IMPACT AUDIT REPORT
OF
KACH DELAY ACTION DAM, SRA KHULA AREA
DISTRICT QUETTA IRRIGATION DEPARTMENT
GOVERNMENT OF BALOCHISTAN
AUDIT YEAR 2025-26



AUDITOR-GENERAL OF PAKISTAN

SERVING THE NATION BY PROMOTING ACCOUNTABILITY, TRANSPARENCY AND GOOD GOVERNANCE IN THE MANAGEMENT AND USE OF PUBLIC RESOURCES

FOR THE CITIZENS OF PAKISTAN

PREFACE

The Auditor-General of Pakistan conducts audits in accordance with Articles 169 and 170 of the Constitution of the Islamic Republic of Pakistan 1973, read with Section 10 of the Auditor-General's (Functions, Powers and Terms and Conditions of Service) Ordinance, 2001. The Impact Audit of Kach Delay Action Dam, Sra Khula, Quetta (2019-20) was carried out accordingly.

The Directorate General of Audit, Balochistan conducted Impact Audit during July to December 2025 with a view to evaluating the outcomes/impact of the project using time-series analysis based on the indicators before and after the project. The Audit Report indicates specific actions that, if taken, will help the management realize the objectives of the Project.

The Audit Report has been finalized in the light of written responses of the department; no DAC meeting was convened by the department despite repeated requests.

The Audit Report is submitted to the Governor of Balochistan in pursuance of the Article 171 of the Constitution of the Islamic Republic of Pakistan 1973, for causing it to be laid before the Provincial Assembly.

Islamabad **(Maqbool Ahmad Gondal)**
Dated: 2026 **Auditor-General of Pakistan**

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ABBREVIATIONS AND ACRONYMS

DAC	Departmental Accounts Committee
EIRR	Economic Internal Rate of Return
FY	Financial Year
GPV	Gross Production Value
INTOSAI	International Organization of Supreme Audit Institutions
NPV	Net Present Value
PC-I	Planning Commission Form I
PSDP	Public Sector Development Program
Q-WASA	Quetta Water and Sanitation Authority

EXECUTIVE SUMMARY

The Director General Audit Balochistan, Quetta conducted Impact Audit of Kach Delay Action Dam, Sra Khula, Quetta (2019-20), which was incorporated into the Audit Plan with the approval of the Auditor-General of Pakistan for the Audit Year 2025-26.

The primary objective of the audit was to determine what impact the Delay Action Dam Sara Khula, Quetta had on the targeted population in terms of controlling floods, improving groundwater recharge, making the 1000 acres of land cultivable and benefiting 150 farm-families in the area.

The Audit was conducted in accordance with INTOSAI Auditing Standards with a view to evaluating the impact of the project on the target population regarding improving livelihood of 150 farm families, irrigating 1,000 acres of land, controlling / mitigating floods and improving underground water level.

Key Audit Findings

Following are the key audit findings:

i. Inadequate improvement in agricultural income.
ii. Non-provision of intended drinking/domestic water supply.
iii. Non-achievement of projected economic benefits and EIRR.

Recommendations

Audit recommends to:

i. Make efforts to enhance agricultural activity and livelihood in the area.
ii. Collaborate with WASA to ensure provision of potable water.
iii. Rationalize economic overview in future projects.

1.1 INTRODUCTION

Water scarcity and recurrent flood events pose significant socio-economic and environmental challenges in Balochistan, particularly in and around Quetta Valley. Rapid population growth, prolonged drought cycles, over-extraction of groundwater, and limited surface water storage have aggravated pressure on already stressed water resources. In this context, the Government of Balochistan has undertaken various water conservation and recharge initiatives to enhance water security and protect communities from flood risks. One such initiative is the construction of the "Delay Action Dam at Sra Khula Area, District Quetta".

This Impact Audit has been conducted to assess whether the Delay Action Dam Sara Khula Project has achieved its intended objectives and generated the envisaged outcomes and impacts for the target population, in line with the approved PC-I and applicable development goals.

1.1.2 Background

The Sara Khula Valley lies in the north-west of Quetta city and is vulnerable to flash floods during heavy rainfall events, causing damage to life, property, and agricultural land. Historically, rain and flood water in the area flowed unutilized, resulting in lost opportunities for groundwater recharge. The project aimed to harness this potential by constructing a delay action dam to store flood water temporarily, allowing percolation and recharge of the groundwater aquifer while mitigating flood risks.

1.1.3 Role of the Project

The primary role of the Delay Action Dam Sara Khula Project was to controls and conserve rain-water and encourage groundwater recharge through controlled percolation. By improving water availability, the project was expected to support agricultural productivity, stabilize livelihoods of farming households, and contribute to improved socio-economic conditions in the project area.

2.1 OVERVIEW

2.1.1 Brief Description of the Project

The Kach Delay Action Dam, Sara Khula Area, 22 km from Quetta, was constructed during FY 2019–20 by the Irrigation Department, Government of Balochistan, at an estimated cost of Rs. 250 million under PSDP No. 1150, with capacity of 650 Acre Feet, catchment area of 26,880 Acres and command area of 4000 Acres.

2.1.2 Project Objectives and deliverables

As outlined in the approved PC-I, the project objectives were to:

- Control and store rain and floodwater for recharge of the groundwater aquifer to support irrigation and drinking water needs.
- Protect life and property of downstream communities from likely flood threats.
- Bring 1,000 acres of fertile land under cultivation and benefit 150 farm families.
- Supplement 65 tube wells in the area by improving and recharging the groundwater aquifer.

The project deliverables are as follows:

- 1000 Acres Land would be Cultivated
- 150 Families would be Benefited

3.1 AUDIT OBJECTIVES

"To determine what impact the Delay Action Dam Sara Khula Area District Quetta had on the targeted population in terms of making the land cultivable and benefiting farm families in the area."

In order to assess the impact on the target population, both with and without the intervention, audit further strived:

- To assess the effectiveness of the intervention in terms of achieving the desired objectives.
- To identify gaps and areas for improvement in future efforts regarding water storage and provision.
- To assess whether the impact on the target population is attributable to the intervention as compared to that of rival causes.

4.1 AUDIT SCOPE AND METHODOLOGY

4.1.1 Scope:

The scope of the Impact Audit was confined to evaluating the outcomes and impacts of the Delay Action Dam Sara Khula Project (completed in 2020-21) in relation to its stated objectives. The audit covered:

- Assessment of project impacts on groundwater recharge, agricultural land cultivation, and beneficiary farm families.
- Evaluation of flood protection benefits provided to the local population.
- Comparison of pre-project (2018-19) and post-project (2021-22) conditions to assess changes attributable to the intervention.
- Review of project implementation and outputs as envisaged in the approved PC-I.
- An assessment of rival causes and control variables, if any.

