

A STUDY OF DELAY ACTION DAMS BASED ON PERCEPTIONS OF THE INHABITANTS IN SUB-BASIN PISHIN, BALOCHISTAN

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ABSTRACT

The delay action dams (DADs) are instrumental to fetch water for agriculture and nurture the underground water and the indigenous karezes in study area. Mostly the livelihood in Pishin sub-basin is dependent on subsistence farming. The data is collected with the help of closed-ended questionnaire based on the perceptions of the inhabitants. Also required secondary data were obtained from relevant Government Departments. The data were subjected to descriptive qualitative method mainly analyzed by SPSS and excel sheet. The results are evident that the life of karezes streams and springs water level has direct relation with water behind the dams in the study areas in the contemporary scenario. The natural vegetation also has close association with these dams in arid and semi-arid climate area. Hence findings additionally uncover that dams are a source of entertainment for the people. The DADs need proper planning and development including de-siltation and capacity increase that can bring prosperity in the study area and surrounding.

KEY WORDS: Pishin sub-basin, delay action dams, karezes, agriculture.

INTRODUCTION

Scarcity of water is serious problem in Balochistan, the northwestern rugged areas are no more exception and the annual rainfall is uncertain and insufficient in the study area and surrounding (Ahmad et al 2014). Lack of water is a serious problem in subtropical areas especially the areas of the country that receive winter precipitation (Ahmad et al. 2015). It is demand of the day to improve the water resources through wise use of water sources. Unfortunately, Pakistan lies in the category, where precipitation is occurring underneath the required amount, as the country is at the risk of local winds especially in case of Balochistan. The circumstance is turning out to be poorer if no appropriate reclamation efforts of water level. This would be just conceivable if a thorough study is done in the territory to discover the destinations and assess its effect on the farming and other related exercises related to water availability. DADs are fundamentally built for more water penetration. Around 12 sub-projects of ensuring bunds and dams have been developed in Balochistan (Tariq and Giesen, 2012). Out of 292 delay action dams in Balochistan, 127 were built in the Pishin Lora basin (Sagintayev et al., 2012). To handle this intense issue, Pishin Sub-basin has been chosen for this study as

confronting the issue of deficiency of water as well as have great physical structure for the development of such Delay Action Dams. There researchers like Ramaswamy (1989) underpins that there ought to be large dams while the other firmly restricted it and contend that small dams are more appropriate with each perspective like social, financial, and environmental restrictions to therefore sizeable dams are the apparently thoughtful proposal. The natural effect of large dams would add in the loss of cultivating area and woodlands, removal of individuals, domesticated animals and the loss of occupations the dislodging of untamed life and vanishing of important vegetation (Vohra, 1986; Goodland1986) therefore affects the tamed and natural life. The appropriate way is to see the water demand, geological, geomorphological, climatic, social and economic comprehensions for the establishment of dams.

The issues emerging from the large scale appropriating of water and conceivable climatic changes where the loss of vegetation, intemperate overflow, loss of top soil, siltation of the repository, water-logging and saltiness (D.K. Datt, 1998). It was contend that man has created distinctive procedures to protect water in his ability in spite of the fact that he had not possessed the capacity to adapt to the shortage of water in deserts (Lindesy, T and Nesse, S 1996)).

Dams like throughout in Pakistan hot issue in light of numerous political interests and ethnic issues. However, government approaches and its weak considerations need improvements to address the problems related to delay action dames. The small dams are developed for the motivations behind expanding the subsurface water supply in light of the fact that the tube-wells and cutting edge electric-fueled pumps are seriously damaging the environment in Balochistan (Rahman, 1981). Karez water system, which is rehearsed in 22 countries, is likewise a vital method for water system in the dry land ranges of Balochistan (Khan and Nawaz, 1995). The premise of water system (irrigation) began in little alluvial valleys of Southwest Asia, which prompted to the complex water system and water administration frameworks (Rahman, 1993). The uplands of Balochistan are in the move from traditional karez water system to tube wells water system this move is influencing the water table and social setup in Balochistan (Musthafa and Qazi, 2007). Karezes are currently confronted with high expenses of work for development and displace by tube wells which drain the underground water (Kahlownd and Hamilton, 1994). Presently the Karez are being substituted by bond pipes and "Delay Action Dams". The check dams are being built up to supplement the underground water supply and assurance against floods (Tariq and Giesen, 2012). There is a need of techno-institutional methodologies, for example, presenting

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water rights, direct or indirect evaluating and permission for construction (Qureshi et al. 2010).

