TERMS OF REFERENCE (TORs)
FEASIBILITY STUDY OF 30 NOS OF SMALL DAMS
IN WATER SCARCE AREAS OF SINDH PROVINCE

TABLE OF CONTENTS

LIST OF ANNEXURES

TERMS OF REFERENCE (TORs)
FEASIBILITY STUDY OF 30 NOS OF SMALL DAMS
IN WATER SCARCE AREAS OF SINDH PROVINCE

1. Introduction

The main responsibility of Sindh Irrigation Department is operation and maintenance of the irrigation, drainage, and flood protection system, regulation of flows of rivers Indus and canal system, construction of small storage and recharge dams in water scarce areas of Sindh to recharge underground fresh water aquifers, which are utilized for domestic and agricultural purposes to uplift livelihood of inhabitants. Other responsibilities of department are execution of development schemes, mega projects and dealing with administrative and financial matters.

Besides floods, Sindh province faces droughts in north-western and southern regions on recurring basis. The drought from 1998-2002 affected 1.4 million people, 5.6 million cattle head and 12.5 million acres cropped areas, triggering spread of malnutrition-based diseases in the population and food scarcity in the province due to poor overall crop production.

The province of Sindh has always been under vulnerable natural disasters i.e. floods, droughts, cyclones, heat waves, etc. because of its geo-graphical location and climatic cycles. In recent past province has faced heavy losses to public and private infrastructures, livestock, livelihood etc. worth billions of rupees. Sindh Irrigation Department also feels responsibility to fulfill agricultural and domestic water needs by managing floods and droughts through improved infrastructure in the water scarce areas.

2. Main Objective

Project Director, Sindh Resilience Project (Irrigation Component) intends to hire services of consultancy firm to carryout, “Feasibility study for construction of 30 Nos. small recharge/storage dams in water scarce areas of Kohistan, Achhro Thar and Tharparkar regions of Sindh”.

Dams shall be constructed to recharge fresh water aquifers or storage of fresh water for domestic, agriculture and livestock purposes to improve the livelihood of poor people, as well as minimize runoff and downstream of nutrient loading into rivers and water bodies.

3. Background

The construction of small dams in arid zones of Sindh were taken up by various agencies since early 1980. The Sindh Arid Zone Development Authority (SAZDA) carried out feasibility study of small dams and gabion weirs in Nagarparkar and Kohistan region in 1991. About 6 or 7 dams were constructed in Nagarparkar area at that time. Most of those got damaged with passage of time.

In the late1990s 5 small dams were constructed in Nagarparkar area by some NGOs. One of them, the Kalidas dam, got breached on its first filling and remaining four developed heavy leaks. A few dams were constructed on Malir and Thado Rivers by Sindh Irrigation Department and Karachi City Government in late nineties.

In year 2003, the Sindh Irrigation Department formed Small Dams Organization (SDO) under a Chief Engineer level Project Director with an aim to carryout design, construction and maintenance and operation of small dams in the province. Under SDO following studies were carried out for feasibility and detailed design of small dams in various parts of Sindh:

Name of Study	Year	No. of Dams Studied
Comprehensive Feasibility Study for Design and Construction of Small Dams & Detention Weirs for Leftover Potential Sites in Nagarparkar Area Including Construction of Irrigation Bund along Chhrasar Nai	2008	48
Feasibility Study for Construction of Small Dams on Nai Baran, Nai Sann, Nai Baz Khando, Nai Bandhni and Other Nais in Kirthar Range (Sindh)	2008	54
Consultancy Services for Planning and Preparation of Detailed Designs of 40 Small Dams, Recharge Dams and Vetting of Designs of 63 Detention Weirs located in Kohistan and Nagarparkar areas of Arid Zone, Sindh.	2009	50
Feasibility Study for Design and Construction of Small Dams On Nais Originating from Quba Qadir Bux and Ubhan Shah Hills In Sukkur and Khairpur Districts	2009	20
Consultancy for Surveys, Investigations, Detailed Designs, Tender Documents and PC-I of Seven (07 Dams in Kohistan Region, Sindh	2010	06

A study for feasibility of 2 number small dams (Pokhan and Injeer in central Kohistan) was also carried out by Ministry of Water and Power Islamabad under Water Sector Capacity Building and Advisory Services Project (WCAP) in 2013.