4.1.2 Methodology

The Impact Audit adopted a mixed-methods evaluation approach combining quantitative and qualitative techniques to assess the outcomes and impacts of the Delay Action Dam Sara Khula Project. The methodology was

designed in line with impact audit practices and took into account data availability constraints and circumstantial factors. The key elements of the methodology included:

- Use of an impact logic framework linking project inputs and outputs with intended outcomes and long-term impacts as envisaged in the PC-I.
- Application of a time-series analysis approach by comparing selected indicators for the pre-intervention period (2018-19) with the post-intervention period (2021-22).
- Adoption of a "with and without comparison" condition, where feasible, to assess changes attributable to the project intervention.
- Reliance on primary and secondary data sources, including administrative records, beneficiary feedback, and field observations.
- Consideration of rival causes and external factors such as rainfall variability, alternative water sources, and other development interventions while attributing observed impacts. However, keeping in mind the situation and contribution of the project, there is no rival cause or variable, except the Sra Ghurhgai Dam downstream, which was assessed at the time of planning this audit. However, at the time of Verification, the reservoir was found dry due to heavy siltation and accumulation of debris over time, since this dam is too old, and downstream, as evidenced by the survey results and as detailed in the **Physical Verification Report at Annexure 1.1**, therefore, it's impact on the area between the two dams was negligible.

4.1.3 Techniques Employed

To operationalize the above methodology, the following audit techniques were employed:

- **Documentary Review:** Examination of PC-I, project files, completion reports, drawings, and departmental records.
- **Joint Physical Verification:** Physical verification of the dam structure, spillway, intake arrangements, and ancillary works to assess functionality and utilization.

- **Surveys and Questionnaires[1]:** Collection of primary data from beneficiaries and local residents through questionnaires to assess changes in water availability, agricultural practices, and flood impacts. The sample based on 50 beneficiaries was selected using Simple Random Sampling method. The questionnaire contained both structured and unstructured questions.
- **Interviews and Discussions:** Meetings and informal discussions with officials of the Irrigation Department, local leaders, and community members.
- **Observation:** On-site observation of water storage, recharge patterns, and downstream conditions during and after rainfall events, where possible.
- **Data Triangulation:** Cross-validation of information obtained from documents, field evidence, and stakeholder feedback to enhance reliability of audit findings.

5.1 AUDIT FINDINGS

Audit, besides assessing the overall impact of the project on the target population, also evaluated the impact of project on the target population regarding each deliverable, which is summarized in the following table, and elaborated in the subsequent pages:

[1] Impact Audit Questionnaire "Construction of Kach Delay Action Dam Srakhula Area District, Quetta" (Annexure 1.3)

Impact Audit Matrix of Srakhula Dam

Para	Observation	Condition Without[2]	Condition With[3]	Impact
5.1.1	**Groundwater recharge and water availability**	Acute scarcity; springs dried; Groundwater at 1,000 ft; Abandoned land; High irrigation costs.	Stored water/recharge confirmed; Water level raised to 800 ft.	Core recharge achieved; partial irrigation revival (200 Acres; Subsidies are required for tube wells[4].
5.1.2	**Flood mitigation**	Vulnerable to flash floods; damage to land/roads/homes; displacement risk.	Dam operational; reduced 2024 flood intensity; no major damage/evacuation.	Largely achieved;
5.1.3	**Agricultural activity and livelihoods**	Water scarcity; Groundwater at 1,000 ft; 1,800 acre barren land	200 acres cultivated against planned 1,000; High costs limit cultivation.	Moderate: Only 20% of 1,000-acre target; Only vegetable cultivation.
5.1.4	**Drinking and domestic water supply**	Scarcity; Reliance on expensive/ unreliable deep wells; Seasonal spring flow used locally	Spring flow used locally; WASA system unchanged; No new tube wells installed.	Moderate: Benefits to the extent of Spring Flow are attributable the project.

[2] PC-I of the Project

[3] Results of Audit Survey/ questionnaires.

[4] Ibid.

Para	Observation	Condition Without[2]	Condition With[3]	Impact
5.1.5	**Projected economic benefits and EIRR**	Scarcity hit agriculture; Projected GPV Rs. 5.351M / year; EIRR 21.63%.	Partial realization; 200 acres increase; Actual GPV: Rs. 1.178M/year.	Moderate: Only 22% (1.178/5.351) achieved.

5.1.1 Groundwater recharge and water availability

Condition without: Prior to the intervention, the Sra Khula area was experiencing acute water scarcity. Perennial springs had largely dried up, and the groundwater table had declined to depths of approximately 1,000[5] feet. As a result, farmers were compelled to rely on deep electric tube wells, substantially increasing irrigation costs. Due to the high cost of boring and electricity, a significant portion of agricultural land was abandoned, leading to reduced cropping intensity and loss of livelihoods.

Condition with: Post-construction physical survey, interviews and results of questionnaires, confirmed the presence of stored water in the reservoir and evidence of groundwater recharge through controlled percolation from 1000 ft to 800ft[6].

Impact: Audit assessed that the core hydrological objective of groundwater recharge has been achieved. However, the translation of recharge benefits into affordable irrigation and agricultural revival has been only partially achieved. While 200 acres out of target 1,000 acres were brought under cultivation[7].

[5] Source: Field Survey and Physical Verification – Annexure 1.1.

[6] A process where a fluid moves through porous material or connections form in a system, widely used in engineering drainage (managing water flow)

[7] Based on data obtained during Audit Survey.

5.1.2 Flood mitigation

Condition without: Prior to implementation of the project, the downstream areas of Sara Khula and adjoining settlements were highly vulnerable to flash floods during intense rainfall events. Questionnaire responses and local stakeholder consultations indicated that floodwater previously flowed unchecked through natural drainage channels, causing recurrent damage to agricultural land, access roads, boundary walls, and residential structures.

