CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1476647

Available online at: http://www.iajps.com Research Article

SOCIO-SPATIAL GOVERNANCE FOR DELAY ACTION DAMS IN DISTRICT MASTUNG, BALOCHISTAN, PAKISTAN

Dr. Ahmed Ali Mengal[1*], Muhammad Asif Musakhail[1], Dr. Habibullah Magsi[2], Dr. M. A. Tareen[3], Muhammad Ayub Babar[1]

[1]Agriculture Research Institute Agriculture Research (ARI) Sariab Quetta Balochistan, Pakistan.
[2]Department of Agricultural Economies, Sindh Agriculture University Tandojam, Pakistan
[3]Department of Agricultural Extension, Agriculture and Cooperatives Department Quetta, Balochistan, Pakistan.

Abstract:
Present text aims sought to present the socio-spatial governance of delay action dams as a case study in Mastung district Balochistan, Pakistan. A descriptive research survey was carried out. Fifty (50) respondents as a key informants from Directorate of Water Management, Agriculture & Cooperatives Deptt: (25) and from Irrigation and Power Department, (25) government of Balochistan were selected by using the systematic sampling method. T-test and One-Way-ANOVA (Scheffe's test) were run in order to denote the respondent's perceptions variation between and among two groups by using the SPSS 22. A results show that statements received highest mean scores as perceived by staff of Water Management directorate was: crop production was increased (t=1.823, p>0.05) at 0.05 alpha level. On the other hand the statement about socio-economic life in the community was change (t=.000, p>0.05) and (t=1.026, p>0.05) acquired highest mean scores and were ranked as 1st and 2nd respectively as perceived by the irrigation department staff. Significant level was observed at 0.05 level. With the term of economic dimension the marketing of crops increased (p=4.824, p>0.05) and employment opportunity increased (p=.172, p>0.05) were got the highest mean scores. Livestock increased (p=.437, p>0.05) and agriculture improved (p=.736, p>0.05) were got the highest mean score by using One-Way-ANOVA, Scheffe, multiple comparison test. Significant differences were observed in 6 out 35 statements regarding the initial conservational examination. Present research fills in one chapter of the rural development picture. We suggested that an integrated program should be developed and implemented in the command area of these dams for the effective utilization of available water and development of irrigation infrastructure.

Key words: *Balochistan, DAD, governance, Socio-economic, Pakistan*

Corresponding author:
Dr. Ahmed Ali Mengal[*],
Agriculture Research Institute Agriculture Research (ARI),
Sariab Quetta Balochistan,
Pakistan
ahmedagric@gmail.com

QR code

Please cite this article in press Ahmed Ali Mengal et al., ***Socio-Spatial Governance for Delay Action Dams in District Mastung, Balochistan, Pakistan.,*** *Indo Am. J. P. Sci, 2018; 05(11).*

1. INTRODUCTION:

The agriculture including livestock sector stared as the foremost dominate components of Balochistan province of Pakistan, which constitutes 52% of provincial GDP and contributes 65percent of labor forces. As a matter of fact, Balochistan province considered as varieties of fruits and considered as fruit baskets of Pakistan [1]. However, agriculture sector is regarded as energetic and vibrant segment that can eliminate the poverty and reflect positive and ever-lasting impact on the socio-economic conditions of the rural recipients in the country. Countries like Pakistan where economy, politics and social fabric are directly connected with canal water, irrigated agriculture and water assets are the virtually core shocking issues of the land conflicts.

Balochistan province has been facing some sort of chronic problem such as worst human indicators, land conflict inferior physical infrastructure, dominate poverty, radical chaos, terrible education stipulation and the like. Due to the myriad numbers of tube well installation at the diverse location of the district, the ground water decrease at greater extent as well as huge concern for the district. Therefore, in the sake of assured irrigation it is needed to store water, to boost agriculture and save future generations from food conflicts as well as bring prosperity and development [2, 3, and 4]. But, if water reservoir construction related projects will be based on blemished planning, which will evidently create socio-economic and environmental conflicts [5, 6]. Thus in Balochistan government has decided to construct delay action dams in order to increase water table, increase rural welfare and economic prosperity.