The number of small dams constructed in Sindh since 1994 todate is as under:

Regions	Number of Dams Constructed
Nagarparkar	15

Kohistan	19

The details of small dams being constructed and are under tendering process as under:

Regions	Number of Dams in progress / tendering
Nagarparkar	13
Kohistan	7
Quba Qadir Bux	5

As a part of World Bank-funded Sindh Resilience Project (SRP), in its phase-1 a total of 15 small dams shall be constructed in various parts of Sindh. These dams were selected form the feasibility studies carried out by Sindh Irrigation Department under Small Dams Organization. The list of these dams is given in Annexure-1.

The consolidated list of studies for various small dams in Sindh province is given in Annexure-2.

A number of streams and potential locations of dam sites have been identified by previous studies. The main streams and dam sites identified are listed in Annexure-3. The Consultants are encouraged to evaluate dam sites on these streams. The consultant shall carry out feasibility of cascade dams on streams where one or more dam have already been constructed and develop a ranking list for 30 dam sites for detailed feasibility study, designs and other project documentation.

4. Location of Study Area

Feasibility study is proposed to be conducted in following arid zones of Sindh:

I. **Kohistan Region**
II. **Achhro Thar Region**
III. **Tharparkar Region** (Thar and Nangarpar Regions)

The consultants may select after approval from Client the dams from previous studies which are neither constructed nor being tendered. However the updating and completion of investigations surveys, design and other aspects of feasibility study of those dams shall be responsibility of the Consultant.

5. Scope of Work

The consultants would be assigned but not restricted to the following responsibilities:

I. Collection of Data

Consultant shall collect all the primary and secondary source data available related to the study.

II. Review of Data

Consultant shall review all the data collected through previous feasibility studies, such as rainfall and stream flow data, climatic and weather data, topographic data, demographic data or any other data deemed necessary for the detailed feasibility study.

III. Investigations Surveys and Analysis

After completion of review, consultant shall devise strategy for collection of important data needed for conduction of feasibility, study for which consultant shall carry-out further investigations and additional surveys and information or data deemed necessary based on each potential site. These shall include the following:

a. Topographic surveys, Geo-technical Investigations including Geo-Seismic surveys, Hydrology studies and other studies of each proposed site which are essentially required for detail designing of a safe, technically reliable, and economically viable structure.
b. The available data shall be collected which may comprise of design features, topography, geology, land use and others. The DEM and satellites imageries shall be acquired to get the topographic and land-use features of individual catchments on selected scale and resolution. In addition, soil maps of catchment area shall also be procured. The daily rainfall and flow data of relevant rainfall and stream flow gauging stations shall be collected from the relevant agency and incorporated in the GIS system for the assignment.
c. Collection of rainfall data frequency, Run-off data (A-FT), evaluation of maximum discharge of 25, 50, 100, 500 or 1000 years return periods, as well as run-off characteristics (e.g. mean value and standard deviation).
d. All required investigations including seismic assessment and geo-technical investigation etc should be conducted in detail in order to ensure a safe and hydraulically efficient works under all expected static, dynamic, hydrodynamic forces, and seepage gradients. The geotechnical investigation shall be conducted by the Consultants through a properly qualified contractor / firm.
e. Consultant shall assess the incremental flooding in case of weir breach and prepare associated inundation maps.
f. Consultant shall also carry out a safety check flood (SCF) analysis (ratio between Design Flood and the flood that can be passed with water level immediately below the dam crest elevation) and use that to assess overtopping resilience.
g. To carry-out other unforeseen studies and investigations essentially required for detailed designing of safe, stable and durable dams/ weirs and appurtenant structures.
h. Observe water availability of each proposed dam / weir site in the project area.
i. Monitoring of ground water levels in area prior (baseline survey) to construction of each dam / weir, provide forecast during operation. To do that, the Consultant is expected to observe seasonal variations of groundwater levels during project

implementation, and monitor the effect of first aquifer recharge after completion of the works.

j. Provide guidance to Sindh Irrigation Department on how to monitor and interoperate the recharge of aquifer in project area and to maintain the record of water table profile and contours.
k. Observe seasonal variations and impacts of recharge of the aquifer when the reservoirs are filled and during the defect liability period.
l. Availability of lands and its associated cropping pattern for purpose of utilization of storage water of the dams.
m. Command area of each proposed recharge facility and areas benefited.
n. Based on discharge observation and sediment yield assessment, forecast the progress of sedimentation for monitoring and management at all proposed 30 sites.
o. Impact on Socio-Economic life of communities located at dam sites, command areas and lower riparians.

