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An Analysis of Household Income, Consumption Expenditure, and Savings Before and after the Mirani Dam Right and Left Bank Canals in District Kech, Balochistan, Pakistan

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ABSTRACT

This study looked at household income, consumption, and saving patterns in the Mirani dam command area before and after the dam's two irrigation canals were built. A total of 371 households were chosen for the data collection for this study in the vicinity of the Mirani dam command area. A T-statistics technique was used to compare income, consumption, and saving before and after the Mirani dam on both canals. The data analysis result reveals that all three variables have changed significantly in the locality of the Mirani dam command area. The income, consumption, and saving patterns of the three types of farmers have significantly improved. These changes in the variables were caused by the availability of irrigation water in the vicinity of the Mirani dam command area.

Keywords: *Kech, Balochistan, Mirani Dam, Income, Consumption, Saving, Household*

INTRODUCTION

Irrigation infrastructure is essential for rural economic growth, particularly in those regions or countries where agriculture is the primary source of revenue and subsistence. Livelihood creation through increased farm productivity is critical for poverty reduction in these areas and regions, and irrigation is a driving factor for economic growth. Countries have attempted to expand irrigation infrastructure coverage since the 1950s, with South and East Asia having the most success. The number of people who had access to irrigation more than doubled between 1960 and 2000. The development of irrigation schemes has resulted in higher farm yields and a lower world price index (Lipton et al., 2003, Hussain and Hanjra, 2004; Hussain, 2007; Smith, 2004).

Greater household income through increased agricultural yields, increased crop area, improved crop intensity, crop diversity, and increased usage of high-yield varieties are all direct benefits of irrigation. Indirect benefits included increased labour demand, higher wage rates, lower food grain prices, increased trade, improved research, and the development of fertilisers and high-quality varieties.

Water is a critical resource for economic development because it is critical for agricultural productivity and services. Agriculture consumes 70 percent of the world's freshwater. The income of developing countries is mainly dependent on agricultural products, and water use in agriculture in these countries is almost 90 percent whole water extraction. But in a developed nation in the world, about 40 percent of water is consumed in the sector of agriculture, and less than the same amount of water is consumed in the industrial sector (FAO, 2010).

Pakistan's economy depends on agriculture, and irrigation is a key source of employment and income generation that, as a result, contributes to the development of the resource while at the same time changing the consumption and saving patterns of the community. The development of a massive irrigation project has a significant impact on the economic and social lives of the residents who live near the project area. A

huge investment in irrigation projects generates new productive activities that increase the income of the local population. The cost of consumption and the region's residents' saving habits change as a result of this increase in income. (Reddy, 1995).

The agricultural sector in Balochistan greatly benefits from the Mirani Dam (Right and Left Bank Canal) irrigation project. The plan is projected to raise the yield of all major crops and the farm's income in order to support the expected population of more than 47940 persons. Additionally, it boosts the agro-industry, produces annual savings in foreign currency, and frequently enhances the inhabitants' economic situation.

The major purpose of the significant financial investment in the right and left bank canals of the main canal irrigation distribution system on Mirani Dam is to increase the area under diverse crops and so improve the province of Balochistan's financial development and reduce poverty. The main crops grown on the right and left bank canals of Mirani dam include cotton, wheat, fodder crops, vegetables, and pulses. Growing new crops and expanding the area under cultivation of already-existing crops present a huge opportunity in the study region, which would put pressure on costly and water-intensive crops while reducing the likelihood of salinity and water logging as well as insufficient water resources.