Condition with: Post-construction physical verification confirmed that the delay action dam is operational and effectively mitigates peak flood flows by temporarily storing runoff and releasing it in a controlled manner. During the field visit, the dam reservoir was observed to be functional, and the spillway was found in serviceable condition. Questionnaire feedback and discussions with residents of the area revealed that downstream flood intensity was significantly reduced. No major structural damage to settlements or agricultural land was reported, and importantly, no migration or evacuation of the local population was observed, indicating enhanced flood resilience of the area. The comparison is given in Figure 1.1:

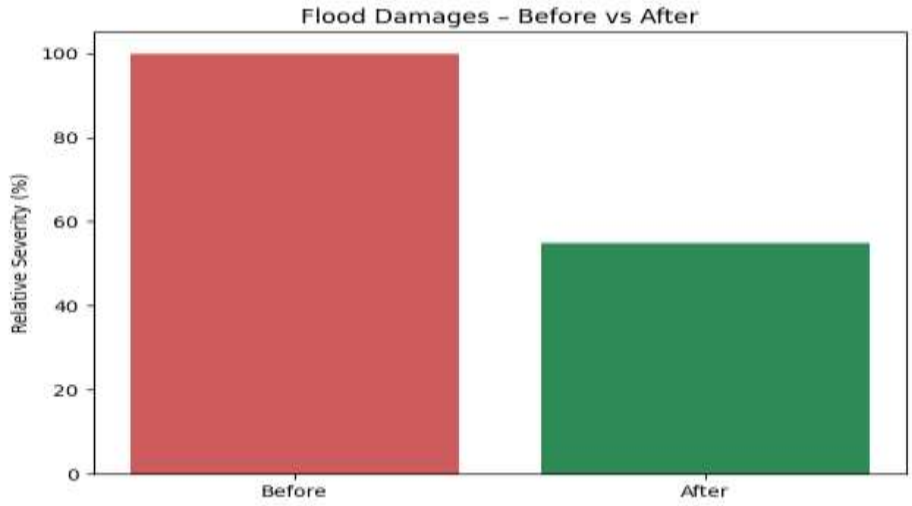


Figure 1.1

Impact: Audit assessed that the flood mitigation objective of the project was largely achieved, as evidenced by moderated flood peaks, reduced flood

damage, and improved safety of downstream communities during recent high-rainfall events.

5.1.3 Agricultural activity and livelihoods

Condition without: Before construction of the Sra Khula Dam, persistent water scarcity caused by reduced rainfall and depletion of perennial spring sources led to a severe decline in agricultural activity in the command area. Consequently, large tracts of agricultural land became barren, and many landowners either abandoned farming or converted agricultural land into residential and commercial plots, adversely affecting agricultural livelihoods

Condition with: As per PC-I, the total command area of the project was estimated at 4,000–4,500 acres. However, due to pre-existing urbanization trends, only about 1,800 acres remained available for agriculture at the time of project implementation. The project was able to bring 200 out of target 1,000 acres of land under cultivation. During physical verification, cultivation was limited to vegetables and small orchards. The reason for non-achievement of the target include high cost of drilling water. A comparison of targeted, baseline, achievement and short fall is elaborated in Figure-2.2.

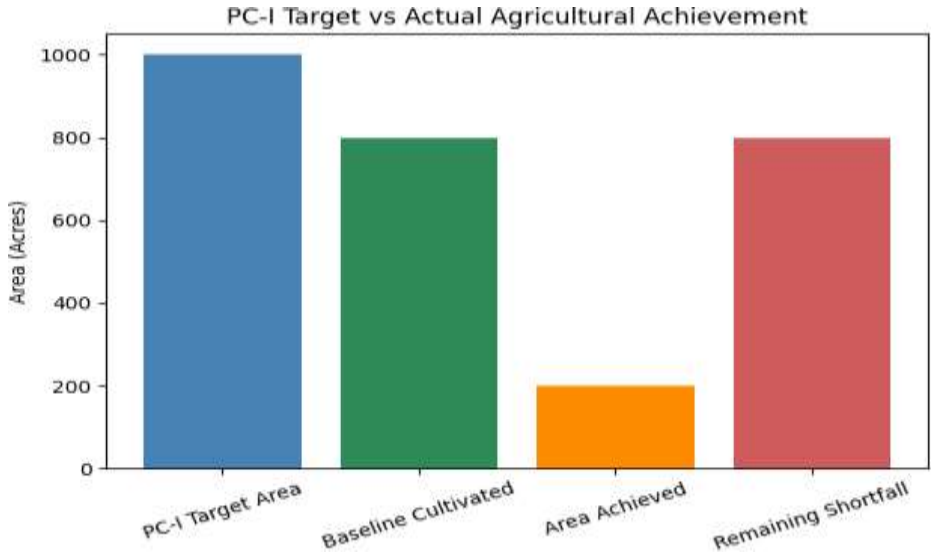


Figure 2.2 PC-I Target Vs Achieved

Impact: Audit assessed that the agricultural and livelihood objectives of the project were not achieved and fell short of PC-I targets. Against the project objective of irrigating the remaining 1,000 acres of available agricultural land, only 200 acres (20%) were actually brought under cultivation, as detailed in Annexure 1.1 (Physical verification).

5.1.4 Drinking and domestic water supply

Condition without: Before the intervention, households reported recurring drinking water scarcity and relied on the existing supply arrangements and natural sources. Field records indicate that prolonged drought and groundwater depletion during 2017-18 to 2018-19 increased reliance on deep tube wells, which became increasingly expensive and unreliable for domestic use.

Condition with: During the physical verification, audit observed continuous inflow from a perennial spring upstream of the Srakhula dam system. Residents along the spring channel were using this flow for domestic and drinking purposes, including extraction through solar-powered pumps. However, the potable water supply arrangement serving the wider area was found to be operated by WASA Quetta through its filtration and distribution system, fed by WASA-owned tube wells located outside the dam command area.

Impact: Audit assessed that drinking and domestic water supply benefits are not directly attributable to the Sra Khula dam project, as none of the envisaged tubewells for water supply were observed in the command area of the dam.

5.1.5 Projected economic benefits and EIRR

Condition without: Following the collapse of the upstream dam in the 1980s, the area had no reliable water storage source except the Sra Ghurhgai Dam, which later became silt-filled. Persistent water scarcity adversely impacted agriculture-based economic activity (cultivation, harvesting, and related livelihoods).

Condition with: The PC-I envisaged substantial economic gains through expansion of cultivated area, enhanced crop production, and improved farm incomes. Based on cropping intensity and profitability, the total projected net value of agricultural production was Rs. 5.351 million per year, with an Economic Internal Rate of Return (EIRR) of 21.63% based on cultivation of 1000 acres of land, as detailed below. However, the project was able to bring 200 Acres of land under cultivation, based on which NPV of Rs. 1.178 million could be achieved, as summarized below and **detailed in Annexure 1.2**:

PC I-Targeted Economic Benefits

Crop	Area Before (Acres)	Area After (Acres)	Increase (Acres)	Expected GPV (Rs. M)	Net Value /Year (Rs. M)
Wheat	35	650	615	4.92	3.567
Vegetables	9	97	88	0.616	0.44
Onion	110	163	53	0.424	0.355
Watermelon	25	182	157	1.177	0.989
Total	**179**	**1092**	**913**		**5.351**

Total projected net value of production per year (PC-I): Rs. 5.351 million.