IV. Feasibility and Design of Dams

Based on all reviews, data collection reports, technical investigations and analysis the consultant shall identify the potential sites for construction of small dams. Identification of sites must address;

a. Catchment area of respective proposed dam/ weir site.
b. Reservoir boundaries and reservoir capacities of respective dam and weir site.
c. Type of dam structure.
d. Design of proposed structures including various components, canals and structures, hydraulic passages, crossings and other related structures and outlets.
e. Considering the elevation contours of stream and upstream area and annual water inflows, propose the best suited size of the reservoir and dam crest level.
f. Recommended plan for watershed conservation management, finalized to control sediment yield.
g. Type and suitability of construction material required and its availability in the near-by areas.
h. Recommended cropping patterns and irrigation practices.

V. Environment and Social Safeguards Management

Under this item of work, the consultant shall be required to perform the following functions:

i. Prepare ESMP/ IEE / EIA / EMMP in accordance with the environment and social framework of the project, and in line with Government of Pakistan/ Government of Sindh regulations and laws, and World Bank guidelines.
ii. Prepare Land Acquisition & Resettlement Plan (LARP) / Abbreviated Resettlement Action Plan (RAP) in accordance with the environment and social framework of the project.

The deliverable(s) under this item shall be reviewed by an independent expert.

VI. Financial and Economic Analysis

As first step for financial and economic analysis, all benefits and costs of the project shall be assessed. Irrigation benefits shall be calculated as difference between 'with project' and 'without project' situations. Benefits shall be calculated in financial and economic terms. After the preparation of cost estimates, the concerned expert shall compose cost and benefit streams over the project life, and compute the economic internal rate of return and the net present worth of the project. Sensitivity of results shall be tested for changes in major parameters such as engineering cost estimates, projected yields, product prices and discount rates. The analysis shall establish whether the project is economically viable or not.

VII. Final Feasibility Study Report

Based on Identification of feasible dam sites, consultant shall prepare a detailed report, for each dam site. Report should be submitted to Project Director, SRP in the shape of hard as well as soft copy; the latter shall include all data and studies..

VIII. Detailed Design Report and PC-I Proforma

The Consultant shall submit Detailed Design Reports and PC-I proforma as per guidelines and specifications of Pakistan Planning Commission for the assignment.

IX. Bidding Documents

The Consultant shall prepare and submit complete Bidding Documents of the assignment as per World Bank procurement guidelines. The document shall include Instructions to Bidders, Selection Criteria, Conditions of Contract, Tender Forms, Bill of Quantities and Technical Specifications, and other sections as warranted under Government/World Bank requirements.

6. Proposed Staff for Assignment;

KEY STAFF

I. Team Leader

Qualifications: The Team Leader shall have a Master's Degree in Civil Engineering with at least 20 years' of experience in irrigation planning, management and administration of government and foreign funded Projects/ Development Schemes.

II. Hydraulic Design Specialist

Qualifications: The Hydraulic Design specialist shall have a master's degree in Hydraulic / Irrigation Engineering with at least 15 years' experience in Irrigation Planning. Specific experience on hydraulic design of dams and irrigation structure would be an advantage.

III. Water Management and Sedimentation Specialist/ Hydrologist

Qualifications: The Water management and sedimentation specialist/hydrologist must have master's degree in Water Management or Hydrology with minimum 15 years professional experience in water management projects in Pakistan. He/ she shall have demonstrated competence at both policy level and field implementation level and relevant experience in decentralization of O&M to farmer's organizations.

IV. Dam Design Expert

Qualifications: The Dam Design Expert shall have a Master's Degree in Civil Engineering or Hydraulics or Geotechnical Engineering with minimum 15 years professional experience in dam design, safety management and dam operation and maintenance.

V. Ground Water Specialist

Qualifications: The ground water specialist shall have a Master's Degree in Hydraulics orHydrogeology with 15 years professional experience for monitoring of sub surface drainage and ground water.

VI. Geologist

Qualification: The geologist shall have a Master's degree in Geology with minimum 15 years' experience in planning, supervision and interpretation of sub-surface investigations for dams and hydraulic structures.

VII. Contracts Engineer

Qualification: The Contracts Engineer shall be graduate engineer with minimum 15 years' experience of preparing bidding documents, procurement and contract management of mega projects particularly projects funded by international banks.