Balochistan province considered as the least-developed and under-privileged province of the country. Agriculture sector was the vibrant segment of Balochistan economy. Considerable majority of people and their livelihood options directly and indirectly depend on this farming system. However, province was faced severe short of issues and concern regarding water-related matters and inadequate operation maintenance [7, 8]. In Balochistan province the primary harvesting systems based on *Sailaba* and *Khushkaba* [9]. The recent prolonged drought spill since (1997 to 2004) not only affected the crop productivity but also causes negative impact over on socio-economic condition of the rural population. The reduction of ground water is immense concern for the province [10]. An instant recharge measure to reverse the disastrous condition (water resources engineering consultant association 2000). Nevertheless, no assessment regarding the socio-economic spatial research study for these constructed delay action dams has been carried out [11]. Hence, there was urgent need to assess the delay action dam's impact so as to promote optimal and suitable strategies regarding overcome the water-related issues particular the construction of delays action dams [12]. Due to drought and indiscrimination utilizes of ground water the per annum water-table depletion. With the purpose of revitalize the depleted aquifers specifically in the upland areas of Balochistan province there is crucial need to construct delay action and check dams in order to increase the recharge of ground water and under-lying aquifers. Therefore, the present research was attempted in order to important to known that socio-economic spatial of delay action dams and governance in the vicinity of district Mastung, as well as evaluated in the term of Initial Conservational Examination, anticipated benefit, planning, design, construction, operating/ maintenance and social point of view in Mastung district of Balochistan province, Pakistan. The protest about construction of dams had been at minor scale were recorded due to political interference, similar, minor and trivial level of displacement and migration were occurred, however, in this regard precise restricted migration in response to comparatively great district-level economic shocks.

1.1. Delay action dams: historical overview

The Irrigation and Power departments: government of Balochistan remained directly involved in construction of delay action dams (DADs) since 1960s, with aims to rises ground water table, boasting agriculture productivity, vasting the area of grazing grounds and availability water for the local population. In this connection, initiatives were imposed on drilled-wells and pumping equipment supplied at subsidized rates as well as on interest-free loans. In fact, subsidies on tube-wells (electric powered deep tube-wells) encouraged over-pumping and over-mining ground water which reflected negative impact not only on lowering water-table at alarming rate particular in the uplands of the province, but also caused a reduction of ground water reservoir at considerable extent [13, 14]. However, approximately 100 DADs had been contracted in diverse district of Balochistan province. The rudimentary determination of these dams is to conserve each droplet of available floods and rain-fed water for irrigation and agriculture purpose. Dams may also be dogmatic icons of countrywide modernity, power, trait and identity [15]. With passage of time (few years) almost all of the DADs have become entirely silted-up and no contribution to recharge the ground water. To restock groundwater resources, so-called DADs have been constructed in

some valleys of Balochistan province, but results are not encouraging because the silting hinders filtration. Usually, DADs not only to recharge ground water but also considered as restore the surplus water.

Balochistan provinces is located in semi-arid region with mean annual precipitation between 150 to 200 mm. Almost all river and stream are ephemeral, accordingly dependence upon ground water resources has been risen up day by day to developed the agricultural productivity. Considerable agriculture production and maintaining normal living standard have been achieved by utilization of ground water through the tube wells and open wells particular in arid and semi-arid region of the province. Sustainable ground water development can be attained together with proper preservation of the ground water resources. Excessive extraction by pumping behind the possible recharge capacity to the aquifer promptly induces shortage of ground water and also causes the lowering of the ground water table. The government of Balochistan issued edicts which restricted further ground water extractions aiming at agricultural development by means of tube well construction in Quetta, Pishin and Mastung districts. Delay action dam construction has been a significant factor of economic growth edges in the Balochistan province. Construction of new dam has played an imperative part in Balochistan government efforts to restore and develop sizable reservoirs of water resources throughout this span so as to improve economic efficiency of the region. Delay action dam constructions have been commenced since 1971, and 110 dam were operated and 84 dams are presently proposed to be constructed in the Balochistan province in order to solve the local and regional economic remedies [16]. Keeping in view this, the present research was designed in order to know the pros and cons of delay action dams regarding socio-economic and spatial and governance as well as productivity and distributional effects of delay action dams in Mastung, Balochistan; with specific objective to assess the impact of delay action dam governance over socioeconomic values of local population.

2. METHODOLOGICAL CONSIDERATIONS:

Descriptive survey was carried out for this research, because the descriptive types of survey gaining individuals acuities on exiting social facts and social issues [17, 18]. The study universe comprised of district Mastung, Balochistan. In order to measure the socio-economic spatial and sound effects of the delay action dams. Fifty (50) farmers as respondents were selected among them twelve (50) key informants from Directorate of Water Management (25) and Irrigation and Power Department, (25) government of Balochistan were also selected by using the systematic sampling whereby every N^{th} number was chosen by randomly as developed by [19, 20]. For the sampling purpose 12 villages were chosen (4 from vicinity of each dam) by using simple random sampling. The sample size for both populations was determined by using Wunsch (1986) [21] table of "Selecting Sample Sizes" at the 0.05 percent error rate.