Impact: Audit assessed that the projected economic benefits have not been realized so far to the extent envisaged in the PC-I. The economic projections were premised on assumptions such as substantial command area utilization, broad-based groundwater recharge translating into affordable irrigation access, and large-scale cropping expansion. Field verification indicates that these enabling conditions were only partially achieved, as illustrated by **Figures 1.3.**

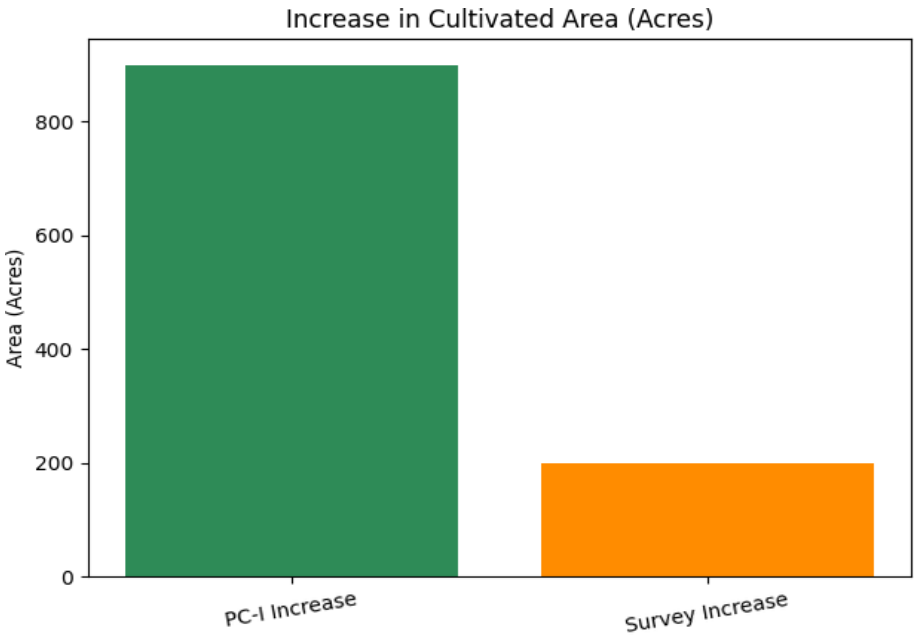


Figure 1.3(a)

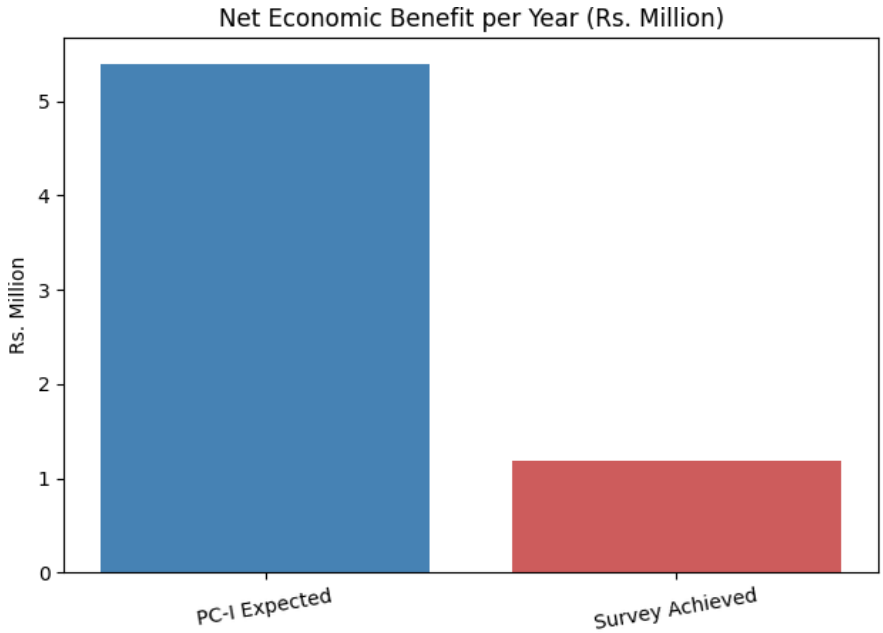


Figure 1.3(b).

6.1 SUMMARY OF DISCUSSION WITH MANAGEMENT / AUDITEE

The Department was requested in December 2025 to submit reply and convene DAC meeting. In reply, management stated that the Srakhula Delay Action Dam was designed mainly for flood moderation and groundwater recharge, and these core objectives were achieved. The project ensured to control flooding during the 2024 rainfall and improvement in groundwater levels from about 1,000 feet to around 800 feet. However, the broader irrigation, agricultural, drinking water, and economic benefits projected in the PC-I could not be fully realized due to factors beyond the Irrigation Department's control, including prior urbanization of the command area, farmers' inability to install tube wells because of high boring and electricity costs, and WASA Quetta's mandate over potable water supply. Further, no DAC meeting was held despite repeated requests till the finalization of this audit.

7.1 CONCLUSION

Audit concludes that the Kach Delay Action Dam, Sra Khula Area, has largely achieved its primary hydrological and flood mitigation objectives, as evident by controlled flood flows and marginal improvement in groundwater recharge. However, the intended outcomes envisaged in the approved PC-I relating to agricultural development, livelihood enhancement, drinking water supply, and realization of projected economic benefits have not been achieved to the extent planned**.** Despite observable recharge, the absence of complementary irrigation infrastructure, non- installation of planned tube wells, high groundwater abstraction and energy costs, and substantial land-use conversion within the command area significantly constrained utilization of the recharged resource. Consequently, the project's environmental and protective benefits are evident, whereas its socio-economic impacts remain limited, and the projected EIRR could not be realized under prevailing ground conditions. The impact of rival cause, the Sra Ghurhgai Dam downstream, being negligible,

was nullified, since the dam was silted, and had no major role in the post-intervention era.