NON- KEY STAFF

1. Senior Engineer Surveying
2. GIS Experts
3. Environmental Expert
4. Social Safeguard
5. Expert
6. Economic Specialist
7. Agriculture Specialist
8. Bio-Engineer/ Ecologist

7. Deliverables

The Consultant shall prepare the following documents for the project and submit to the Employer within the period specified:

Sr. Nr.	Name of deliverable	Timeline (after commencement of services)
1	Inception Report (05 copies)	1 month
2	Workshop to discuss the Inception Report and share roadmap for conducting study	Within two weeks after submission of Inception Report
3	Review, Recommendation & Approval of Client on Inception Report	Within two weeks after Workshop on Inception Report
4	Monthly Progress Report (05 copies)	Within first week of every month
5	Topographic, Geotechnical & Site	At the end of 8th month

	Investigation Report (10 copies)	
6	Draft Feasibility Study Report (05 copies)	At the end of 12th month
7	Draft ESIA and Resettlement Plans	At the end of 12th month
8	Draft Bidding Documents	At the end of 12th month
9	Workshop to disseminate results of Draft Feasibility Report	Fifteen days after submission of Draft Feasibility Report
10	Final feasibility including Drawings/plans, Economic & Financial Analysis, and Cost Estimates & design (12 copies)	At the end of 14th month
11	Final ESIA and Resettlement Plans	At the end of the 15th month
12	NOC on Environment Impact Assessment (EIA) of the project from Sindh Environment Protection Agency (SEPA)	At the end of the 18th month
13	Bidding Documents and PC-I (12 copies)	At the end of the 18th month

8. Schedule period of consultancy services

Schedule period for carrying-out consultancy services is eighteen (18) months.

9. Schedule of payment

The schedule of payment for consultancy services is as under;

S. Nr	Name of Deliverable	Amount in percentage
1	Final Inception Report	10%
2	Topographic, Geotechnical & Site Investigation Reports	10%
3	Financial and Economic Analysis	10%
4	Final feasibility including Drawings/plans and Cost Estimates & detailed design	20%
5	ESIA and Resettlement Plans	10%
6	Final Bidding Documents	10%
7	Final Bidding Documents and PC-I	30%

10. Indicative person-months required for the Assignment

Indicative person-months required for the assignment are 402 as given below:

S.Nr	Proposed Position	Minimum Man-Months
A	***Key Staff***	
1	Team Leader	18
2	Hydraulics Design Specialist	8
3	Ground Water Specialist	6
4	Dam Design Expert	16
5	Water Management and Sedimentation Specialist/ Hydrologist	6
6	Geologist	12
7	Contracts Engineer	6
	Sub - Total A	**72**
B	***Non- Key Staff***	
1	Senior Engineer Surveying	26
2	GIS Expert	12
3	Environmental Expert	8
4	Social Safeguard Expert	8
5	Economist	6
6	Agriculture Specialist	8
7	Bio Engineer/ Ecologist	6
	Sub - Total B	**74**
C	***Other Technical Staff***	
1	Assistants to Specialists	130
2	Computer Operator/ Autocad operator	36
3	Support Staff	90
	Sub - Total C	**256**
	Total A + B + C	**402**

11. Coordination

The consulting firm shall report to the Project Director, Sindh Resilience Project or any other staff designated. The Project Director or the designated staff shall approve all work.

12. Qualification

The interested firm must:

- Be a tax registered consultancy firm incorporated for at least ten (10) years.
- The Consultants/ Firms who have completed minimum of five (05) numbers of similar of assignment of scale and complexity

- The firm and its staff must have experience of offering similar services and have completed similar projects of this scale and complexity.
- Adequate Logistical Capacity

13. Selection Process

The selection of Consultants shall be based on Quality & Cost Based Selection (QCBS) method in accordance with Part -II World Bank's Guidelines: Selection and Employment of Consultants [under IBRD Loans and IDA Credits & Grants] by World Bank Borrowers, January 2011 (revised July 2014).