In the research area, Pishin sub-basin the over-reflection of ground water for plantation development has prompted to exhaustion of the ground water table, decelerating the water energizes process (Qasim et al. 2011). This would draw out the authentic connection between expected inquiries of delay action dams. Subsequently, the inscribed research study is proposed for the manipulation of the water crisis and deficiency in Pishin Sub-Basin.

RESEARCH METHODOLOGY

Study Area

Pishin-sub bowl or sub-basin situated between 29° 10' to 31° north latitude and 66° 14' to 67° 31' east longitudes in the north-west territory of Balochistan with Quetta valley to the south east. Land debasement is boundless and the small underground water assets are additionally utilized as a part of unsustainable technique, influencing the water potential in the basin. The basin covers the area of the three localities in particular Pishin, Killa Abdullah and Quetta with their individual regions of around 2,490, 3,281 and 1,233 Km², (Qasim et al. 2011). The Pishin sub-bowl has a region of around 7,004 Km² and is encompassed by mountains from all sides. The physiography of the region demonstrates high mountains, piedmont fields and valley floors. The significant stream in the region is Pishin Lora. The height of the region ranges from 1,365 to 3,137 meters above mean sea level (msl).

The aggregate population of the sub-basin has substantially increased and was 471,316 as per 1998 Census, Government of Pakistan. The atmosphere of the study territory is warm in summer and extremely frosty in winter. The region lies roughly outside the streams of Summer Monsoon Currents in summer season. January is the coldest and July is the hottest month. Farming is the overwhelming segment in the territory. Kharif are sown in summer and collected in early winter, while Rabbi are sown in winter and reaped in summer both practices are tried but common in the region. Before, the real wellspring of water system (irrigation) in the territory was through an extraordinary underground trench framework called Karez. With the presentation of power in the last part of the 1970, the circumstances have changed. Presently tube-wells have turned into the most imperative wellspring of water system. The reaping of water through tube-wells has decreased the underground water table. The government has built dams for the revival of the water level in a few areas but still to a great extent is inadequate.

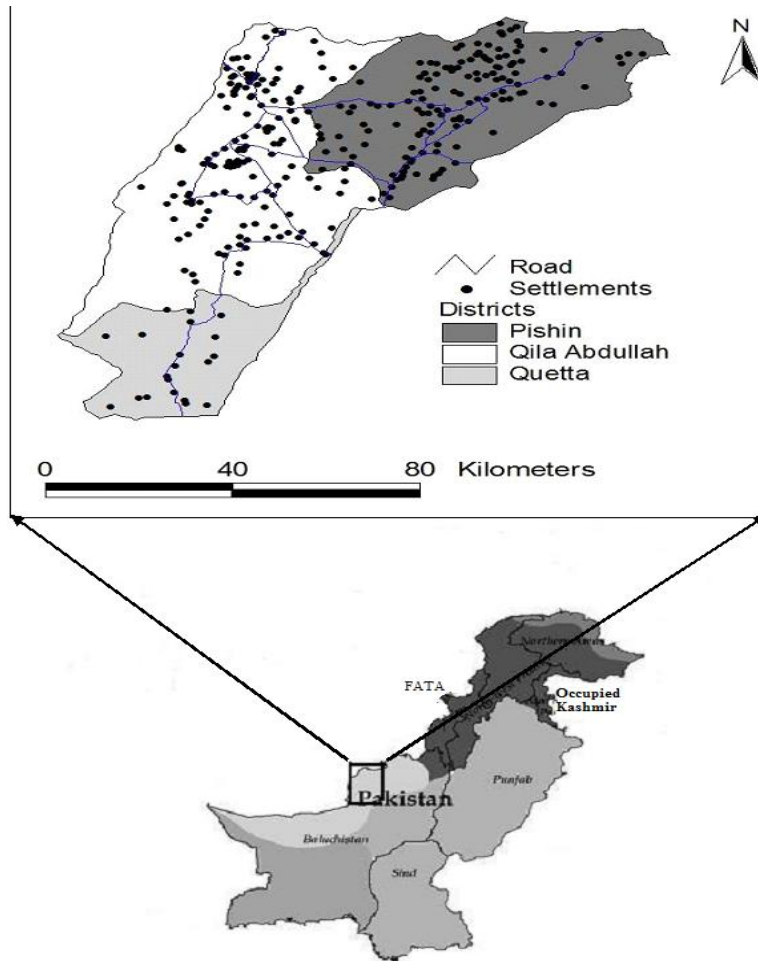


Figure 2: Location of the study area, showing districts, road network and settlements.

Data Sources and Acquisition

The information gathered in time of two months and in such manner 204 respondents were found to give the wanted information. Though some respondents were reluctant to give the complete information however it was observed that the general reaction of the respondents was found completely collaborative.