The Mirani dam is situated on the Dasht River about 40 kilometres west of Turbat in Mekran division province of Balochistan, Pakistan. The project's objective is to supply irrigation water for agricultural areas on both sides of the Dasht River. This is the first project in the water industry to be completed under an EPC (engineering, procurement, and construction) arrangement, in accordance with WAPDA's Vision 2025. The Mirani Dam Project study got under way in 1966. The Balochistan Irrigation and Power Department published the investigation report in 1969. From 1969 to 1974, the Water and Power Development Authority (WAPDA) conducted feasibility studies for the dam, and the Department issued a feasibility report the same year. In 1985, the Water and Power Development Authority published a new feasibility study. NESPAK completed the Mirani dam project planning report in September 1992. The Power and Irrigation Organization established the PC-I in July 2001, and ECNEC approved it in February 2002. In February 2002, the authority recruited management consultants (M/S NEAC Consultants), and in the same month, the authority finished reviewing and shortlisting the EPC proposals. Prequalified bidders received the tender documents on March 21, 2002, and on May 20, 2002, the bids were opened. The management consultant submitted the report on the bid evaluation on June 4th, 2002. The lowest-qualified bidder received the Engineering, Procurement, and Construction (EPC) contract on June 15th, 2002.

Construction of the Mirani dam was contracted to a group of three local construction companies known as the Mirani Dam Joint Venture (MDJV). The project's completion window was set at four years. The WAPDA can obtain management consulting services from a different joint venture of foreign and local consultants, headed by NESPAK, in order to complete the project. A total of Rs. 4.25 billion went into the contract. From June 2002 until June 2007, work on the Mirani Dam project was completed.

There are the following distinctions in the Mirani Dam project:

- This is the first concrete-faced rock-fill dam (CFRD) of more than 100 feet in height to be built in Pakistan, as well as the first Engineering, Procurement, and Construction (EPC) project in the water resource industry.
- This is the first water sector scheme to be launched under WAPDA's ambitious 2025 Water & Power Development Program.
- This is the first and largest project under the Dream 2025 programme, completed through a joint venture of local construction companies.

The Pakistani president, General Parvez Musharraf, personally performed the laying of the cornerstone and inauguration ceremonies for this first megaproject in the Balochistan province.

The Mirani Dam project's principal objective was to store water from three rivers and streams for summer floods. 33,200 acres of primarily fallow and farmed land in the Kech Valley may be irrigated with the water gathered. The vast majority of the acres are fallow, with a few Barani and a few tube wells irrigated. The other objectives were to market agricultural products, raise the standard of living through increased economic activity and food production, create jobs during construction, and maintain and administer the

programme. Additionally, the dam will provide a metaled road that runs for about 40 kilometres from Turbat to the Mirani dam site, provide drinking water for the project area, advance fisheries development by allowing fish to be raised in a reservoir, and enhance the socioeconomic growth of the region (WAPDA, 2008).

OBJECTIVES OF THE STUDY

To compare household income levels before and after the dam of both canals.
To compare household consumption pre- and post-construction of the two canals of the dam.
To compare the amount of household savings before and after the construction of both canals of the dam.

HYPOTHESES OF THE STUDY

Household income has significantly changed since the dam's right and left bank canals were built.
There is a significant difference in household consumption levels before and after the Mirani dam.
After the construction of the Mirani dam's right and left bank canals, household savings increased significantly.

LITERATURE REVIEW

There have been many studies conducted both inside and outside of Pakistan, but only a select few are used for the study's literature review.

The Chinese instance was looked into by Uang, Q., et al. (2005). According to the study, irrigation increases agricultural output and per-acre yield. Every crop grown in the study area has seen an increase in acreage yield. The income, consumption, and savings of the farmers have increased as a result of the increase in per-acre output. This demonstrates that the financial success of crops and irrigation have a substantial positive association. Consequently, China's poverty has decreased. There is a strong relationship between irrigation and income, according to a number of domestic and international studies. This in turn increases consumption as well as savings in the area. It is not possible to include all studies on the given topic, but a few are important enough to be mentioned. These studies confirm the basic theme of the study that irrigation increases income, consumption, and saving.

Saeed et al. (2011) evaluated the agricultural productivity in Ziarat, Balochistan, from the perspective of the small dam's impact, and they found that the mini dam significantly improved agricultural output, the livelihood of the locals, and significantly raised their standard of living. The study also showed that the area's farming population benefited from the availability of irrigation water in terms of crop and fruit yields, income, and consumer expenditures.

