management models. Future research should assess ecological impacts over time and explore frameworks for community-led water governance.

The results of interviews, observation and focus group discussions were compiled as source data and statistically analyzed.

Alternative crop that respondents grow

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Maize	17	56.7	56.7	56.7
	Sugar cane	13	43.3	43.3	100.0
	Total	30	100.0	100.0	

Figure 3.1

About 80% of respondents identified climate change to have a major impact on crop production (Figure 4.1). Results demonstrated that only 0.72% respondents used Organic fertilizers due to poor soil quality. The most popular fertilizer used was urea (50.16%) followed by Nitrogen fertilizer (45.76%) and Diammonium phosphate (DAP) fertilizers (3.36%) as demonstrated.

Use of new machinery for crop cultivation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30	100.0	100.0	100.0

Figure 3.2

Mostly farers used tools and agriculture equipment's for harvesting of crops. Modern machines like seed drills, trans planters, and combine harvesters reduce the time and labor needed compared to traditional manual methods.

Use of fertilizers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diammonium phosphate (DAP)	1	3.3	100.0
Missing	System	29	96.7	
Total	30	100.0		

Figure 3.3

Challenges that respondent face in crops production

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Water scarcity	15	50.0	50.0	50.0
	Pest and Disease	5	16.7	16.7	66.7
	High Input Costs	4	13.3	13.3	80.0
	Climate Change and Extreme Weather	1	3.3	3.3	83.3
	Insufficient capital	3	10.0	10.0	93.3
	Lack of Technical Knowledge and Extension Services	1	3.3	3.3	96.7
	Lack of Mechanization	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Figure 3.4

Farmers face a variety of challenges in crop production, including unpredictable weather patterns, such as droughts and floods, which can devastate yields. Rising costs for essential inputs like seeds, fertilizers, and machinery further strain resources, while soil degradation, pests, and diseases threaten crop health and productivity.

Discussion

This study aims to assess how Simly Dam influences the livelihoods, income levels, agricultural productivity, employment opportunities, access to water, and overall well-being of the local communities surrounding the dam. It will explore both the positive outcomes (such as improved irrigation, water availability, and economic activities) and the challenges (like displacement, unequal water distribution, or environmental concerns) that affect residents (Ghoraba, S. M. (2015). By the used of surveys, interviews, and secondary data analysis to evaluate whether the dam has contributed to sustainable community development and what gaps or policy improvements are needed for equitable resource sharing. Dam contribute to better food security, as they allow for multiple cropping cycles and improve crop yield. They also serve as a source of water for local communities, reducing the time spent by women and children fetching water from distant sources. Moreover, small dams create local employment opportunities, including construction and maintenance jobs, and stimulate the local economy through the development of markets and services (Izharul, H., & Hashmi, F. (1982). However, challenges sound the community who lived near the simly dam faced such as inadequate management, limited funding, and insufficient training for local communities in water conservation practices hinder their full potential. Results from various studies suggest that when small dams are

well-maintained and managed, they significantly boost local economies, promote sustainable farming practices, and foster a sense of community resilience. While Simly Dam has brought clear economic benefits to many local communities, especially in boosting agriculture and livelihoods, challenges remain in ensuring equitable water distribution and addressing environmental and social side effects. There is a noticeable gap between well-connected villages and more remote or marginalized groups. Women, in particular, benefit from reduced time spent fetching water, but they also express concerns about their limited role in decision-making regarding water use. Addressing these disparities is key to maximizing the dam's potential for inclusive development.

CONCLUSION

Simly Dam has played a significant role in improving socioeconomic conditions for many local communities by enhancing water availability, boosting agriculture, and supporting livelihoods. However, to achieve long-term sustainable and equitable development, policymakers must address issues related to water management, ensure fair resource distribution, and involve local communities, especially marginalized groups, in decision-making. Strengthening local governance, improving infrastructure, and implementing environmental safeguards are crucial steps toward maximizing the positive impacts of the dam. Dam water used for several purpose particularly in improving water access for agriculture, livestock, and daily consumption. Small dams, like those in Potohar, help address water scarcity issues by storing rainwater and enabling irrigation during dry spells, enhancing agricultural productivity. In conclusion, while small dams in Potohar provide critical support for agriculture and local development, more efforts are needed to address management issues and empower communities to ensure long-term sustainability and equitable resource distribution.

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