2.1. Location

In one ecological zone (upland) of the Balochistan province i.e. district Mastung was selected purposively, the district was regarded as agricultural important district of the province. In this connection, huge quantities of fruits, crops and vegetables were produce in this regard [22]. The district is also considered as one of the leading sources of livelihood options of the rural masses are agriculture and allied agriculture activities such as livestock and forestry [23]. In this regard, agriculture depends on flood water, tube-wells and Karezat (traditional system of irrigation). Due to indiscrimination utilization of ground water pumping almost Karezs were dried out and near to extinct as a results frequently deteriorating of water table. However, the district Mastung has facing strict sort of consistent drought spill (from 1997 to 2004) and being under maximum severe condition on groundwater usages [24]. Beside that district has fronting shortage of rain fall, nevertheless ground water aquifers are reducing by dint of extreme mining and installing of tube wells at a greater extent. The deducing of rangelands, depleting of ground water, soil wearing away, deforestation and disappearing of precious wildlife fauna not only causes diverse environmental issues but also influences the adverse impact on the socio-economic circumstance of rural masses. Three delay action dams (government owned and they have numerous recipients) such as Kungarh, Khad Kucha-1 and Amach were selected for study. Keeping in the view above mention facts and figures present research was designed in order to assess the delay action dams and their impact over on livelihood options of rural masses.

2.2. Development of research instrument

Valid research instrument separated into two portions. In first part, that consist background information or socioeconomic circumstances of the respondents. The second part was consisted regarding the initial conservational examination of delay action dams around district. The respondents responses were captured on five point Likert scale ranging from very strongly disagree to strongly agreed [25, 26].

2.2.1. Data and sources

A valid interview schedule was developed keeping in the view objectives of the study. Primarily data was collected from the respondents i.e. farmers and field staff of Water Management and Irrigation & Power Department, government of Balochistan. Face to face communication was considered as effective tools to for the data collection process. Face to face communication through the sample random sampling. Pre-test of the questionnaire was also applied in this connection. However, the Cronbach"s Alpha program was used to test the reliability for the questionnaire in order to check the reliability of the questionnaire. Moreover, the reliability was .699 which was quite reliable. Likert-5 point will used to denote the perception of the respondents. The questionnaire containing the devise quarries related to the socio-economic condition and initial conservational examination of delay action dams related to impact of dams and governance.

2.2.2. Analytical measures

T-test and One-Way-ANOVA (Scheffe's test) were run in order to denote the respondent's perceptions variation between and among two groups by using the SPSS 22.

3. RESULTS AND DISCUSSION:

The imperative aspect of the present study was to determine the perceptions of the respondents. Significance difference s was observed at 0.05 level as shown in table-1.

Table 1: Perceived score regarding supportive counter-measures improvement of socio-economic conditions

Statements	Farmers			Deptt: Staff			SE	t-vales	Sig*
	M	*SD*	*RO*	*M*	*SD*	*RO*			
Market road improved	3.58	1.031	8th	3.62	1.00	9th	.20400	-.196	.845NA
Drainage improvement	3.80	.968	3rd	3.92	1.046	5th	.20171	-.595	.553 NA
Improvement of irrigation water quality (turbidity, salinity etc.)	3.58	1.05	7th	4.04	.754	2nd	.18306	-2.513	.014*
Improvement of existing irrigation facilities (canals, bunds karez etc.)	3.96	1.087	1st	3.52	1.110	10th	.21983	2.002	.048*
Farm land reclamation	3.82	1.02	2nd	4.02	.979	3rd	.20037	-.998	.321 NA
Improvement of irrigation water sources	3.36	1.045	10th	4.32	.712	1st	.17889	-5.367	.000**
Improvement of livestock breeding	3.60	.989	5th	3.96	.493	4th	.15639	-2.302	.024*
Development of grass land	3.38	1.06	9th	3.68	1.202	7th	.22737	-1.319	.190 NA
Improvement of crop production	3.58	1.35	6th	3.64	1.025	8th	.24049	-.249	.804 NA
Rationalization of on-farm water management practices	3.62	1.085	4th	3.82	1.024	6th	.21108	-.948	.346 NA
Promotion of agriculture mechanization	3.32	1.28	11th	3.42	1.051	11th	.23479	-.426	.671 NA

Scale 1 = Strongly disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly agree
** Significant at 0.05 Level (2-tailed) SD = Standard deviation RO = Ranked order*
** *Significant at 0.0Level*

Statements received highest mean scores as perceived by farmers were: improvement of existing irrigation facilities (canals, bunds karez etc.), (t=2.002, p>0.05), farm land reclamation (t=-.998, p>0.05) and drainage improvement (t=-.595, p>0.05). The rank orders were 1st, 2nd, and 3rd respectively. While, statements received highest mean scores as perceived by government staff were: (t=-.998, p>0.05), (t=-.998, p>0.05), and (t=-.998, p>0.05) at 0.05 alpha level. Similar, statements received highest mean scores as perceived by irrigation and water management staffs were: improvement of irrigation water sources (-5.367, p>0.05), improvement of irrigation water quality (turbidity, salinity etc.) (-2.513, p>0.05) and farm land reclamation (t=-.998, p>0.05) at 0.05 level, in this regard, the rank orders were 1st, 2nd, and 3rd respectively. However, promotion of agriculture mechanization got bottom of the ranking.