Following are the audit recommendations:

- The Irrigation Department may, in coordination with relevant line departments, initiate complementary measures to enable effective utilization of recharged groundwater, including cost-effective pumping solutions and energy-efficient irrigation options.
- The Department may review the non-achievement of the PC-I target of supplementing 65 tube wells and ensure that future water recharge projects incorporate realistic, implementable, and clearly assigned responsibilities for irrigation infrastructure.
- To enhance livelihood impacts, the Department may consider integrating agricultural support interventions such as extension services, crop diversification guidance, and water- efficient farming practices alongside recharge infrastructure.
- The Department may clearly align drinking water objectives with the responsible agency (WASA or otherwise) in future planning, to avoid attribution of outcomes to projects lacking direct drinking water supply components.
- For future projects, the Planning & Development Department may ensure that economic analyses, including EIRR calculations, are based on conservative, field-validated assumptions, explicitly accounting for energy costs, farmer affordability, and land-use dynamics.
- The Department may institutionalize a post-completion monitoring mechanism to periodically assess groundwater levels, cultivated area, and livelihood indicators, and share the results with audit for verification of sustained impacts.

ACKNOWLEDGMENT

The Director General Audit, Balochistan wishes to express his appreciation to the management and staff of Project, as well as the residents of the Sra Ghurgai area, District Quetta, for the assistance and cooperation extended to the audit team during the Impact Audit assignment.

ANNEXURES

Annexure 1.1

JOINT PHYSICAL VERIFICATION REPORT

Name of Auditee Office: Executive Engineer, Irrigation Division, Quetta
Date of Visit: 03.12.2025

1. Kach Delay Action Dam, Sra Khula Area, District Quetta

The Kach Delay Action Dam (Srakhula) is an earthen dam structure situated approximately 16 km southeast of Quetta City. The dam was constructed during the financial year 2019–20 at an estimated cost of Rs. 250 million. As per the approved PC-I, the dam has a designed storage capacity of 650 acre-feet and was envisaged primarily as a delay action dam to control flash floods, store flood runoff, and enhance groundwater recharge through controlled percolation. During the physical Verification, continuous inflow from a perennial spring originating upstream was observed entering the reservoir. The water channel was seen passing through the populated locality of Sraghurgai, where residents were utilizing the flow for domestic and drinking purposes. The intake tower of the dam was found completely submerged, indicating a satisfactory water level at the time of visit. Minor repair and maintenance works were observed at the spillway, including cleaning and patch repairs, which indicate routine upkeep of the structure.

No tube wells were observed between the Sraghurgai settlement and the Srakhula Dam. As clarified by the Sub-Divisional Officer (SDO), no piezometers were installed at the dam site due to its small scale. Hydrological inflows to the dam consist of perennial spring discharge and seasonal flood flows. Overall, the dam structure was found physically intact and operational, fulfilling its intended hydrological function.

2. Check Dam (Upstream of Kach Delay Action Dam, Srakhula Area)

The upstream check dam is an earthen structure located approximately 2 km upstream on the left side of the Kach Delay Action Dam. This dam was constructed during the financial year 2022–23 at an estimated cost of Rs. 89.119 million. As per PC-I provisions, the check dam has a designed storage capacity of 154 acre-feet and serves as a regulating structure to reduce sediment inflow, attenuate peak flood discharge, and enhance water conservation efficiency for downstream reservoirs.

During Verification, perennial spring flow was observed along the access route and entering the reservoir. The intake tower was found partially submerged,

indicating the presence of stored water. No tube wells were observed between this check dam and the downstream Kach Delay Action Dam. A small settlement of approximately 20 households exists near the dam site, where residents were observed using solar-powered pumps to extract spring water for domestic needs. The dam receives inflows from perennial spring discharge and seasonal flood events. Visual Verification revealed no signs of seepage, slope instability, settlement, or cracking. The overall physical condition of the dam was found satisfactory, and the structure appeared capable of performing its intended regulating function.

3. Sraghurgai Dam, District Quetta

Sraghurgai Dam is an earthen reservoir constructed approximately two decades ago and is located about 14 km from Quetta City, downstream of both Srakhula and Kach Delay Action Dams, thereby forming part of a cascade system. Historically, the dam had a designed storage capacity of 310 acre-feet. However, at the time of Verification, the reservoir was found dry due to heavy siltation and accumulation of debris over time. Extensive desilting works are currently in progress at an estimated cost of Rs. 250 million, with the objective of restoring the original storage capacity, improving flood moderation, and enhancing groundwater recharge potential in the downstream command area. Several private tube wells were observed in the vicinity, which may be contributing to groundwater abstraction. The embankment slopes were found covered with moderate vegetation growth, while the downstream toe exhibited no visible distress, seepage, or erosion. Given its downstream position, the dam plays a crucial role in flood attenuation. Completion of desilting works is expected to restore its functional efficiency and hydrological benefits.

4. Command Area Impact Assessment – Srakhula Dam

According to project records, the command area of Srakhula Dam was estimated at approximately 4,000–4,500 acres. During the field visit, it was physically verified that the command area is situated at a distance of about 12 kilometers downstream of the dam. Land-use assessment revealed a significant deviation from the originally envisaged agricultural character of the area.

Audit observed that over 60% of the total command area has been converted into built-up settlements, including residential housing, commercial establishments, government buildings, and local markets. The remaining approximately 40% of the area (around 1,800 acres) comprises land classified as agricultural.

Further physical verification established that out of the 1,800 acres of agricultural land, only about 800 acres were under active cultivation, while approximately 1,000 acres remained barren, despite the PC-I envisaging conversion of the entire command area into a productive agricultural zone. Local landowners reported that nearly a decade earlier, more than 2,000 acres were under cultivation, with gardening and orchard farming constituting the principal sources of livelihood. The decline in agricultural activity was primarily attributed to reduced rainfall and prolonged drought conditions, which resulted in the depletion of perennial spring water sources. Consequently, farmers increasingly relied on electric tube wells for irrigation. However, continuous groundwater abstraction coupled with drought led to a sharp decline in the groundwater table, reportedly reaching depths of up to 1,000 feet during 2017–18 and 2018–19. This situation rendered irrigation economically unsustainable, resulting in widespread abandonment of agricultural land. Many landowners either sold their land at low prices or converted agricultural holdings into residential and commercial plots.
Following the construction of Srakhula Dam, a partial improvement in groundwater recharge was reported. The groundwater table was stated to have improved to approximately 800 feet, which contributed to an increase of around 200 acres in cultivated land, raising the cultivated area from 800 acres to about 1,000 acres. However, this improvement remained substantially below the PC-I targets. Audit noted that the majority of farmers were unable to capitalize on the improved groundwater conditions due to the high cost of tube well boring and expensive electricity tariffs, which continued to make groundwater abstraction financially unviable.