Both primary and secondary information were gathered from concerned workplaces however the essential information (primary data) was focused. The Secondary information gathered for the accompanying divisions.

- Department of Power and Irrigation

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- Department of Planning and Development
- Department of Agriculture
- Dams studies
- Survey of Pakistan

The essential information (primary data) gathered through after devices/methods

- Field observation
- Interviews from various leaders of the area
- Close-ended Questionnaire to the chose population

Data Analysis

Information (data) that was broke down utilizing present day measurable and cartographic systems, computer based programs the SPSS was utilized for information investigations (data analysis). The data was examined qualitatively. In the research area, Pishin sub-basin the ground water for plantation development has prompted to consumption of the ground water table, decelerating the water energizes (water recharge) process. This research of Delay Action Dams in Pishin Sub-Basin highlights connection amongst surface and underground water and streams of karezes and springs nurtured by dams. This would draw out the accurate connection between accepted inquiries of check dams.

RESULTS AND DISCUSSIONS

Table 1: Does dam raise the underground water level				
Response	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	204	100.0%	100.0%	100.0

As indicated by table 3.1 below it can be seen that 100% members reacted that dams raised underground water level. It implies that the surface water and underground water are interdependent. Therefore it is important not to waste the rain water and make it productive and socio-economic development can certainly bring the prosperity.

Table 2: DADs impact on underground water level: Comment on the condition before DADs

Response	Frequency	Percent	Valid Percent	C.P	
Before dam water table is low		167	81.9%	81.9%	81.9
Don't know		37	18.1%	18.1%	100.0
Total		204	100.0%	100.0%	

In the light of Table 3.2 it is evident that 167 (81.9%) respondents reported that before the development of dams the underground water level was low while 37 (18.1%) respondents had no idea about this issue.

Table 3: DADs impact on underground water level: Comment on the condition post DADs

Response	Frequency	Percent	Valid Percent	C.P
After dam water table is high	202	99.0%	99.0%	99.0
Don't know	2	1.0%	1.0%	100.0
Total	204	100.0%	100.0%	

Table 3.3 uncovers that 202 (99.0%) members reported that after the development of dams the underground water level was raised while 2 (1.0%) respondents reported that they had no clue about the said issue.

Table 4: How much area do you cultivated

Response	Frequency	Percent	Valid Percent	Cumulative Percent
0—5 acres	60	29.4%	29.4%	29.4
6—10 acres	61	29.9%	29.9%	59.3
11—15 acres	51	25.0%	25.0%	84.3
16—20 acres	32	15.7%	15.7%	100.0
Total	204	100.0%	100.0%	

As indicated by the Table 3.4 that 29.4% respondents cultivated up to 5 acres of land while 29.9% cultivated 6 to 10 acres of land. The table further

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uncovers that 51 25.0% respondents developed 11 to15 acres of land that constitute 15.7% respondents cultivated 16 to 20 acres of land.

Table 5: which sort of natural products do you have developed?

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Apple	168	82.4%	82.4%	82.4
Grapes	13	6.4%	6.4%	88.7
Other	23	11.3%	11.3%	100.0
Total	204	100.0%	100.0%	

Table 5 reveals that 168 interviewed farmers (82.2%) planted apples in their land, while 13 (6.4%) respondents planted grapes in their soil; moreover, 11.3% of the respondents cultivated crops including cereals and vegetables. The vegetable are locally consumed and also transported to the local market and Quetta city.

Table 6: The reason behind cultivation

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Less water required	2	1.0%	1.0%	1.0
Less care	11	5.4%	5.4%	6.4
Easy cultivated	4	2.0%	2.0%	8.3
Market oriented	91	44.6%	44.6%	52.9
Traditional	82	40.2%	40.2%	93.1
No cultivation	14	6.9%	6.9%	100.0
Total	204	100.0%	100.0%	

Table 6 reflects that 2 (1.0%) respondents reported that less water is required for cultivation, while 11 (5.4%) members reacted that the reason behind the cultivation is mainly fruit growing and demands less care. The respondents 4 (2.0%) reported that development of these agricultural

products are simple to grow while substantial percentage 91 (44.6%) shows that horticulture is market oriented. The 82 (40.2%) justified that crops and fruits were conventional and it is inherited from their forefathers. The 14 (6.9%) members reacted that they have no agricultural practices as their land was close to the road or commercial area therefore the land was more valuable for commercial activity rather than simple farming.

