PROGRESS REPORT OF
CONSERVATION & MANAGEMENT OF
INDUS DOLPHIN
GUDDU, SUKKUR REACH

PROJECT MANAGEMENT OFFICE
SINDH BARRAGES IMPROVEMENT PROJECT
IRRIGATION DEPARTMENT
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A. Introduction

As part of the World Bank funded Sindh Barrages Improvement Project (SBIP) an International Conference on the Conservation and Management of Indus River dolphin in Sindh, Pakistan was organised by Project Management Office (PMO), Sindh Barrages Improvement Project (SBIP) the Irrigation department. The conference was held at the Marriot Hotel in Karachi on 15th May 2017 and was attended by more than 100 people from the Sindh Wildlife Department, Sindh Irrigation Department, World Bank, MMP, WWF-Pakistan, University of Sindh and the Information Technology University in Lahore. International attendees came from Canada, Japan, USA and the UK.

The objective of the workshop was for the Irrigation department to share information about the planned rehabilitation of Guddu and Sukkur barrages with the wildlife community and for the irrigation department to learn more about threatened and endangered wildlife, particularly the Indus dolphin from local and international experts. Information was shared regarding potential impacts of the work on dolphins and how these would be mitigated by the contractor, as well as on the current level of knowledge an status of the Indus dolphin as well as current threats and how government and NGOs have been addressing these threats over a number of years.

Engr. Shafqat Hussain Wadho Project Director, (PMO, SBIP), Irrigation Department

B. Welcome Address for conference

Mr. Shafqat Hussain Wadho (Project Director) welcomed all the participants of conference and said that the overall aim of this an International Conference on ‘Conservation and Management of Indus Dolphin’ is to learn and share Indus dolphin conservation and management options between experts and the participants. The findings from this conference will be shared with overall stakeholders at national and international level.

Specific objectives of the International Conference are such as Raise awareness of Project activities amongst stakeholders with interests in dolphin conservation and man-
management. Share experiences in methodologies for dolphin population surveys and population monitoring.

Discuss impacts and management options with respect to rehabilitation and operation of barrages; dolphin mortality in irrigation canals; depletion of prey base; fishing; pollution; and, poaching.

Identify existing barriers to effective management and conservation of the Indus Dolphin. Identify stakeholders with a role to play in the management and conservation of the Indus Dolphin.

C. Keynote Presentation for Conference

Dr Gill Braulik from the UK was the Key Note speaker at the conference and spoke on the following principal topics:

Why Indus dolphins are unique – The Indus River has been in existence for approximately 40 Million years since the Himalayas were formed and from fossil and genetic evidence, we know that the South Asian river dolphins have existed for approximately 30 Million years. Indus dolphins are therefore one of the most ancient of all cetaceans and are much more similar to Sperm whales than to any of the modern dolphins. This means that biologically they are also quite different to other dolphins. They swim on their side, they are almost blind, they have unusual skulls and behave quite unlike marine dolphins.

Indus dolphins are mammals – they are warm blooded mammals and therefore have many characteristics similar to humans. They breath air, give birth to a single live baby every few years, babies feed on mothers’ milk, they are intelligent and highly social. They live to be more than 35 years in age and as they reproduce slowly they are slow to recover from population declines.

Range decline – we know from a study in the 1870s that Indus dolphins used to occur throughout the Indus River, and the Jhelum, Chenab, Sutlej, Ravi and Beas Rivers in Punjab all the way from the delta to the mountains. This is a distance of about 3500km. When this is compared to the present day the dolphin has declined by 80% and is now extirpated from all the Punjab rivers and occurs only in about 700km of river. This is due to the construction of dams and barrages and diversion of water.

Interviews – to avoid the situation that occurred with the Yangtze River where the dolphin vanished without us ever understanding why, I conducted interview surveys throughout the rivers of Punjab with the oldest fishermen we could find and reconstructed the pattern of decline. The dolphin disappeared in a domino type pattern and its important to remember that this is still happening. We undertook modelling exercises to understand the cause of the decline and included 7 factors that might be responsible including the length of a river section, the date the barrage was built, the distance from the range edge, the mean annual discharge
before the dams were built, the gradient, number of major confluences, and dry season river discharge. Dolphins disappeared more quickly and longer ago where dry season river discharge is lowest. The chances that dolphins are still present are greatest where dry season discharge is lowest. 50 years after isolation behind a barrage there is a 50% chance that dolphins will have disappeared. Water exaction for human uses, especially irrigation has caused the massive range decline of the Indus dolphin. Range decline is dynamic, it is still happening!