Shah et al. (2011) investigated household income, consumption, and saving before and after the construction of Dera Ismail Khan's Chashma Right Bank Canal (CRBC). The research findings concluded that the inhabitants' income, consumption, and saving increased. As a result, the inhabitants' standard of living changed. According to the study, the project had a significant impact on the socioeconomic status of the people living in CRBC.

Khan and Shah (2012) evaluated the association between irrigation and the increase in farm output and decrease in poverty in Khyber Pakhtunkhwa. They emphasised how the CRBC has improved farm and household income, decreased poverty, and increased crop output in the region. According to the research's findings, the community in the study area now has access to better irrigation water, which has helped to reduce poverty and create jobs and a means of subsistence. The socioeconomic environment, cropping intensity, crop output, household income level, level of consumption, and area conservation all saw considerable increases. It has been determined that there are strong connections between irrigation, farm productivity, and the reduction of poverty. The relationships described are both direct and indirect; the direct relationship shows effects at the local and household levels, while the indirect relationship shows consequences at the national and international levels. By expanding the area that can be farmed and boosting crop production, irrigation has helped the populace and made it feasible for them to obtain affordable food, especially for the underprivileged.

Amed, et al. (2019) studied the socioeconomic impact of Mirani Dam in District Kech, Balochistan, Pakistan, and concluded that the dam played an essential role in the development of the living standards of the local population and the study area. Due to the Mirani dam, irrigation water became available for farmers and their livestock. As a result, the area under cultivation, standard of living, and literacy ratio in the study area increased. Irrigation water availability aided in increasing cropping and land use intensity in the study area. The income level, consumption expenditures, and savings of the inhabitants increased significantly. The study further summarizes that, due to extensive and intensive farming, crop production has increased manifold in the overall command area.

Gidey (2020) investigated the impact of small-scale irrigation development on farmers' improved livelihoods in Ethiopia and discovered that small-scale irrigation schemes are a very impressive alternative for a sustainable improvement of livelihoods, transformational growth, and poverty alleviation in the country's rural areas. This has major implications for crop intensification and diversification, job creation, increased livestock production, and household income and earnings. Furthermore, he came to the conclusion that farmers now have greater food security than they did before irrigation development and that farmers who use irrigation water receive the best income and have more food security than farmers who do not. Irrigation has generally affected farmers' ways of life in both direct and indirect ways.

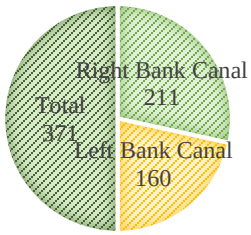
RESARCH METHODOLOGY

A logical research study includes systematic and appropriate methods for data analysis. The procedures for collecting samples, establishing a statistical foundation, and analyzing, verifying, and defining the association are all critical. There are both quantitative and qualitative factors that must be explained in detail when looking at the results and data. Research study findings are successful when information is organized and distributed. In order to complete the study in the area, the following approach and procedure were used within the framework of the study's aims and objectives.

UNIVERSE OF THE STUDY

The Mirani Dam's two canals' command area was selected for the current study. The Mirani Dam's irrigation system has a main channel that is 24.8 miles long, eight distributaries channels, 195 watercourses that are a combined total of 305894 miles long, and a command area that is 33200 acres. Over 47940 people lived in the communities in the command zones for the right and left bank canals of the Mirani Dam (GOP, 2018). A list of family units was prepared in each sampled village near the Mirani dam command area, and then a specific random sampling was used to select the respondent for the interview. For gathering estimated information/primary data from the field, a representative sample of 8 distributaries, 32 minors' canals, and 371 farm households (211 from RBC and 160 from LBC) was chosen. In order to determine the effect of the right and left bank canals of the Mirani dam on household income, spending, and saving, a questionnaire was developed. The information was gathered in the study area during the fiscal year 2016-17.

FIGURE-1 BREAK UP OF SAMPLE SIZE



According to the size of the farm, the households were split into four categories: small (less than 6 acres), medium (6–20 acres), large (21–50 acres), and very large (more than 50 acres). To examine the level of income, consumption, and savings before and after the Mirani Dam, data were collected and processed in the SPSS software. Right and Left Bank Canal paired-sample T-tests were used to evaluate the data.