Table 2: Perceived score regarding major changes in community brought by construction of the delay action dam

Statements	Water Management Directorate			Irrigation Department			SE	t-vales	Sig*
	M	SD	RO	M	SD	RO			
Ground water level was raised up	3.62	1.193	2nd	3.36	1.336	2nd	.25339	1.026	.307NA
Pumping up cost of irrigation water was reduced	2.92	1.026	5th	2.56	.929	5th	.19588	1.838	.069 NA
Utilization of irrigation water was rationalized	3.52	1.147	3rd	3.26	1.352	3rd	.25079	1.037	.302 NA
Crop production was increased	3.64	1.120	1st	3.22	1.183	4th	.23044	1.823	.071 NA
Socio-economic life in the community was change	3.42	.882	4th	3.42	.905	1st	.17884	.000	1.00 NA

Scale 1 = Strongly disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly agree
** Significant at 0.05 Level (2-tailed) SD = Standard deviation RO = Ranked order*
** *Significant at 0.0Level*

The perceptions of the respondents were recorded in the five-point scale as shown in table-2. Statements received highest mean scores as perceived by staff of water management directorate were: crop production was increased (t=1.823, p>0.05) and ground water level was raised up (t=1.026, p>0.05) at 0.05 level however, the rank orders were 1st and 2nd respectively. On the other hand the statement about, socio-economic life in the community was change (t=.000, p>0.05) and (t=1.026, p>0.05) acquired highest mean scores and were ranked as 1st and 2nd respectively as perceived by the irrigation department staff.

Table 3: Perceived score regarding initial conservational examination of delay action dams

Initial Conservational Examination			Farmers			Deptt: Staff			MS	P-vales	Sig*
			M	*SD*	*RO*	*M*	*SD*	*RO*			
PHYSICAL ENVIRONMENT	*LAND & SOIL*	Land improved	3.64	1.120	3	4.02	1.05	1	3.610	3.037	.085NA
		Soil erosion limited	4.12	1.154	1	3.72	1.32	4	4.000	2.590	.111 NA
		Soil salinity restricted	3.80	.947	2	3.82	1.08	2	.010	.010	.922 NA
		Low percent soil contamination	3.24	1.33	5	3.76	1.06	3	6.760	4.657	.033*
		Soil pollution stopover	3.64	1.025	4	3.20	1.12	5	4.840	4.178	.044*
	WATER	Surface water increased	3.42	1.279	7	3.60	1.17	2	.810	.536	.466 NA
		Ground water easily availability	3.66	.847	4	3.80	.989	1	.490	.577	.449 NA
		Ground water level improved	3.96	.946	1	3.38	.830	3	8.410	10.60	.002*
		Ground water quality improved	3.84	1.113	2	3.02	1.68	4	16.81	8.249	.005*
		Flooding halt	2.72	.990	3	3.00	.968	5	1.960	2.042	.156 NA
		Siltation overcome	2.58	.991	5	2.94	.766	6	3.240	4.124	.045*
		River morphology change	2.56	.836	6	2.48	.862	7	.160	.221	.639 NA
Biotic Environme	***FAUNA AND***	Fauna community improved	4.04	1.068	1	3.72	1.06	2	2.560	2.240	.138 NA
		Flora habits better	3.68	1.15	3	3.34	1.23	5	2.890	2.022	.158 NA
		Vegetation enriched	3.68	1.096	4	3.48	1.16	4	1.000	.782	.379 NA
		Grass land nurtured	3.32	1.168	5	3.62	1.10	3	2.250	1.741	.190 NA
		Pasture areas improved	4.00	.808	2	3.92	1.22	1	.160	.148	.701 NA
Human	*SOCIAL*	Socio-economic condition improved	3.40	1.142	5	3.62	1.04	4	1.210	1.007	.318 NA
		Settlement enhanced	3.46	1.417	4	3.56	1.26	5	.250	.139	.710 NA