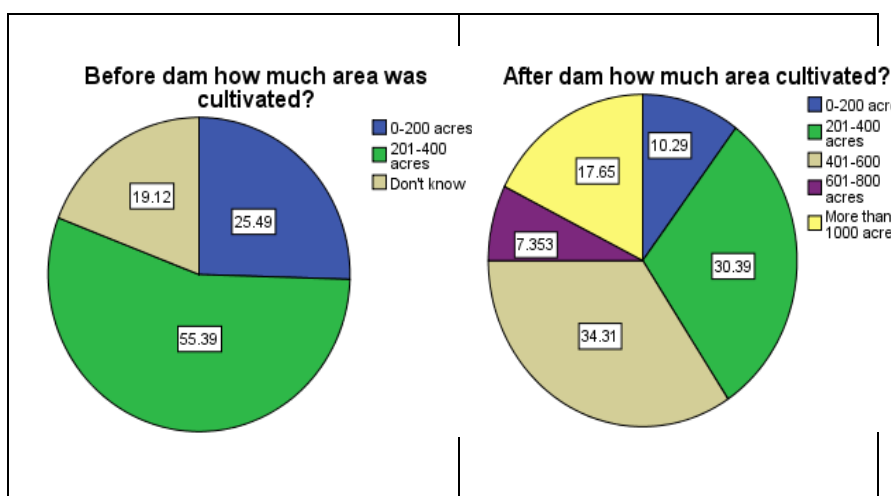


Figure 1: The pie graph shows comparative cultivation in research area, prior and after DADs

The Figure 3.1 figures out that more than half land was not arable while after the construction of dams most of the land was brought under plough eventually brought prosperity amongst the land owners and peasants. The area got some opportunities to bring the land under plough after the irrigation water availability.

Response	Frequency	Percent	Valid Percent	Cumulative Percent
Tube well	153	75.0%	75.0%	75.0
Karez	51	25.0%	25.0%	100.0
Total	204	100.0%	100.0%	

In light of Table 7 it can be seen that 75.0% people were using drinking water obtained from tube wells and the tube wells now have mostly replaced the wellsprings in the study area. The 25.0% respondents registered dependency on Karezes for obtaining their drinking water.

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Response	Frequency	Percent	Valid Percent	Cumulative Percent
No	204	100.0%	100.0%	100.0

Table 8 uncovers that all the respondents were not utilizing dam water for drinking purpose but their livestock were using often.

Findings of the Research

It was observed that shortage of water influence human life in a variety of ways and shortage of water can propel the occupants of the area to move to other places. Some people have migrated to Quetta city in search of jobs, but most of them were uneducated and unskilled, this has turned their adoption in a variety of ways. This has contributed also in the katchi abadies, squatting and increase in crime rates. Scarcity of water is big threat for the people because most of them were dependent on farming and farming is almost non profitable without water resources in the arid and semi-arid climate domain.

DISCUSSIONS ON THE FINDINGS

Balochistan has experienced dry period and almost a decade long spell with below average precipitation. Its outcomes can be found in social and financial fields in uncommon in the region which relies upon agriculture business. In any case, the late dry season and non-event of precipitation influenced the inhabitant's lives from either side. Fundamentally, the area is an image of tribal customs where individuals lead lives under the framework composed by their progenitors. Their farming and the arrangement of water system are very old. The masses flood their territories with the assistance of karez spring and tub-wells.

Thus in such situation the investment in delay action dams should be the priority which helps in rising and replenishing water level. Based on field perceptions these dams are not only rising water table but also rejuvenating the existing karezes which is very useful way of water transfer from one place to another locality with minimal water lost through evaporation.

Essentially, delay action dams, the prime subject of the present study; remain very supportive in managing the water and water system framework in a zone. Similarly, the arrangement of water system in Pishin sub-basin relies on delay action dams. These dams are seen very supportive in control the stream of karezes which assume fundamental

part in inundating the developed land. These karezes get a decent add because of the capacity of water in the delay action dams on the grounds that amid the present this study is evident before the development of dams the stream of springs and kerazes were sluggish in flowy and were not sufficient to meet the irrigate needs of the occupants. The said sources got support and include after the dams were built in the territory. The exploration members specified a high contrast in the stream of karezes and spring previously, then after the fact the development of delay action dams which is a proof that delay action dams accelerate the stream of karezes and springs.

It won't not be right to state that delay action dams helps the recipients to acquire drinking water in a roundabout way through dams as they are the sources of karezes, springs and tub-wells. The masses of the zone took tremendous torment in getting drinking water amid the dry season. Be that as it may, they are quiet nowadays because of the presence of dams in their environment. As of now specified, the occupants of the area used to acquire drinking water by means of private water tankers which remained a weight upon the economy of the poor colleagues. It was the time when various tub-wells escaped water and the yearly precipitation was less regularly to be seen.