STUDY AREA

The analysis was completed in the Mirani Dam Command Area in the Tehsil Dasht in the Kech District (see figure 1). In tehsil Dasht, there are nine union councils: Darchkoh, Bal Nigore, Zarain Bug, Jan Muhammad Bazar, Bisholi, Kunchaiti, Kumbail, Kuddan, and Sanghi (GOB, 2020). The research area consists of more than 20 villages with a combined population of more than 47940 people and 6918 homes. The only source of irrigation is rain; there are no other options. The annual rainfall is inadequate (GOP, 2018). Due to insufficient crop production and the kinds of crops planted in the affected area, there are cyclical fluctuations in precipitation and a consequent shortage of soil moisture. Possibly one of the lowest agricultural outputs in the nation is produced in this region. The fact that the per capita income in

this remote region of Pakistan is significantly lower than the national average is therefore reasonable.

Figure: 2 - Map of the study area

Source: Planning commission, Summary of PSDP Funded Completed Projects, Vol-I, 2009-2010

SIZE OF SAMPLE AND ITS PROCEDURE OF SAMPLING

The right and left bank canals were the two main channels that made up the Mirani Dam's irrigation system (RBC and LBC). With a combined flow of 377 cusecs, both canals have a total length of 24.8 miles (RBC 13.5 miles and LBC 11.3 miles) (RBC 236 cusecs and LBC 141 cusecs). There are 195 watercourses (RBC 118 and LBC 77), 32 minor canals (RBC 18 and LBC 14), 8 distributaries (RBC 4 and LBC 4), and a total of 305894 miles (RBC 190, 430 miles, and LBC 115,464 miles) in this irrigation system that can irrigate the command area of a total of 33200 acres (RBC 20800 acres and LBC 12400 acres). The Local Government Department district Kech provided a list of families in the villages in the Mirani dam command area, while the Agriculture Extension Department district Kech provided a list of farmers in the study region. The localities, population, and homes close to the command area for the Mirani dam are shown in Table -1.

Table -1 Name of Villages, Population and Households

S.No	Name of Villages	Population	Households
1	Bahoot chat	990	151
2	Hoochat	957	115
3	Mazan Bund	1084	167
4	Pitook	1397	288
5	Sibdan	1146	155
6	Siahaloo	960	120
7	Kohak	2417	316
8	Panoodi	578	91
9	Jallabani	458	70
10	Toolagi	4657	609
11	Shakaroo	407	80
12	Kuddan	9257	1419
13	Maksar	2393	270
14	Ballin	2126	306
15	Bandgia	271	35
16	Choot	2371	339
17	Hammalani	468	63
18	Harani Baint	1129	152
19	Kasar	5216	793
20	Kunchaiti	5507	712
21	Kuntidar	2393	359
22	Nellag	774	100
23	Pirani Lumb	751	160
24	Kunari	233	48
	Total	**47940**	**6918**

Source: (GOP.2018)

Afterward, a precise arbitrary testing strategy was utilised to pick the respondent for the interview. The sample size for this investigation was determined using the following formula:

Sample size $= \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1+\left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$

$$= \frac{\frac{(1.96)^2 \times 0.5\,(0.5)}{(0.05)^2}}{1+\left(\frac{(1.96)^2 \times 0.5\,(0.5)}{(0.05)^2 6918}\right)}$$

$$= \frac{\frac{3.8416 \times 0.25}{0.0025}}{1+\left(\frac{3.8416 \times 0.25}{0.0025 \times 6918}\right)}$$

$$= \frac{384.16}{1.0555305} = 364$$

Where
N = Population size,
Z = Critical value of the normal distribution at the required confidence level,
p = Sample proportion,
e = Margin of error

According to the formula above, 364 measurements or more must be made in order to have a 95% confidence level that the real value is within 5% of the measured or surveyed value. In order to strengthen accuracy and reliability, 371 households have been included (RBC 211 and LBC 160). For interviews, a total of 371 farm households were contacted. Out of 371 families, 211 interviews with RBC farmers and 160 interviews with farmers in the LBC region were done. The researcher was unable to interview female household members due to cultural and norm restrictions, so only the male representative was interviewed. Despite the fact that the researcher considers the absence of women in the sample to be a drawback, it is significant to remember that the agricultural farms in district Kech are managed by men. In most circumstances, women do not own land; but, in those instances when they do, the males of the family are responsible for farming.