		Resettlement improved	3.36	.942	6	3.50	.952	6	.490	.546	.462 NA
		Social equivalence accelerate	3.86	.880	1	3.70	1.07	2	.640	.664	.417 NA
		Life style change	3.82	.962	2	3.96	1.06	1	.490	.474	.493 NA
		Heath improved	3.78	1.055	3	3.64	1.19	3	.490	.387	.535 NA
	POPULATION	Population growth	3.36	1.025	3	3.38	.966	2	.010	.010	.920 NA
		Population increased	3.60	1.08	1	3.28	1.10	3	2.560	2.125	.148 NA
		Population structure improved	3.56	1.214	2	3.60	1.27	1	.040	.026	.873 NA
	ECONOMIC	Revenue generate	3.02	1.020	5	2.90	1.07	5	.360	.328	.568 NA
		Income arise	3.62	1.027	3	3.44	1.23	4	.810	.630	.429 NA
		Employment opportunity increased	3.80	1.106	2	3.70	1.29	1	.250	.172	.679 NA
		Marketing of crops increased	4.08	1.140	1	3.54	1.31	2	7.290	4.824	.030*
		Water right increased	3.36	1.38	4	3.48	1.32	3	.360	.196	.659 NA
	HUMAN USE	Agriculture improved	3.62	1.193	3	3.82	1.13	1	1.000	.736	.393 NA
		Livestock increased	3.80	1.087	1	3.64	1.32	2	.640	.437	.510 NA
		Better domestic water supply	3.80	1.030	2	3.46	1.18	4	2.890	2.352	.128 NA
		Forestry improved	3.00	1.442	4	2.56	1.34	5	4.840	2.492	.118 NA

Scale 1 = Strongly disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly agree
** Significant at 0.05 Level (2-tailed) SD = Standard deviation RO = Ranked order*
** *Significant at 0.0Level*

The rank order were calculated based on mean score so as to find out the relative ranking of each categories as shown in table-3. In this regard, the respondents were enquired about physical environment related to the water, land and soil prospect. Significant level was observed at 0.05 level. Soil erosion limited (p=2.590, p>0.05) and land improved (p=3.037, p>0.05) statements were obtained the highest mean scores as perceived by the respondents and were ranked 1st and 2nd respectively. However, ground water level improvement (p=1060, p>0.05) and ground water easily availability (p=.577, p>0.05) got highest mean scores at 0.05 level respectively. The respondents were further asked to demonstrate their perceptions about the biotic environment with the statements of fauna community improved (p=.577, p>0.05) and pasture areas improved (p=.577, p>0.05) received the highest mean scores and were ranked 1st and 2nd respectively. The human environment consisted into four groups such as human use, economic, population and social life. However, in this regard the statements social equivalence acceleration and life style changed with the context of social and life acquired the highest mean scores (p=.664, p>0.05) and (p=.474, p>0.05) as perceived by the respondents. On the other hand, population increased (p=2.125, p>0.05) and population structure improved (p=.026, p>0.05) were gained the highest mean score and ranked as first and second respectively. With the term of economic dimension the marketing of crops increased (p=4.824, p>0.05) and employment opportunity increased (p=.172, p>0.05) were got the highest mean scores as perceived by the respondents. Livestock increased (p=.437, p>0.05) and agriculture improved (p=.736, p>0.05) were got the highest mean score by using One-Way-ANOVA, Scheffe, multiple comparison test as perceived by the respondents. Significant differences were observed in 6 out 35 statements regarding the initial conservational examination.

Table 4: Inventory of constructed delay action dam in district Mastung

Name of dam	Dam types	District	Completion of dam	Cons: cost (Mil: Rs)	Dams dimension or specification					
					Dam Height (m)	Crest Length (m)	Catchment Area (sq km)	Storage Capacity (1000cum)	Design: flood volume (1000cum)	Embank volume (1000cum)
Amach	Earth	Mastung	12/31/1986	2.8	15.2	762.0	25.70	1.050.0	83.27	136.0
Khad Kucha 1	Earth	Mastung	12/31/1984	3.6	15.2	636.0	21.00	522.8	35.22	198.2
Kungarh	Earth	Mastung	2012-13	8.763	35 ft max	----	4.25	---	----	---

Source: GoB and JICA (1997).

3.1 Amach dam

The region is located near Mastung town. The socio-political setup of the group was semi-tribal. According to the inhabitants, the dam has help out in refilling the ground water. Orchard and wheat are the major crops in Amach dam area. Further the discharge of karez (traditional irrigation system) has been improved through the efficiency of ground water recharge. In this regard, domestic water supply and irrigation inclination are steady. Henceforth, the dam generates optimistic and everlasting impacts to mutually field of physical and human environment.

3.2 Kad Kocha I dam

The area is located near Mall Kharma (mountain name east of Kad Khoch area). The social setup of the communities surrounded by dam is tribal. The demotic water source is open surface tube wells and wells. In addition, the better appropriate region for ground water and diverse shallow well and tube wells located in the dam areas. Due to the dam construction the ground water increases at greater extent. Furthermore, the dam controlled the flush flood.

3.3 Kungarh dam

The most important income generating activity in district Mastung is agricultural and livestock occupations which entirely depended on irrigation. The Kungarh dam was mainly focused at serving the interest of marginal famers. In the Kungarh dam area approximately 60 acres was brought under cultivated so as to improve the livelihood options, protection of community physical infrastructure of human lives, stimulate business and income generation opportunity of the rural populations. In this connection, the yield was increased at least 45%. Similar, 2 Karezes, 8 tube wells, several open surface tubes well were recharge, 50 households were protected from the flood havoc and 20 farm families were directly benefited.