Beas River- In March 2017 an environmental catastrophe happened on the Beas River. Harike Barrage needed to be rehabilitated and the Indian Irrigation Department stopped the flow of the Beas River. Discharge dropped from 30,000 cusecs to 1,000 cusecs over night. There was massive mortality of fish, turtles and the resident dolphins all vanished and are presumed dead. This is a huge warning for Pakistan, although it is possible to cut off the flow of rivers to help with barrage rehabilitation this MUST NOT HAPPEN in Pakistan as all the Indus dolphins would die and this would be an environmental catastrophe as well as a huge embarrassment for the Irrigation Department. It is essential that other methods for rehabilitation be found.

Habitat Use – As habitat is limited in the dry season and this is when dolphins are most vulnerable we conducted a detailed study to look at the characteristics of their habitat so that this can be protected. We gathered more than 200 depth cross-sections across the Indus and also analysed satellite images for habitat characteristics. Models showed that dolphins are recorded with higher frequency and in larger groups in narrow river channels, at river confluences and constrictions and in channels with high cross-sectional area. Dolphins are selecting pools with large volume during the dry season and therefore it might be possible to protect these habitats.

Abundance – dolphin surveys have been conducted over many, many, years in Pakistan. Numbers were at their lowest in 1972 when only 150 dolphins were recorded between Guddu and Sukkur. Dolphin hunting was banned in the Sindh Wildlife Act and hunters prosecuted and moved away and since that time the threats have reduced and numbers are gradually rebounding. There are well under 2000 animals remaining, but that might translate to only about 500 breeding females which are still very few.

Speciation – the Indus and Ganges River dolphins are closely related to each other but very different from all other cetaceans. They are both blind. Genetic studies conducted recently suggested that they have been geographically isolated for ½ million years and that there are considerable differences in the control region of the Mitochondria. There was very little diversity in the Indus dolphin. However given all of the other human threats this is not the most pressing issue facing the dolphins

What we don’t know – in conclusion there are still many things we don’t know about the dolphin which will influence conservation. These are:

a. Mortality- what are the causes of death, this requires a systematic mortality monitoring network with trained vets who can conduct post-mortems and samples for routine analysis.

b. Movements through barrages – we know dolphins can move through barrages from the dolphin radio tracking study conducted by Dr Uzma Khan from WWF-Pakistan. It is vital to understand more about this for population dynamics

c. Water Flow – there needs to be a minimum discharge set so that the terrible incident that occurred in India is not repeated in Pakistan.
d. Food – there is concern about the carrying capacity of dolphins between Guddu and Sukkur and that the river will soon not be able to sustain the number of dolphins in the river. Understanding the carrying capacity might be useful but it is extremely difficult and complex to determine, the resulting calculation will be subject to considerable uncertainty and the actions that would be required if the carrying capacity was exceeded uncertain.

e. Pollution – pollution loads are increasing, and dolphins between Guddu and Sukkur are most vulnerable as they are at the lower end of the distributional range. At the top of the food chain and as top predators Indus dolphins accumulate toxins that might cause disease, reduced fitness, lower reproductive rates etc. It is vital that the EPA controls pollution discharges into the river, especially between Guddu and Sukkur. Continuation of the sustainable agriculture work that educates farmers about wise pesticide use and causes a net reduction in the use of chemicals for farming is also advised.

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D. Indus Blind River Dolphin

Mr. Chris Hall imparted presentation on Implementation of Contractors’ Environmental and Social Management Plan (CESMP) as per the Contract Specification of Guddu SBIP/G2. The Contractor’s Environmental and Social Management Plan (CESMP) must demonstrate compliance with this specification as well as the Environmental Code of Practices and Environmental and Social Management Plan as defined in the ‘Sindh Barrages Improvement Project – Guddu Barrage Rehabilitation, Environmental and Social Assessment Report by Independent Environmental Consultants’ dated December 2014

Safeguard of Wildlife
- Use of Waterborne Plant
- Exclusion Zone
- Limited Noise
- Soft Start Procedure.

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Engr. Muhammad Ibrahim Samoo (Team Leader-Associated Consultant Engineers)

E. Sukkur Barrage Rehabilitation and Modernization

Mr. Muhammad Ibrahim Samoo delivered presentation regarding Sukkur Barrage Rehabilitation and Modernization. He highlighted and described the major activities of Rehabilitation of Sukkur barrage such as Repair of Civil works (Main barrage and Canals ’structures), Change Electro-mach Equipments and Dredging. Potential impact and concern has been described regarding dredging material. *Increased sediment load due to dredging* - Gate operation to open barrage gates near dredging location to quickly transport the increased sediments to downstream of the barrage.
Striking of Dolphins by construction vehicles- Limiting the speed of all the waterborne plants and speed boats to 15km/hour.
Disturbance due to Noise and Vibrations- Equipments which make a lot of noise will operate with mitigation measures during breeding season. Increased river pollution due construction waste- Contractor to manage spill kits, absorbent materials and surface skimmers.