The secondary data was gathered from a variety of sources, including the profile of Mirani Dam, the District Census Report, the Agricultural Statistics of Balochistan, and the Economic Survey of Pakistan, the office of the Agriculture Extension Department, the On-Farm Water Management Office, the Agriculture Crop Reporting Services Office, and the Agriculture Soil Fertility Office. The distributaries and farmers/households have taken over all of the villages in the control zone of the Mirani Dam's right and left bank canals in the tehsil Dasht, district Kech.

RESULTS AND DISCUSSION

The Mirani dam and its two canals increase locals' income, consumption, and savings. Consumption accounts for the majority of total expenditures. Consumption rises when income does, but not as quickly. Savings grow along with income, but faster than income. Tables 2, 3 and 4 examine and display

comparisons between before and after income, consumption, and savings for various kinds of farmers in the region.

A COMPARISON OF INCOME BEFORE AND AFTER MIRANI DAM ON THE RIGHT AND LEFT BANK CANALS

"Income" is the money that a person or company receives after investing capital, producing a good or service, or both. Depending on the source, income can come from a variety of sources and may be taxed at varying rates. For most people, this comes mostly in the form of a paycheck or salary; however, other forms of income include pensions, dividends, interest, and stock options. The Mirani Right and Left Bank Canals significantly increased household income.

The income level of families in the Mirani dam command area was compared before and after the Right and Left Bank Canals were built using a paired sample T-test. Data were compared before and after the right and left bank canals of the Mirani Dam were built. About the significant level for farm size (sig = 0.000 for less than 6 acres, 6-20 acres, 21-50 acres, and more than 50 acres), and as the sig is less than 6 acres (.0000.05), the significant differences of these indices were validated for the two periods described above. The data reveals that the income of all farm types has changed significantly. The right and left bank canal construction at the Mirani Dam has a favourable effect on the income levels of the populace. The data in parenthesis are t-ratios, and they demonstrate that household income greatly increased following the building of the RBC and LBC of the Mirani dam in every area nearby, just as it did with the construction of the CRBC in KPK, Pakistan, and the Karun 3 dam, Iran (Shah et al., 2011; Esmaili & Sedighi, 2017).

Table – 2
Significant level of Average Household Income Pre &Post Mirani Dam Right & Left Bank Canal

Farm Size	Period	Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	Df	Sig. (2-tailed)
<6 Acres	Before After	-55106.060	22613.172	3936.448	-63124.343	-47087.778	-13.99	32	.000
6 -20 Acres	Before After	-70122.641	23530.407	2285.475	-74654.316	-65590.966	-30.68	105	.000
21-50 Acres	Before After	-69087.121	27000.317	2350.076	-73736.132	-64438.110	-29.39	131	.000
> 50 Acres	Before After	-71412.000	27156.926	2715.692	-76800.523	-66023.476	-26.29	99	.000

1- This same standard deviation (SD) is a dispersion indicator that shows how far data has deviated from the average value.
2-df (degrees of freedom) = total number of independent observations minus total number of calculated parameters

3-Sig is an abbreviation for "significant difference," which indicates and measures the difference between variables with a significance level of less than 0.05.
4. Before (before and after the construction of RBC and LBC) (After RBC and LBC construction)