Annexure-1

LIST OF DAMS IN SRP

SMALL DAMS		Short Names
KOHISTAN-I		
1	Construction of NAING-II Recharge/Small Dam in Central Kohistan, Jamshoro	NAING-II DAM
2	Construction of GABOL Recharge/Small Dam in Central Kohistan, Jamshoro	GABOL DAM
3	Construction of NALI Recharge/Small Dam in Central Kohistan, Dadu	NALI DAM
4	Construction of QASIM TOK Recharge/Small Dam in Central Kohistan, Dadu	QASIM TOK DAM
5	Construction of Dhal DHORO-II Recharge/Small Dam in Central Kohistan, , Jamshoro	DHAL DHORO-II DAM
KOHISTAN-II		
1	Construction of Upper MOLE-II Recharge/Small Dam in Lower Kohistan, Jamshoro	UPPER MOLE-II DAM
2	Construction of ARIPIR Recharge/Small Dam in Lower Kohistan, Jamshoro	ARIPIR DAM
3	Construction of SURESHI Recharge/Small Dam in Lower Kohistan , Jamshoro	SURESHI DAM
4	Construction of TIKHO-II Recharge/Small Dam in Lower Kohistan , Jamshoro	TIKHO-II DAM
5	Construction of JUNG SHAHI Recharge/Small Dam in Lower Kohistan, Thatta	JUNG SHAHI DAM
6	Construction of KONKAR Recharge/Small Dam in Lower Kohistan, Malir	KONKAR DAM
7	Construction of KARMATIANI Recharge/Small Dam in Lower Kohistan, Malir	KARMATIANI DAM
NAGARPARKAR		
1	Construction of BHANSAR RATHI Small / Recharge Dam Tharparkar	BHANSAR RATHI DAM
2	Construction of SABUSAN Small/Recharge Dam Tharparkar	SABUSAN DAM
3	Construction of SANKAR Small/Recharge Dam Tharparkar	SANKAR DAM

Annexure-2

PAST STUDIES FOR SMALL DAMS IN SINDH

S. Nr.	Name of Study	Client	Consultant	Year of Study	Names of Dams
1	Feasibility Study for Construction of Delay Action Dams Small Dams & Recharge Dams in Kohistan	Sindh Arid Zone Development Authority, Govt of Sindh	Mining & Industrial	1991	Thado-1
					Thado-2
					Langheji
					Jharando
					Kalu-1
					Kalu-2
					Mula
					Rahuja
					Nai Mango
					Sari
					Ullar
					Uper Mole
					Kand Jhang
					Koteri
					Suk
					Pukhan
					Ranikot
					Bandhani
					Angai
					Khandhani
					Haleli
					Bahawal Babar
					Nali
					Taki
					Makhi
					Salari
					Buri
					Dillan
2	Comprehensive Feasibility Study for Design and Construction of Small Dams & Detention Weirs for Leftover Potential Sites in Nagarparkar Area Including Construction of Irrigation Bund along Chhrasar Nai	Sindh Irrigation Department	ACE (Pvt) Ltd.,	2008	Koowara Dam
					Jaleli Bund
					Bartalao Dam
					Umedde Ka Wandhio Dam
					Bhansar Dam
					Naryasar Dam

S. Nr.	Name of Study	Client	Consultant	Year of Study	Names of Dams
					Sanikar Bund
					Kalkee Bund
					Chanida Dam
					Khetlai Bund
					Rhetlai Bund
					Rinmalsar Dam
					Manjhrai Bund
					Bhootlai Bund
					Peprai Bund
3.	Feasibility Study for Construction of Small Dams on Nai Baran, Nai Sann, Nai Baz Khando, Nai Bandhni and Other Nais in Kirthar Range (Sindh)	Sindh Irrigation Department	NDC & Techno	2008	Khenji Nai
					Sita River
					Mazarani Nai
					Unnhar/Dillan/Thadri
					Buri Nai
					Khurbi Nai
					Makhi Nai
					Salari Nai
					Taki Dhoro
					Shol Lower Nai
					Bahawal Babar
					Shori Nai
					Nali Nai
					Kukrani Nai
					Haleli Nai
					Khandani Nai
					Angai Nai
					Naing Nai
					Bandhni Nai
					Ding Dhoro Nai
					Mori Nai
					Sann Nai (Rani Kot)
					Ocha Nai
					Baz Khando Nai
					Pokhan Nai
					Kataro Nai
					Suk Nai
					Gabbar Nai
					Koteri Nai
					Ullar Nai
					Marai Nai (Dao)