Dr. Fateh Muhammad Mari,( Project Coordinator-Project Coordination Monitoring Unit) Planning and Development Department.

F. Safeguard Policy of World Bank during Inauguration Session

He delivered speech during inauguration of session of Conference. He said that the credit of organizing this International Conference on Indus Dolphin conservation and Management went to the Project Director SBIP and his team also Sindh Irrigation Department. He said that World Bank has funded for rehabilitation of Guddu barrage and further said that it is World Bank policy to safeguard socio and environment within project area. Therefore Bank has emphasized for conserving the Endangered Indus Dolphin and ecosystem between Guddu and Sukkur reach 170 km. He said that Indus Dolphin is sensitive and endangered species that almost observed in Indus River but particularly maximum number between Guddu and Sukkur reaches. He informed the conference forum that Indus Dolphin is facing various types threats ie disposal of wastewater from cities, towns and Industries, Explosion material for fishing, small nets for fishing and pesticide residue from agricultural run-off. Regarding this, the awareness should be created among fishermen, local communities and other stakeholders for caring of this endangered species.

Engr. Junaid Ahmed Memon (Special Secretary), Sindh Irrigation Department

G. Conclusion Remarks in Inauguration Session

Mr. Junaid Ahmed Memon was Chief Guest of Inauguration Session of the Conference on the Conservation and Management of Indus River dolphin in Sindh, Pakistan. He appreciated the Project Director and his team for organizing this and welcomed all the International and National participants for sparing their costly time for attending this mega event regarding Indus Dolphin conservation and management during his speech. He told the forum that Sindh Irrigation department has given serious concentration on the ecosystem of Indus River during construction of barrages when there was no concept about introduction of subject environment in Engineering Institution. He said that is worth mention here this auspicious occasion that before construction of Kotri,
Ecology study was conducting for avoiding any mishap regarding aquatic biodiversity and environment. He ensured that the ESMP of Guddu barrage rehabilitation will be implemented with spirit and coordination will carried out with Sindh Wildlife Department for proper implementation of Indus Dolphin Conservation and Management in Sindh.

**Dr. Ghulam Sarwar Gachal (Pro Vice Chancellor at Mipurkhas Camps, University of Sindh)**

### H. Indus River Dolphin Conservation of the Dolphin depends on:

Dr. Ghulam Sarwar Gachal speech on Indus Dolphin Conservation depends on: Reducing pollution by natural filtration through lateral wetlands. Capture of animals trapped in canals for release in the Indus. Enforcement of legal protection. He said that Educating local people about sensitivity Dolphins and better understanding their ecology and environment needs. In addition of these, there is more important “Dolphin friendly” barrage designs. He further said during presentation regarding **Analysis**: Seasonal Change in water Quality, Pollution load of river water, Pollution load of river fish. Pollution load of sediments from various sites between Guddu & Sukkur Barrages may be analysed. Dolphin genetic study may be carried out through DNA.

**Dr. Masud Karim, PhD., P. Eng., PMP and Navin Bindra, M.Eng, P.Eng.Engconsult Ltd., Canada**

### I. Cumulative Impact Assessment for Sindh Barrages

Dr. Masud Karim imparted presentation on Cumulative Impact Assessment for Sindh Barrages and highlighted Dolphin management and conservation actions plan, including: Action 1. Initiate population status survey, Action 2. Threat assessment surveys, Action 3. Setting up of no fishing zones in the Game Reserve, Action, 4. Capacity building for dolphin conservation and management, Action, 5. Community Involvement in river dolphin Conservation and Management, Action 6. Ensuring Critical Levels of Water Flow in Riverine Habitats of Dolphins, Action 7. Dolphin rescue programme, Action 8. Education and awareness, Action 9. International conference on dolphin conservation and management, He further said that the main purpose of barrage rehabilitation is to continue sustained supply through canals for irrigation in Sindh. Water should be used effectively by farmers without wasting it. Reduced wastage of irrigation water will allow more water to be discharged in to the downstream. He made the following initiatives were recommended: a) Continue to provide support to small and
medium size farmers in more productive use of waters. B) Continue to provide trainings in efficient use of water, soil, crop management, alternate use of saved water etc. c) The role of Watercourse Associations (WCAs) should be enhanced beyond routine water course improvement.