COMPARISON OF CONSUMPTION BEFORE AND AFTER THE MIRANI DAM RIGHT AND LEFT BANK CANALS

Consumption expenditure is the overall sum spent by all households within an economy on various final goods and services in order to fulfil their needs. In Table 3, people' consumption patterns before and after the Mirani dam and its two canals were built in the study area are compared. The four different types of farms in the command area of the Mirani dam were assessed using the survey responses from participants for the right and left bank canals of the dam before and after construction. According to the paired T-test results, the farm size is less than 6 acres, 6–20 acres, 21–50 acres, and more than 50 acres indices have significant levels (sig = 0.000), and the farm size is less than 6 acres (.0000.05). This data analysis reveals a considerable variation in consumption between the right and left bank canals before and after the Mirani dam. People in the area began to consume more after the construction of the Mirani dam and its two canals. Which means the construction of both canals' has had a positive impact on the consumption of people living in the Mirani dam command area, as household consumption has increased, significantly after CRBC in all three stages (Shah et al., 2011)

Table-3: Significant level of Average Household Consumption Pre &Post Mirani Dam Right & Left Bank Canal

Farm Size	Period	Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
<6 Acres	Before After	-40679.54	17583.35	3060.869	-46914.332	-34444.757	-13.29	32	.000
6 -20 Acres	Before After	-51134.43	19412.67	1885.525	-54873.082	-47395.785	-27.11	105	.000
21 - 50 Acres	Before After	-50514.51	22424.81	1951.829	-54375.691	-46653.323	-25.88	131	.000
> 50 Acres	Before After	-51359.44	23420.91	2342.091	-56006.658	-46712.221	-21.92	99	.000

COMPARISON OF SAVING PRE & POST-MIRANI DAM RIGHT AND LEFT BANK CANAL

Savings are defined as the amount of disposable income that is left over after paying for current expenses. The saving function describes the connection between income and saving. There is a direct correlation between income and saving, meaning that as income rises, saving rises as well, though less so. In other words, when income rises, so does the percentage of income that is saved. A paired sample T-test was conducted using the data from before the construction of the Right and Left Bank Canals of the Mirani dam

and the data from after the construction of the Right and Left Bank Canals of the Mirani dam to compare the level of savings of households in the Mirani dam command area. Concerning the significant levels for farm size of less than 6 acres, 6-20 acres, 21-50 acres, and more than 50 acres (sig = 0.000), and as the sig is less than.00005, the significant differences of these I ndices for the two periods mentioned above were confirmed. According to the findings, there has been a significant shift in saving across all categories. The construction of the Mirani dam's right and left bank canals has had a favourable impact on people's savings in the Mirani dam command area, according to Shah et al. (2011), who found that household savings had increased significantly after CRBC in all three stages.

Table-4: Significant level of Average Household Saving Pre &Post Mirani Dam Right & Left Bank Canal

Farm size	Particular	Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	T	Df	Sig. (2-tailed)
<6 Acres	Before								
	After	-14426.51	5384.507	937.322	-16335.778	-12517.251	-15.39	32	.000
6 - 20 Acres	Before								
	After	-18988.20	5377.614	522.320	-20023.871	-17952.543	-36.35	105	.000
21-50 Acres	Before								
	After	-18572.61	5671.564	493.646	-19549.163	-17596.063	-37.62	131	.000
> 50 Acres	Before								
	After	-20052.56	5577.664	557.766	-21159.289	-18945.830	-35.95	99	.000

CONCLUSIONS

Water is a critical factor in agricultural productivity, and agriculture is impossible without it everywhere on the planet. Prior to the construction of the Mirani Dam's Right and Left Bank Canals, this region was completely dry and devoid of any agricultural water. Since the average rainfall in this area is so low, agriculture in this area is primarily dependent on rainfall. The Right and Left Bank canals and the Mirani dam, however, considerably enhanced the quality of life for the locals. Irrigation increased on-farm and off-farm employment in the command area and surrounding areas. This increased the region's residents' income, consumption, and saving levels. This resulted in a significant improvement in the people's standard of living.

POLICY IMPLICATION

To increase household income, savings, and consumption expenditure, the following policy implications are proposed for implementation in the Mirani Dam command area as well as the entire district of Kech Balochistan, Pakistan.