During physical verification, no wheat cultivation was observed anywhere within the command area. Agricultural activity was limited to small-scale vegetable cultivation and minor fruit orchards. Overall, agricultural operations remained marginal, indicating that the intended irrigation, agricultural revival, and livelihood enhancement objectives of the project have not been fully achieved.

On the positive side, audit observed a notable impact in terms of flood mitigation. During the heavy floods of 2024, it was reported that flood-related damages were significantly curtailed due to the presence of the dam, and no displacement or migration of the local population occurred, demonstrating the dam’s effectiveness in mitigating flood risks.

Regarding drinking water supply, audit observed that potable water is being provided by WASA Quetta through a filtration and distribution system with a surface reservoir capacity of 200,000 gallons. The system is supplied through tube wells owned and operated by WASA, which are located outside the dam command area. No tube well installed by the Irrigation Department was found within the command area, indicating that Srakhula Dam has not been utilized as a direct source for drinking water supply, contrary to broader water resource development expectations.

Conclusion

Audit concludes that while Srakhula Dam has yielded positive outcomes in flood mitigation and limited groundwater recharge, the core PC-I objectives of agricultural development and livelihood enhancement have been only partially realized. High irrigation costs, escalating energy tariffs, and extensive land-use conversion have significantly constrained the achievement of the intended project impacts.

Recommendations

1. Ensure regular physical Verification and preventive maintenance of all dam structures.
2. Expedite completion of desilting works at Sraghurgai Dam to restore its storage and recharge capacity.
3. Explore cost-effective and sustainable solutions for groundwater utilization to enhance agricultural benefits.
4. Strengthen coordination with local communities to prevent encroachments within the command area.
5. Maintain updated photographic and documentary records for future impact assessments.

Note: The Field Audit Team visited the site in the presence of the concerned Executive Engineer/SDO. The audit team verified only the existence and physical status of the works/schemes. The responsibility for ensuring the quality, quantity, and technical specifications of the executed work rests with the concerned Executive Engineer.

SD	**SD**
Field Audit Team	**Executive Engineer**
Dated	**Dated**

The pictures show Dam body, perineal flow and command area







Annexure 1.2

Net economic benefit of the project

Crop		A	Wheat	Vegetables	Onion	Watermelon	Total
Area Before (Acres)		B	35	300	250	215	800
Area to be increased as per PC-I After (Acres)		C	615	88	53	157	913
Total Area Should be (Acres)		D = B + C	650	388	303	372	1713
Area as per Physical Survey (Acres)		E	20	400	350	230	1000
Actual Area Increased (Acres)		F = E - B	-15	100	100	15	200
Approx. Yield as per PC-I (Kg/Acres)		G	1000	1000	1000	1500	
Expected Production (M. Ton)		H = F x G/ 1000000	-15	100	100	22.5	
Price as per PC-I Rs. P/Ton		I	8000	7000	8000	5000	
Actual Gross Production Value (GPV) Rs. in Million		J = H x I/ 1000000	-0.120	0.700	0.800	0.113	
Farm Production Expenses as per PC-I	**Rs. per Acre**	K	2200	2000	1300	1200	
	Rs. in Million	L = F x K/ 1000000	-0.033	0.2	0.13	0.018	
Net Value of Production per Year as per PC-I		M	3.567	0.44	0.355	0.989	5.351
Net Value of Production per Year as per Survey		N = J - L	-0.087	0.500	0.670	0.095	1.178
Variation in Target Achievement		O = M - N	3.654	-0.060	-0.315	0.895	4.174

Annexure 1.3

QUESTIONNAIRE

IMPACT AUDIT QUESTIONNAIRE

Impact Audit of Construction of Kach Delay Action Dam Srakhula Area District, Quetta

This valuable input from local citizens from the targeted population of your area has great importance in terms of useful contribution towards better understanding of role and impact of Dam Construction Project. Your active participation is always welcome for making the audit process more effective. This office is very grateful for this engagement of the citizens as a direct beneficiary of the Project.

Note: Please tick the relevant column and attach extra sheets where needed.

Section A — Respondent Profile

1. **Name:**

   _____

   _____

2. **Father/Husband Name:**

   _____

3. **Gender:**

   _____

4. **Age:**

   _____

5. **Occupation:**

   _____

6. **Residing in the area since (Year):**

   _____

7. **CNIC** (optional):

   _____

Section B — Water Availability (Household & Farming)

1. Main source of drinking water **before the dam** (2018–19):

   ☐ Govt. tube well

   ☐ Private tanker

   ☐ Personal well

   ☐ Other: _____

2. Main source **after the dam** (2021–22):

   ☐ Govt. tube well

   ☐ Private tanker

   ☐ Personal well

   ☐ Other: _____

3. Average **monthly spending on drinking water**
   - Before the dam: Rs. _____
   - After the dam: Rs. _____

Section C -- Groundwater Levels

4. Depth of your well / tube well (if applicable):
   - Before dam (approx.): _____ ft
   - After dam (approx.): _____ ft
5. Has groundwater availability improved after the dam?

   ☐ Yes

☐ No

☐ No change

If yes, describe how: _____

Section D — Agriculture and Livelihood

6. Crops grown before the dam (2018–19): _____
7. Crops grown after the dam (2021–22): _____
8. Annual farm income:
    - Before the dam: _____ Rs
    - After the dam: _____ Rs
9. Did water scarcity previously cause land to remain uncultivated?

    ☐ Yes ☐ No

    If yes, area left uncultivated (acres): _____
10. Area cultivated after dam: _____ acres
11. Have crop yields increased?

    ☐ Yes ☐ No ☐ No change

    If yes, by approximately:

    ☐ <10% ☐ 10–25% ☐ 25–50% ☐ >50%

Section E — Flood and Safety Outcomes

12. Did floods damage your property before the dam?

    ☐ Yes ☐ No

    If yes, describe: _____
13. Have flood-related damages decreased after the construction of the dam?