In addition, delay action dams can likewise add to the fascination of the area. The more the zone is lush and green, the more it draws in the general population. Therefore, they will disregard relocating from their grounds. As a rule it is seen that individuals move from a zone which is harmed by the dry season since they think that it's hard to acquire the required water. Fortunately, the presence of delay action dams in Pishin sub-basin halted the ever troublesome issue of open movement which may have changed over the area into an abandon and uninhabited ground since they store rainy water.

Delay Action Dams stops the land disintegration and gives more chances to develop uncultivated land. Delay Action Dams increment the estimation of land as it gets changed over from fruitless parts into all around developed one. Progressively, the mindfulness has been creating about Delay action Dams among individuals and they come to know about how to develop much land with less water. The wellspring of income in the study region was agriculture which relies on water assets and men control. It implies that the development of dams give work to a zone and regulates the income of farmers from various perspectives.

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CONCLUSIONS

In view of the findings of the present study, it was concluded that the delay action dams are exceptionally gainful for the improvement of the area.

The deficiency of water prompts to turn of underground water level because of low yearly precipitation. It is additionally watched that the lack of water was a genuine risk to sub-basin Pishin because of accentuation of droughts. The underground water table can be raised by the development of dams. The store of rain water in dams raises the level of underground water table. Furthermore, the shortage of water can constrain the general population to abandon a region. What is required, parts of vegetation and debris in irrigation channels may cause to lose effectiveness or block utterly the flow of water. It means more time, enlarged labor costs and abridged watering for crops. In the study area near to settlements the traps can be installed, the induction of litter trap can confine and hold the floating litter and debris and will further increase the significance of delay action dam's water.

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REFERENCES

- AHMAD. I**, R. Ambreen, S. Sultan, SUN Zhaobo, Deng Weitao, 2014 "Spatial-Temporal Variations in January Precipitation over the period of 1950-2000 in Pakistan and Possible Links with Global Teleconnections: Geographical Perspective" *American Journal of Climate Change*, 3: 378-387.
- Ahmad. I**, R. Ambreen, Sun Zhaobo, Deng Weitao, 2015 "Winter-Spring precipitation variability in Pakistan" *American Journal of Climate Change*, 4: 115-139.
- Tariq, M.A.U.R., van de Giesen, N. 2012 "Floods and flood management in Pakistan" *Physics and Chemistry of the Earth*, 47(48): 11–20.
- Sagintayev. Z**, Sultan. M, Khan. S.D, Khan. S.A, Mahmood. K, Yan. E, Milewski. A and P. Marsala, 2012 "A remote sensing contribution

to hydrologic modelling in arid and inaccessible watersheds, Pishin Lora basin, Pakistan” *Hydrological Processes*, 26: 85–99.

Ramaswamy. R, Iyer Source 1989 “*Economic and Political Weekly*” 24: A107-A11.

Vohra. B, 1986 “Some Thoughts on the Conservation of Water *Aquaworld*” A1098-A89

Goodland, 1986 “Power and Dam Construction” *Hydro and the Environment: Evaluating the Trade-offs*, 25-33.

Datt. D.K, 1998 “Techno-Economic Considerations for Ground Water Development in India” *Natural Resources Forum*, United Nations, New York.

Lindesy. T, Nesse. S, Thomas, 1996 “D Pollution Presentation Water Qual, INT” 113-122.

Rahman. M, 1981 “Ecology of Karez Irrigation: A case of Pakistan” *Geojournal*, 5(1): 7-15.

Khan. F.K, Nawaz. M, 1995 “Karez Irrigation in Pakistan” *Geojournal*, 37(1): 91-100.

Rahman. M, 1993, “Irrigation and farm water management in Pakistan” *Geojournal*, 31(4): 363-371.

Musthafa. D, Qazi. M.U, 2007 “Transition from Karez to Tubewell Irrigation: Development, Modernization, and Social Capital in Balochistan, Pakistan” *World Development*, 35(10): 1796–1813

Kahlown. M.A, Hamilton. J.R, 1994 “Status and Prospects of Karez Irrigation System” *Journal of the American Water Resources Association*, 30(1): 125–134.

Qureshi. A. S, McCornick. P.G, Sarwar. A, and Sharma. B.R, 2010 “Challenges and Prospects of Sustainable Groundwater Management in the Indus Basin, Pakistan” *Water Resources Management*, 24(8): 1551-1569.

Qasim. S, Shrestha. R, Shivakoti. G, and Tripathi. N, 2011 “Socio-economic determinants of land degradation in Pishin sub-basin, Pakistan” *International Journal of Sustainable Development & World Ecology*, 18: 48-54