SUPPLY OF HIGH-QUALITY SEED

Because good quality seed is not available to farmers in the study area, it is suggested that the government of Balochistan provide good quality seed to farmers in the area so that they can get more production from their various crops and increase their income.

IMPROVING IRRIGATION WATER MANAGEMENT

Improved availability, reliability, and equity of irrigation water and enhanced water use efficiency are vital for enhancing agricultural productivity in the study area as well as in the district kech. For improving agricultural output, the current situation of ineffective irrigation systems and low water usage efficiency does not match water supply with water demands. This situation demands urgent and immediate water conservation and efficient utilisation of water. So provincial governments, through their provincial irrigation departments, must invest in the improvement of the operation and maintenance of irrigation canal systems. Provincial governments must continue to upscale resource conservation technologies (watercourse improvement, bed-furrow irrigation, laser land leveling, zero tillage, and high efficiency irrigation technologies (sprinkler and drip)) to improve water use efficiency through their provincial agriculture departments (OFWM and Agri. Extension). The people in the area increased their income, consumption, and savings by irrigating more land in this manner.

REFERENCES

Amed, N., Khaskelley, A. Z., Magsi, H. u., & Chandio, R. A. (2019). The Socioeconomic Impact of Mirani Dam in District Kech, Balochistan, Pakistan. Int. J. Econ. Environ. Geol. Vol. 10(4), 35-39.

Esmaeeli, A; Sedighi, H; (2017). Effect of Agricultural Research on Productivity and Rural Poverty: Evidence from Iran. Journal of Agricultural Sciences and technology , 19 (1), 21-32.

FAO. 2010. Global major agricultural systems map, accessed in October 2012.

Gidey, G. (2020) Impact of small scale irrigation Development on Farmers Livelihood Improvement in Ethiopia; A Review Journal of Resource development and Management; An international peer reviewed journal volume-62..

GOB. (2021). Agricultural Statistics Balochistan 2020-2021. Quetta: Directorate of Crop Reporting Services Agriculture Department, Balochistan, Quetta.

GOP, (2018). District Census Report Kech 2017. Statistical and Census Department Islamabad.

Hussain I, Wijerathna D. 2004, Irrigation and income-poverty alleviation: A comparative analysis of irrigation systems in developing Asia, International Water Management Institute, Colombo, Sri Lanka.

Huang, Q., Dawe, D., Rozelle, S., Huang, J., & Wang, J. (2005). Irrigation, poverty and inequality in rural China. The Australian Journal of Agricultural and Resource Economics (AJARE), 159-175.

Hussain I. 2007, Direct and indirect benefits and potential disbenefits of irrigation: Evidence and lessons, Irrigation and Drainage, Vol. 56, No. 2-3, pp. 179-194.

Khan, H; Shah, M; (2012). Irrigation, Farm Productivity and Poverty Reduction in KPK: Understanding Direct and. Procedia Economics and Finance, 2, 292-298.www.sciencedirect.com

Lipton M., Litchfield J., Faures J-M. 2003, The effects of irrigation on poverty: A framework for analysis, Journal of Water Policy No.5, pp. 413-427.

Reddy, R. K. (1995). Irrigation and Agricultural Development in India.

Saeed, Z; Mustafa, U; Hina, H; and Saeed, S; (2011). Agricultural Productivity impact of Mini Dam: A case study of Ziarat Balochistan. Pakistan: Pakistan Institute of Development Economics, Islamabad and Department of Botany, University of Balochistan, Pakistan. Google.com (2013). Land tenure in Pakistan. On line.

Shah, M., Din, Z., Tipu, S.K., (2011). Household Income, Consumption and saving before and after Chashma Right Bank Canal (CRBC) D.I Khan. Gomal University Journal of Research,

Smith L. 2004, Assessment of the contribution of irrigation to poverty reduction and sustainable livelihoods, Water Resources Development, Vol. 20, No. 2, pp. 243-257.

WAPDA (2007). Mirani Dam Salient Feature, Pakistan Water & Power Development Authority. http://www.wapda.gov.pk/indx.php/projects/water-sector/o-m/mirani-dam