    ☐ Yes ☐ No ☐ Not sure

14. Did your family migrate seasonally during rainy years?

- Before dam: ☐ Yes ☐ No
- After dam: ☐ Yes ☐ No

Section F — Tube Wells and Water Infrastructure

15. Was the number of functioning tube wells sufficient before the dam?

    ☐ Yes ☐ No

16. Have new tube wells been installed in your locality after the dam?

    ☐ Yes ☐ No

    If yes, how many (approx.)? _____

17. Has drinking water supply become more reliable after the dam?

    ☐ Yes ☐ No ☐ No change

Section G — Socioeconomic Impact

18. Has the project improved your household's overall well-being?

    ☐ Yes ☐ No ☐ Somewhat

    Please briefly explain: _____

19. Have new livelihood opportunities emerged after increased water availability?

    ☐ Yes ☐ No

    If yes, specify: _____

20. Has agricultural profitability improved?

    ☐ Yes ☐ No ☐ Don't know

Section H — Community Perception & Sustainability

21. Are you satisfied with the operation and maintenance of the dam?

☐ Yes ☐ No ☐ Somewhat

22. Have you observed any issues with the dam structure or water channels?

☐ Yes ☐ No

If yes, describe:

_____

_

_____

_

Impact Audit Questionnaire - Graded Opinion Scale						
Response Scale:						
SD = Strongly Disagree D = Disagree N = Neutral A = Agree SA = Strongly Agree						
Note: Please tick the relevant column and attach extra sheets where needed.						
Q. No.	**Question/ Statement**	**SD**	**D**	**N**	**A**	**SA**
		1	**2**	**3**	**4**	**5**
Section-I - Construction of Dam with respect to ground water recharge						
1	The project aimed to recharge the rapidly depleting under groundwater table.					
2	Underground water table was depleting before and during the financial years 2017-18 and 2018-19.					
3	Construction of the dam has increased underground water levels after 2020-21 and 2021-22.					

Section-II - Construction of Dam with respect to safety of papulation from floods						
4	Before 2017-18 and 2018-19, floods caused severe damage to houses in the areas of Srakhula and Sraghurgai.					
5	Before 2017-18 and 2018-19, residents of Srakhula and Sraghurgai often migrated during rainy seasons.					
6	During 2020-21 and 2021-22, flood-related damages have reduced as a result of construction of the dam.					
7	During 2020-21 and 2021-22, seasonal migration has stopped after construction of the dam.					
Section-III - Construction of Dam with respect to installation of new tube wells						
8	Before 2017-18 and 2018-19, existing tube wells provided sufficient drinking water.					
9	During 2020-21 and 2021-22, new tube wells have been installed in the area after construction of the dam.					
10	Newly installed tube wells provide sufficient drinking water to the population.					
Section-IV - Construction of Dam with respect to agriculture activities						
11	Many fruit gardens and farms existed in the area during 2017–18 and 2018–19.					
12	These fruit gardens and farms were productive during 2017–18 and 2018–19.					
13	There was sufficient water for agriculture before 2017–18 and 2018–19.					
14	Gardens and farms dried due to lack or limited availability of water during 2017–18 and 2018–19.					

15	During 2020-21 and 2021-22, fruit gardens and farms became productive again as a result of construction of dam.					
16	Gardens and farms now receive more water for agriculture.					
Section-V - Construction of Dam with respect to economic growth						
17	Farmers earned a reasonable income from agriculture in 2017–18 and 2018–19.					
18	Construction of the dam has protected agricultural lands and increased farming activity.					
19	Increased cultivation has led to higher crop production and improved agricultural income.					

ثمرات آڈٹ سوالنامہ

کچھ ڈیلے ایکشن ڈیم سرہ خولہ ایریا ڈسٹرکٹ، کوئٹہ کی تعمیر کا امپیکٹ آڈٹ

آپ کے علاقے کی ہدف شدہ آبادی کے مقامی شہریوں کی طرف سے یہ قیمتی رائے ڈیم کی تعمیر کے منصوبے کے کردار اور اثرات کو بہتر طور پر سمجھنے کے لیے مفید شراکت کے لحاظ سے بہت اہمیت رکھتا ہے۔ آڈٹ کے عمل کو مزید موثر بنانے کے لیے آپ کی فعال شرکت ہمیشہ خوش آئند ہے۔ یہ دفتر پراجیکٹ سے براہ راست مستفید ہونے والے شہریوں کی اس مصروفیت کے لیے بہت مشکور ہے۔

نوٹ براہ کرم متعلقہ کالم پر نشان لگائیں اور جہاں ضرورت ہو اضافی شیٹس منسلک کریں۔

سیکشن - A جواب دندہ کی تفصیلات

1- نام_____

2- والد / شوہر کا نام:_____

3- جنس_____

4- عمر_____

5- پیشہ_____

6- اس علاقے میں (سال سے مقیم ہیں):_____

7- شناختی کارڈ نمبر(اختیاری): _____

سیکشن - B پانی کی دستیابی (برائے گھریلو استعمال اور کاشتکاری)

1- پینے کے پانی کا بنیادی ذریعہ ڈیم سے پہلے(2018-19):

حکومتی ٹیوب ویل ☐ پرائیویٹ ٹینکر☐ ذاتی کنواں☐ دیگر☐

2- بنیادی ذریعہ ڈیم کے بعد (2021-22):

حکومتی ٹیوب ویل ☐ پرائیویٹ ٹینکر☐ ذاتی کنواں☐ دیگر☐

3- اوسط پینے کے پانی پر ماہانہ خرچ:

ڈیم سے پہلے:---------- روپے ڈیم کے بعد:---------- روپے

سیکشن – C زمینی پانی کی سطح

4- آپ کے کنویں/ ٹیوب ویل کی گہرائی:

ڈیم سے پہلے (تقریبا): ----------فٹ ڈیم کے بعد (تقریبا) : ----------فٹ

5- کیا ڈیم کے بعد زمینی پانی کی دستیابی میں بہتری آئی ہے؟

جی ہاں: ☐ جی نہیں: ☐ کوئی تبدیلی نہیں☐

اگر ہاں، تو بیان کریں کہ کیسے: ----------

سیکشن- D زراعت اور ذریعہ معاش

6- ڈیم سے پہلے اگائی گئی فصلیں (2018-19): ----------

7- ڈیم کے بعد اگنے والی فصلیں (2021-22): ----------

8- سالانہ زرعی آمدنی

ڈیم سے پہلے:---------- روپے ڈیم کے بعد:---------- روپے

9- کیا پہلے پانی کی کمی کی وجہ سے زمین بنجر ہوتی تھی؟

جی ہاں☐ جی نہیں☐ اگر ہاں، رقبہ بنجر زمین---------- (ایکڑ).