S. Nr.	Name of Study	Client	Consultant	Year of Study	Names of Dams
					Saruni Nai
					Baran Nai
					Drig Dhoro
					Mol Nai and Furkhani Nai
					Khadeji Nai, Nai Mango and Sari
					Langheji Nai and Turi Nai
					Jharando Nai
					Sukkan Nai
					Thado Nai
					Dhanga Nai
					Konkar Nai
					Watanwari Nai
					Malir Nai
					Layari Nai
					Khar Nai
					Kand Dhoro
					Ran Pethani Nai and Bade Nai
					Mulla Nai
					Kuni Nai and Kalu Nai
					Andho Nai
					Rod Nai and Shohar Nai
4.	Consultancy Services for Planning and Preparation of Detailed Designs of 40 Small Dams, Recharge Dams and Vetting of Designs of 63 Detention Weirs located in Kohistan and Nagarparkar areas of Arid Zone, Sindh.	Sindh Irrigation Department	ACE (Pvt) Ltd., Cameos and Spatsole	2009	Bazkhando
					Ullar
					Ding Dhoro
					Gadap / Lat
					Upper mole 2
					Kukrani
					Khurbi
					Mulla
					Hasan Jo Kun
					Dillan U/S
					Khand Dhoro

S. Nr.	Name of Study	Client	Consultant	Year of Study	Names of Dams
					Sukkan
					Naing
					Buri
					Mazarani
					Malir Bakshan
					Ran Pathani
					Bandhani
					Angai / Injeer
					German Dhoro
					Cascade Weir 1
					Cascade Weir 2
					Cascade Weir 3
					Cascade Weir 4
					Jhingri
					Kataro
					Watan Wari
					Layari
					Abdar
					Mohan
					Upper Mole 1
					Halale
					Dao Storage Dam
					Sita Storage Dam
					Sohri Storage Dam
					Kunni Storage Dam
					Ochoo Storage Dam
					Bazkhando Storage Dam
					Malir Memon Goth Weir
					Malir Damloti Weir
					Jhanjhasar Dam
					Vikasar
					Buphlai Bund
					Veerawah Bund (Chhrasar)
					Gordhro Bhitiani Dam
					Abasar Bund
					Sutlai Bund
					Adigam Dam
					Sabusan Bund
					Lakar Khadio Bund
					Ranasar Dam
					Ghartiari Dam
					Surachand Bund
					Bhimra Bund

S. Nr.	Name of Study	Client	Consultant	Year of Study	Names of Dams
					Chitrasar Bund
					Dedrae Bund
					Gotrawa Dam
					Banda Bund
					Porodharo Bund
					Wanihar Nai
					Kahane jo Wandio Dam
					Kalidas Dam
					More Dam
					Tadhio Dam
					Miskeen Jehan Khoso Dam
					Ranpur Bund
					Bhodisar
					Malji Bund
					Kharoro Bund
					Tobiryo Tank
					Lakhay jo Wandhio
5.	Feasibility Study for Design and Construction of Small Dams On Nais Originating from Quba Qadir Bux and Ubhan Shah Hills In Sukkur and Khairpur Districts	Sindh Irrigation Department	ACE (Pvt) Ltd.,	2009	Faqir Bhatti Dargah
					Tharia
					Larha 1
					Larha 2
					Larha 3
					Gharah Nai
					Walar Nai
					Aikrso Nai
					Ukhari Nai
					Kiniri Nai
					Wariwaro Nai
					Sanahri Nai
					Luthi Nai
					Jaganwari Nai
					Upper Darig Nai
					Darig Nai
					Tungwari Nai
					Shahan Ka Khu
					Gangiwari Nai
					Korwari Nai

S. Nr.	Name of Study	Client	Consultant	Year of Study	Names of Dams
6.	Consultancy for Surveys, Investigations, Detailed Designs, Tender Documents and PC-I of Seven (07 Dams in Kohistan Region, Sindh	Sindh Irrigation Department	MMP	2010	Darwat Dam
					Khinji Dam
					Nali Dam
					Sita Dam
					Salari Dam
					Khadeji Dam
7.	Feasibility Study of Small Dams and Water Storages	Ministry of Water and Power	Gentek Consult Ltd. Turkey AAB (Pvt.) Ltd, Pakistan	2013	Injeer Dam
8.	Feasibility Study of Investigation, Designing and Initiating the Construction Work for Detention Weirs/Check Dams/Small Dams in Dadu and Larkana Districts	Sindh Irrigation Department	MMP	2015	Qasim Took
					Dhal
					Luni Khad
					Guwari
					Sangchat Jo tarr
					Ari Pir
					Surishi
					Nali
					Samichar
					Shori-III
					Talib Jo ghuando
					Gabol
					Naing Nai
					Gurand
					Tikho-I
					Tikho-II