Table 5: Observations of existing delay action dam

Ser. No	Planning	Design	Construction	O&M	Others
Amach Dam	• Full water level storage is attained once in 40 years because of its excessively large storage volume of 1.05 million cum. • Less run-off is expected from ordinary rainfall	Downstream of the spillway canal is located closing to the dam embankment. Guide wall or retention wall should be constructed to prevent inundation at the toe of the downstream slope of the embankment	High ground water recharge is expected through 500m crest length of dam. Ground surface upstream of dam has an inclination to the right abutment corresponding to natural terrain. Proper excavation of borrow material contributes effective recharge	Constant monitoring of karez is required to evaluate a quantitative effect of the ground water recharge along with the dam construction	Accumulation of siltation in the storage areas is less expected because rivers extended radially, accordingly flood flows down in small creeks distributed in the catchment areas
Kad Kocha I	• Efficiency of dam storage is low as same that as Amach dam	Spillway was constructed by the use of a natural undulation. In sufficient leveling of the spillway canal extremely harms flow capacity of the spillway. Guide wall or retention wall should be constructed to prevent inundation downstream of embankment.	Leveling of the spillway canal is required to ensure smooth flow during flood	Excessive infiltration is observed In particular area in the reservoir during floods. Piping of the embankment material may cause dam failure	Accumulation of siltation in the storage areas is less expected because rivers extended radially, accordingly flood flows down in small creeks distributed in the catchment areas
Kungarh	• 2 Karezs, 8 tube wells and enormous open surface wells were recharged • 50 household will be protected from flood havoc • Protection of Community Physical Infrastructure (CPI) and human lives • Additional 80 acres was be cultivated • 20 farm families were directly benefited	The spillway is proposed to be cut on right side of embankment. Bed formation is of erodible nature against flood therefore stone pitching treatment is proposed	Assume that poor compaction of spall layers accelerates gully erosion on the downstream slope of the dam	Gully erosion was observed in the downstream slope of the embankment	Dam crest was elevated with stone materials to prevent overflow of flood water

Source: GoB and JICA (1997).

Table 6: Anticipated benefit of delay action dam in study areas

Purpose of DAD	Operative area	Item of benefit	Estimation of benefit
Increase of ground or water table	Explicit benefit area	Increase of ground water potential for sustainable domestic, agricultural and irrigation uses	Additional supply of domestic and irrigation water
		Upsurge the ground water potential for sustainable irrigation uses	Additional supply of irrigation and agriculture uses
	Vague area	Conservation of ground water resources for the multiple use	Until water value equivalent to the most economical artificial recharge cost
Flood control	Downstream area of DAD	Mitigation of flood damage	Prevention of anticipated flood damage
Acceleration of socio-economic condition	Explicit benefit area	Enhance the income of the rural masses. Employment opportunity Raring of livestock Socio-economic boast up	Protect form expected employment

The dam benefits dimension comprised of advantage on agriculture, livestock, increase the ground water potential, irrigation and domestic water supply in specific valuable areas. Moreover, dam benefits not only enhance the income of the rural masses, employment opportunity, raring of livestock but also reflect the positive impact on socio-economic condition. Unforeseen and unexpected flood damage the human properties, agriculture, livestock, the dam likely provided the barricaded to conserve the human properties, agriculture and livestock.

3.4 Locations

Mastung districts were selected purposively due to the agricultural important district of the province and most of land conflicts issues and concerns are prevailed. District Mastung ranks 13 (order: smallest to the most important) in Balochistan and has subject of 5,896 square kilometers by area-wise. Mastung (a district in Kalat Division) lies between East longitudes and North latitudes consisting of 3Tehsils and 13 Union Councils. Place of Mastung is at 735 km (aerial distance) south-west (235 levels bearing) of Pakistan's Capital metropolis Islamabad and forty five km (aerial distance) south-west (200 degrees bearing) from Quetta metropolis, the provincial capital of Balochistan.

3.5 Local population

Balochistan province was a sparsely populated province which is almost half of the country i.e. 44percent approximately, and area wise considered and comprises almost 5.6percent population as a whole of country. Population density is generally very low as compared to other provinces of Pakistan. The total population to the census 998 was 1.31% Annual Growth Rate.

3.6 Compensation

The inhabitants could not get proper compensation either in the shape of re-embarrassment or financial assistant by the provincial government. However, compensation is generally inadequate for the displaced to replace lost land by its equivalent in worth and extent somewhere else [27. 28].

3.7 Losses

Overwhelming majority of the rural was engaged in agricultural and allied agricultural activities. Dam constructs a huge man-made lake, as a result there is a substantial loss of cultivated agricultural land and it leads to erosion of top soil, plantation, forestry, flora, wild life and destroys enormous immovable assets. Simultaneously, there is significant loss of silt and lessening of soil fertility. As results destruction to such a large extent of forest and land obviously were adversely affected and creates huge socio-economic problems of the intended beneficiaries and ecological concern.