10- ڈیم کے بعدکاشت شدہ رقبہ----------(ایکڑ)

11- کیا فصل کی پیداوار میں اضافہ ہوا ہے؟

جی ہاں☐ جی نہیں☐ کوئی تبدیلی نہیں☐

اگر ہاں، تو تقریبا50% ☐<%50-25 ☐ %25-10 ☐ 10%>☐

سیکشن E - سیلاب اور حفاظتی نتائج

12- کیا ڈیم سے پہلے سیلاب نے آپ کی املاک کو نقصان پہنچایا؟

جی ہاں☐ جی نہیں☐

اگر ہاں تو بیان کریں ----------

13- کیا ڈیم کی تعمیر کے بعد سیلاب سے ہونے والے نقصانات میں کمی آئی ہے؟

جی ہاں☐ جی نہیں☐ یقین نہیں☐

14- کیا آپ کے خاندان نے بارش کے موسم میں عارضی طور پر نقل مکانی کی؟

ڈیم سے پہلے جی ہاں☐ جی نہیں☐

ڈیم کے بعد جی ہاں☐ جی نہیں☐

سیکشن F - ٹیوب ویلز اور واٹر انفراسٹرکچر

15- کیا ڈیم سے پہلے کام کرنے والے ٹیوب ویلوں کی تعداد کافی تھی؟

جی ہاں☐ جی نہیں☐

16- کیا ڈیم کے بعد آپ کے علاقے میں نئے ٹیوب ویل لگائے گئے ہیں؟

جی ہاں☐ جی نہیں☐

اگر ہاں تو کتنے (تقریبا)؟ ----------

17- کیا ڈیم کے بعد پینے کے پانی کی فراہمی زیادہ قابل اعتماد ہو گئی ہے؟

جی ہاں☐ جی نہیں☐ کوئی تبدیلی نہیں☐

سیکشن G - سماجی اقتصادی اثر

18- کیا پراجیکٹ نے آپ کے گھر کی مجموعی بہبود کو بہتر بنایا ہے؟

جی ہاں☐ جی نہیں☐ کسی حد تک☐

براہ کرم مختصر طور پر وضاحت کریں----------

19- کیا پانی کی دستیابی میں اضافے کے بعد معاش کے نئے مواقع پیدا ہوئے ہیں؟

جی ہاں☐ جی نہیں☐

اگرہاں تو وضاحت کریں----------

20- کیا زرعی منافع میں بہتری آئی ہے؟

جی ہاں☐ جی نہیں☐ نہیں معلوم☐

سیکشن H - کمیونٹی کا ادراک

21- کیا آپ ڈیم کے آپریشن اور دیکھ بھال سے مطمئن ہیں؟

جی ہاں☐ جی نہیں☐ کسی حد تک☐

22- کیا آپ نے ڈیم کے ڈھانچے یا واٹر چینلز کے ساتھ کوئی مسئلہ دیکھا ہے؟

جی ہاں☐ جی نہیں☐

اگرہاں تو بیان کریں----------

امپیکٹ آڈٹ سوالنامہ - درجہ بندی شدہ رائے کا پیمانہ						
نوٹ براہ کرم متعلقہ کالم پر نشان لگائیں اور جہاں ضرورت ہو اضافی شیٹس منسلک کریں۔						
سوال نمبر	**سوال /بیان**	**بلکل اختلاف**	**اختلاف**	**غیر جانبدار**	**متفق**	**بلکل متفق**
سیکشن – I زمینی پانی کے ریچارج کے حوالے سے ڈیم کی تعمیر						
1.	اس منصوبے کا مقصد زیر زمین پانی کی تیزی سے ختم ہونے والی سطح کو بہتر کرنا تھا۔					
2.	مالی سال 18-2017 اور 19-2018 سے پہلے اور اس کے دوران زیرزمین پانی کی سطح کم ہو رہی تھی۔					
3.	21-2020 اور 22-2021 کے بعدڈیم کی تعمیر کے نتیجے میں زیر زمین پانی کی سطح میں اضافہ ہوا ہے۔					
سیکشن II - سیلاب سے آبادی کی حفاظت کے حوالے سے ڈیم کی تعمیر						
4.	18-2017 اور 19-2018 سے پہلے سیلاب نے سرہ خلہ اور سرہ غڑگئی کے علاقوں میں مکانات کو شدید نقصان پہنچایا۔					

5.	2017-18 اور 2018-19 سے پہلے ، سرہ خلہ اور سرہ غڑگئی کے باشندے اکثر برسات کے موسم میں نقل مکانی کرتے تھے۔					
6.	2020-21 اور 2021-22کے دوران ڈیم کی تعمیر کے نتیجے میں سیلاب سے ہونے والے نقصانات میں کمی آئی ہے۔					
7.	2020-21 اور 2021-22کے دوران ڈیم کی تعمیر کے بعد موسمی نقل مکانی رک گئی ہے۔					
سیکشن III - نئے ٹیوب ویلوں کی تنصیب کے حوالے سے ڈیم کی تعمیر						
8.	2017-18 اور 2018-19 سے پہلے موجودہ ٹیوب ویلوں سے وافر پانی میسر تھا۔					
9.	2020-21 اور 2021-22کے دوران ڈیم کی تعمیر کے بعد علاقے میں نئے ٹیوب ویل لگائے گئے ہیں۔					
0	نئے لگائے گئے ٹیوب ویل آبادی کو پینے کا پانی فراہم کرتے ہیں۔					
سیکشن IV - زرعی سرگرمیوں کے حوالے سے ڈیم کی تعمیر						
1	2017-18 اور 2018-19 کے دوران اس علاقے میں بہت سے پھلوں کے باغات اور فارم موجود تھے۔					
2	یہ پھلوں کے باغات اور فارم 2017-18 اور 2018-19 کے دوران پیداواری تھے۔					
3	2017-18 اور 2018-19 سے پہلے زراعت کے لیے وافر پانی میسر تھا۔					
4	2017-18 اور 2018-19 کے دوران پانی کی کمی یا محدود دستیابی کی وجہ سے باغات اور کھیت خشک ہو گئےتھے۔					
5	2020-21 اور 2021-22کے دوران ڈیم کی تعمیر کے نتیجے میں پھلوں کے باغات اور کھیت دوبارہ پیداواری ہو گئے۔					
6	باغات اور کھیتوں کو اب زراعت کے لیے زیادہ پانی میسر ہے۔					

سیکشن -V اقتصادی ترقی کے حوالے سے ڈیم کی تعمیر						
7	کسانوں نے 2017-18 اور 2018-19 کی۔					
8	ڈیم کی تعمیر سے زرعی زمینوں کی حفاظت ہوئی ہے اور کاشتکاری کی سرگرمیوں میں اضافہ ہوا ہے۔					
9	بڑھتی ہوئی کاشت سے فصلوں کی پیداوار اور زرعی آمدنی میں اضافہ ہوا ہے۔					