Annexure-3

LIST OF PREVIOUS STUDIED STREAMS DAMS ON VARIOUS NAIS

Region	Stream/Nais	Small Dams	
		Studied	Constructed
Nagarparkar	(Sulaiman) Bhtaini		Kalidas
Nagarparkar	Khipora	Khip Rorio	
Nagarparkar	Ghordhro	Maya	
Nagarparkar	Poonam Wah		Miskeen Jehan Khan Khoso
Nagarparkar	Banyo	More	
Nagarparkar	Madan Wai	Thadio	
Nagarparkar	Jinjoo Nadi		Gabion weir No. 1
Nagarparkar	Jinjoo Nadi		Gabion weir No. 2
Nagarparkar	Adhigaon Nadi		Gabion weir No. 3
Nagarparkar	Adhigaon Nadi		Gabion weir No. 4
Nagarparkar	Sudrah Nadi		Gabion weir No. 5
Nagarparkar	Kasbo Nai		Gabion weir No. 6
Nagarparkar	Surachand Nadi		Gabion weir No. 7
Nagarparkar	Gordhro Nai		Gabion weir No. 8
Nagarparkar	Gordhro Nai		Gabion weir No. 9
Nagarparkar	Gordhro Nai		Gabion weir No. 10
Nagarparkar	Gordhro Nai		Gabion weir No. 11
Nagarparkar			Bartalao Dam
Nagarparkar		Umedde Ka Wandhio Dam	
Nagarparkar	Karario nadi		Ranasar Dam
Nagarparkar	Adigam Nadi		Adigam Dam
Nagarparkar			Chanida Dam
Nagarparkar			Jhanjhasar Dam
Nagarparkar			Rimalsar Dam
Nagarparkar	Ghatali nai		Khuwara Dam
Nagarparkar	Kasabo nai	Gotrawa Dam	
Nagarparkar			Kahane jo Wandio Dam
Nagarparkar	Dhobgari		Naryasar Dam
Nagarparkar	Mokario	Bhansar Dam	
Nagarparkar			Gordhro Bhitiani Dam
Nagarparkar	Ghartari nai		Ghartiari Dam
Nagarparkar		Abasar Bund	
Nagarparkar	Murado Nadi		Lakar Khadio Bund
Nagarparkar	Jinjoo Nadi	Sabusan Bund	
Nagarparkar	Malji nai	Khetlai Bund	
Nagarparkar		Dedrae Bund	
Nagarparkar		Porodharo Bund	
Nagarparkar		Buphlai Bund	
Nagarparkar	Sankaar nai	Sanikar Bund	
Nagarparkar	Khararo Nai	Bhootlai Bund	
Nagarparkar	Ramjee Nai	Veerawah Bund (Chhrasar)	

Region	Stream/Nais	Small Dams	
		Studied	Constructed
Nagarparkar	Sukpur Nai	Vikasar	
Nagarparkar		Surachand Bund	
Nagarparkar		Banda Bund	
Nagarparkar		Rhetlai Bund	
Nagarparkar	Adigam Nadi	Sutlai Bund	
Nagarparkar		Chitrasar Bund	
Nagarparkar		Kalkee Bund	
Nagarparkar		Wanihar Nai	
Nagarparkar		Jaleli Bund	
Nagarparkar		Peprai Bund	
Nagarparkar	Surchand nai		Surachand Bund
Nagarparkar			Lakhay jo Wandio
Nagarparkar			Kharraro Bund
Nagarparkar	Ghatiari Nai		Ranpur
Nagarparkar		Manjhrai Bund	
Nagarparkar			Malji
Nagarparkar		Bhimra Bund	
Upper Kohistan			Khurbi
Upper Kohistan		Khenji Tarpan	
Upper Kohistan		Turi	
Upper Kohistan		Malirririri	
Upper Kohistan		Gamrach Dhoro	
Upper Kohistan	Guwari Nai	Guwari	
Upper Kohistan		Rani kot	
Upper Kohistan		Mohan	
Upper Kohistan		Naing	
Upper Kohistan		Makhi	
Upper Kohistan			Buri
Upper Kohistan		Dillan	
Upper Kohistan		Mazarani	
Central Kohistan		Rai-jo-Dhath	
Central Kohistan			Bandhni (Doring)
Central Kohistan		Ashoro Khuch	
Central Kohistan		Haleli	
Central Kohistan		Taki	
Central Kohistan		Salari	
Central Kohistan			
Central Kohistan	Naing Nai	Naing	
Central Kohistan			Shori
Central Kohistan		Ghadhi-Jo-Dhoro	
Central Kohistan		Mohan	
Central Kohistan	Ocho Nai	Ocha Dam	
Central Kohistan	Shole Nadi	Shole Dam	
Central Kohistan		Haleli	