Another dam's drawbacks were mention below:

- Affected people's livelihood sources and socio-economic condition were

damaged with the context of properly rehabilitated
- Homeless.
- People were dislocated their agricultural land and property.
- Inundated.
- The woman workload was increased due to increase in intensity and area of agriculture
- The reservoir be responsible for a regular habitation for vector breeding, and henceforth for diseases such as malaria, filariasis, and river blindness [29. 30, and 31].

3.8 Benefits

Economic development regarded as one of the important instruments that eradicate the poverty and tends towards prosperity of the people [32]. In addition, physical infrastructure plays a significantly role and contributing towards a key role in economic enlargement of the welfare of the rural masses [33]. The main determinations of the dams are water supply, flood control, irrigation, hydroelectric, navigation and recreation.

Dam's divert the attention and advantages were mention below:
- Promotions of fishing sector.
- Amusement and entertainment of people within healthy atmosphere.
- Increase water table.
- Uses of agriculture and irrigation and drinking purpose.
- Barricade for flood water.
- Source of livelihoods.
- Increase the socio-economic condition of the people.
- Regional employment growth.
- Increases the employment in agriculture.
- Stimulate residential location and tourism.
- Vulnerability to torrential rainfall shocks declines.
- Agricultural production increases.
- Rural poverty declines at considerable extent.
- Increasing hydroelectricity production.
- Propel the local economy
- Source of livelihoods.
- Increase the socio-economic condition of the people.
- The worth of land was significantly upgraded
- The raising of livestock was increased
- The tree cultivation was started which will improve the soil structure and fertility
- The cropping pattern was changed from traditional to high value market crops
- The crop yield and water productivity had improved
- The crop production had significantly improved.
- Improving welfare of the rural areas crop intensification, land productivity, value of production per hectare and level of crop diversification were on higher
- Higher household income due to higher cropping intensity, higher crop and labor productivity and higher employment in irrigated setting
- Benefit poor and alleviate poverty
- Crop intensities and crop yield of the farmers have been considerably increased.
- Rangelands, orchards, crop production, livestock, yield, increase
- Dams reduce the spread of flowing water in a stream and allow the main volume of flash-flood water to pass over after unloading sediments in upper reaches.

3.9 Social networks

Social networks were vigorous phenomenon of societal development exclusively focusing to the quality of life. Collaborative society play an effective role to promotes, encourage and obviate the vulnerable segments of community in effective ways.

3.10 Governance

Poor governance was perhaps the source and cause of all other limiting factors. There is no proper complaint and accountability mechanism was existed in selected study districts at all. Lack of accurate understanding and awareness among decision-makers and key other stakeholders at all level.

4. SUMMARY AND SUGGESTIONS:

Here the present research attempts to provide a summary of the work and certain septic suggestions thereof. Systematically devastated of water to a great extent were occurred, the water table which were considered the significant assets bit by bit turn into irreparable losses for the entire region. Present research fills in one chapter of the rural development picture. We suggested that an integrated program should be developed and implemented in the command area of these dams for the effective utilization of available water and development of irrigation infrastructure. Respondent's participation in decision-making process have become a very significant encouraging tool and imperative factor in the procedure of development planning in this regard, to covering both farmers and different department staff in decision-making process. Hence, distinct

livelihood options as an occupation should be prearranged so as to enhance the current socio-economic circumstances of the intended beneficiaries that inhabiting the dam adjacent and vicinity areas.

REFERENCES:

1 GoP, 2017. Economy survey of Pakistan 2016-17: Economic affair division Islamabad, Pakistan.
2 Saeed, S. Magsi, H. Marri FM and Rejeb H. 2013. Under what management practices and mechanisms water resource can be considered as a public good for sustainable development in the developing countries? Journal of Water Sustainability, 3(1): 1-16.
3 Ashraf, M. Kahlown, MA. & Ashfaq, A. 2007. Impact of small dams on agriculture and groundwater development: A case study from Pakistan. Agricultural water Management 92: 90-98.
4 Scudder, T. 2005. The Future of Large Dams: Dealing with Social, Environmental, Institutional and Political Costs. Earthscan, London.
5 Magsi, H., Torre, A., Liu, Y. and Sheikh, M.J. 2017. Land use Conflicts in the developing countries: Proximate driving forces and preventive measures. *Pakistan Development Review*, 56(1): 19-30.
6 Nauman, M. 2003. Ravaged Ecology, Cruel Displacement and Impoverished Livelihoods. Water Nepal 9 (½): 313-318.
7 GoB, 2001. Pakistan-Balochistan on-Farm Water Management, ID PKPE71096, Report No. PID9529, Pp. 1-9.
8 World Bank, GOB, Asian Development Bank, 2008. Pakistan Balochistan Economic Report from Periphery to Core (In 2 Volumes) Volume II: full report. Pp, 1 to 125.
9 Ahmad, S. and Khan, A.G. 2007. Sailaba and khushkaba farming systems of Balochistan – policy support for changing land use and to avoid infrastructure damages caused by flash floods. Water for Balochistan: Policy Briefings, 3(10):1.
10 Wajid, A. Usman, A. Khan, M., K. & Chaudhry, A. A. 2013. Socio Economic Impact of Small Dams on Local Vicinity: A Case Study of Aza Khel Dam Peshawar. Double Blind Peer Reviewed International Research Journal Publisher: Global Journals Inc. (USA). Glo. J. Man. & Bus. Res. Eco. Comm., 13 (5): 31-39.
11 Ibid.
12 GoB, 2007. Water for Balochistan: Supporting Implementation of IWRM Policy in Balochistan: Policy Briefings, ADB and Royal Government of Netherlands (3): 10.
13 Mustafa, D. and Qazi, M.U. 2007. Transition from Karez to tube well irrigation: development, modernization, and social capital in Balochistan, Pakistan. World Dev. 35, 1796–1813.
14 Baloch, M.A. and Tanik, A. 2008. Development of an integrated watershed management strategy for resource conservation in Balochistan Province of Pakistan. Desalination 226 (1–3): 38–46.
15 Veilleux, J., C.2013. The Human Security Dimensions of Dam Development: The Grand Ethiopian Renaissance Dam: Global Dialogue, Cooperation or Conflict. Summer/Autumn—Water: (15).
16 GoB, 1997. Feasibility study on the irrigation water resources development with delay action dam's project in Balochistan in the Islamic Republic of Pakistan: Main report. Japan International Cooperation Agency Japan: Nippon Giken Inc., Sanyu Consultants Inc. No.2.
17 Jonassen, H.D. 2001. Handbook of Research on Educational Communications and Technology: AECT 1800 Blomington IN 47404.
18 Trochim, W. M. 2000. The Research Methods Knowledge Base, 2nd Edition. Atomic Dog Publishing, Cincinnati, OH.
19 Cochran, W.G. 1977. Sampling Techniques. John Wiley and Son, New York.
20 Cohen, L. Manion, L. & Morrison, K. 2007. Research Methods in Education (sixth edition). London: Routledge.
21 Wunsch, D.R. 1986. Forum Feature: Action Research in Business Education. Business Education Forum, 5, 31-34.
22 GoB, 2011. Mastung District Profile: Planning and Development: Government of Balochistan with the collaboration of UNICEF, Pp. 1-90.
23 Ibid.
24 GoB & JICA, 1997. Feasibility study on the irrigation water resources development with delay action dam project in Balochistan: The Islamic Republic of Pakistan. I & P Deptt: Govt, of Balochistan and Japan International Cooperation Agency Japan. Nippon Giken Inc. Sanyu Consultants Inc. Pp 1-75.
25 Emory, C.W. and D.R. Cooper, 1991. Business Research Methods, 4th edition. Inc., Homewood, Illinois.
26 Likert, R. 1932. A technique for the measurement of attitudes: Archives of psychology. 22 (140): 1-55.
27 Dreze, Jean, Meera Samson, and Sanjay Singh, 1997. The Dam and the Nation: Displacement and Resettlement in the Narmada Valley (New Delhi: Oxford University Press 1997).

28 Bratrich, C., Truffer, B., Jorde, L.,Markard, J.,Meier,W., Peter, A., Schneider,M. andWehrli, B. 2004 Green hydropower: a new assessment procedure for river management. *River Research and Applications*, 20, 865–882.
29 Magsi, H. and Torre, A. 2015. Land use conflicts and human development nexus: proximity analysis. In Giri, A.K. (Ed.) *New Horizons of Human Development*. Studera Press, Delhi, India. Pp. 257-271. ISBN: 978-81-930333-5-7.
30 Mulyanto and Magsi, H. 2014. Approaches to measure quality of human resource development index in the village context: case of Central Java, Indonesia. The Macrotheme Review, 3(6): 1-17.
31 Sharma, V., P. 1991. Health Aspects of Water Resources Projects," in Central Board of Irrigation and Power, eds., \Environmental Impact Assessment of Water Resources Projects," (New Delhi 1991).
32 Feinerman, E. and Finkelshtain, I. 2003. Introducing socio-economic characteristics into production analysis under risk. Agricultural Economics. 13(3): 149-161.
33 Truffer, B., Bratrich, C.,Markard, Peter, J.A.,Wüest, A. andWehrli, B. 2003 Green Hydropower: The contribution of aquatic science research to the promotion of sustainable electricity. Aquatic Sciences, 65(2), 99–110.