Region	Stream/Nais	Small Dams	
		Studied	Constructed
Central Kohistan	Kalu Nadi		Kalu-I
Central Kohistan			Naimango
Central Kohistan	Sari Nai		Sari
Central Kohistan	Kukrani Nai		Kukrani
Central Kohistan		Mori	
Central Kohistan		Ghour Bund	
Central Kohistan		Injeer	
Lower Kohistan	Dhoro		Ding Dhoro Dam
Lower Kohistan	Sureshi Dhoro	Suresh	
Lower Kohistan		Rahuja	
Lower Kohistan			Jharando
Lower Kohistan			Langheji
Lower Kohistan	Mol Nadi		Mole
Lower Kohistan			Gaddap
Lower Kohistan			Meer chakar (Abdar)
Lower Kohistan			
Lower Kohistan			
Lower Kohistan			Thado-II
Lower Kohistan	Mol river		Upper Mole
Lower Kohistan			Mulla
Lower Kohistan			German Dhoro
Lower Kohistan		Pokhan	
Lower Kohistan			Kuni
Lower Kohistan			Ullar
Lower Kohistan		Andho	
Lower Kohistan		Marai	
Lower Kohistan		Shohar	
Lower Kohistan			Kand Dhoro
Lower Kohistan		Gabbar-1	
Lower Kohistan			Layari Nai
Lower Kohistan			Ranpattani
Lower Kohistan			Mulla Dhoro
Lower Kohistan			Bazkhando
Lower Kohistan		Jhangshahi	
Lower Kohistan		Achar	
Lower Kohistan		Sallar	
Lower Kohistan			Lat
Lower Kohistan			Kataro
Lower Kohistan		Khar	
Lower Kohistan		Furkhani	
Lower Kohistan		Karmattani	
Lower Kohistan		Dhanga	
Lower Kohistan		Gabol	
Lower Kohistan			Thado-I

Region	Stream/Nais	Small Dams	
		Studied	Constructed
Lower Kohistan			Weir-1
Lower Kohistan			Weir-2
Lower Kohistan			Weir-3B
Lower Kohistan			Weir-3A
Lower Kohistan			Sukkan (on Going)
Lower Kohistan			Malir Bakshan (on going)
Lower Kohistan			Malir Memon Goth
Lower Kohistan	Wahwahro Dhoro	Tikho-1	
Lower Kohistan	Wahwahro Dhoro	Tikho-2	
Lower Kohistan		Konkar	
Lower Kohistan		Karmatiani	
Lower Kohistan	Mol Nai	Aripir	
Lower Kohistan	Sureshi Dhoro	Surshi	
Lower Kohistan		Saruni	
Lower Kohistan			Watanwari
Lower Kohistan		Chandram	
Lower Kohistan		Tangur	
Lower Kohistan		Malir Nadi	
Lower Kohistan			Hassan jo Kunn
Lower Kohistan		Warah Dhoro	
Lower Kohistan		Drigdhoro	
Lower Kohistan		Kand	
Lower Kohistan			
Lower Kohistan			Faqir Bhatti Dargah
Lower Kohistan			Tharia
Lower Kohistan			Larha 1 (on going)
Lower Kohistan			Larha 2
Lower Kohistan			Larha 3
Lower Kohistan			Gharah Nai
Lower Kohistan			Walar Nai
Lower Kohistan			Aikrso Nai (on going)
Lower Kohistan			Ukhari Nai (on going)
Lower Kohistan			Kiniri Nai (on going)
Lower Kohistan			Wariwaro Nai (on going)
Lower Kohistan			Sanahri Nai
Lower Kohistan			Luthi Nai
Lower Kohistan			Jaganwari Nai
Lower Kohistan			Upper Darig Nai
Lower Kohistan			Darig Nai
Lower Kohistan			Tungwari Nai
Lower Kohistan			Shahan Ka Khu
Lower Kohistan			Gangiwari Nai
Lower Kohistan			Korwari Nai