Dr. Wazir Ali Baloch (Chairman, Freshwater Biology and Fisheries department, University of Sindh)

J. Fish Biodiversity of Indus River

Dr. Wazir Ali Baloch delivered presentation on Fish Biodiversity of Indus River, he said and refered that the main Causes affecting the Fish Biodiversity are Habitat destruction and defragmentation (Cuizhang and others 2003), Water abstraction, industries and private use (Szollosi-Nagy 2004; Ricciardi and Rasmussen 1999; Gibbs. Exotic species introduction, Pollution (Lima-Junior et al. 2006), Global climate change impacts (Leveque et al. 2005; Mas-Marti et al. 2010). Biological diversity is the variety of living forms, the ecological role they perform and genetic, Diversity they contain (Wilson, 1988). The biodiversity is considered as actual treasure of any country, it was therefore, very important to document the species composition and population dynamics of Vertebrate community for better understanding of the rehabilitation of lake after super flood. Fish exhibit enormous diversity in their morphology, in the habitats they occupy and in their biology (Froese and Pauly, 1988). Over the last century, riverine ecosystems have suffered from intense human intervention resulting in habitat loss and degradation and as a consequence, many fish species

Regarding the Fish Biodiversity, He said that during the present study 40 fish species were recorded. This is higher number of fish species than recorded earlier. These belong to 14 families and 8 orders. Among them 26 species were commercially important while 14 species were non commercial. All these fish species belong to Cyprinidae (Eleven species), Bagridae (Five species), Channidae (Three species) Siluridae (7 species), Notopteridae and Schilbeidae (Two species), Clupeidae, Mastacembelidae, Belontidae, Heteropneustidae, Chanidae, Cichlidae, Gobiidae, Belonidae and Cobitidae (One species).

Mr. Saeed Akhtar Baloch (Conservator, Sindh Wild Department)

K. Conservator, Sindh Wildlife Department. Protection & Conservation of Indus River Dolphin

Mr. Saeed Akhtar spoke on Conservator, Sindh Wildlife Department Protection & Conservation of Indus River Dolphin. He said that Sindh Wild Department initiated project for Indus Dolphin conservation with
collaboration with WWF-Pakistan is also running for assessing the Agro-based activities which have an impact on the Indus Dolphin. He further said that Use of pesticides and other chemicals in Agriculture fields in and around the Dolphin Reserve is assessed through different metrics and farmers are being educated and trained for minimizing the use of deadly pesticides and chemicals in their agriculture fields.

Sindh Wildlife Department is founder and pioneer of rescue conductor of Indus River Dolphin initiated since 1992. He mentioned that 125 rescue operations have been conducted so far and a total of 99 Dolphins have been successfully rescued between 1992 to 2017.

Dr. M. Y. Khuhawar Institute of Advanced Research Studies in Chemical Sciences, University of Sindh, Jamshoro

L. Water Quality Assessment of the Indus River and Major Sources of Pollution

Dr. M.Y Khuhawar delivered the presentation on Water Quality Assessment of the Indus River and Major Sources of Pollution. He highlighted the results analysis of the water samples collected between Guddu to Sukkur barrage and said that most of the parameters are within the permissible limits of world health organization (WHO).

It indicates that there is no threat at the present to Indus Dolphin from environmental factors however there is the need to examine the water quality at low flows to evaluate the extreme values.

Dr. Muhammad Ashraf Bodla (Chief Environmentalist MM-Pakistan)

M. Guddu Barrage rehabilitation Project and Dolphin Management


He made HUMBLE REQUEST to the participants and said them convey this mes-
sage to all concerned stakeholders during presentation that please Respect Dolphin as we respect our family because dolphin may also be a mother, father or a baby. Help dolphin because they are blind as we do for our blinds Care dolphin because they are innocent and friends of our children Protect them as they are endangered PERHAPS LEGENDARY THEY MAY RESCUE YOU ONE DAY FROM DROWNING

Mr. Rashid Ghufran (Head QHSE Descon Engineering Limited)

N. Dolphin Rescue Guidelines/Plan

Mr. Rashid Ghufran highlighted presentation on ‘Dolphin Rescue Guidelines/Plan. He said during his speech that In case a Dolphin is seen stranded / injured near the work site, the work will be immediately suspended until advised to resume by authorized person. He said that regarding this swiftly report to the site HSE personnel and Dolphin Squad will be shared for coordinating with the concerned department (WWF or Sindh Wildlife department) and pass on the required information.

He said that Joint Actions with Sindh Wildlife Department and WWF Pakistan will be taken for rescuing the Dolphin which is being seen in work place and Descon may work as a Facilitator with Sindh Wildlife and WWF Pakistan, to conserve Indus river Blind Dolphin at Guddu Project site. The Local Authorities will be pursued through Employer (PMO), Sindh Wildlife and WWF Pakistan to establish no fishing zone within Guddu Project site.

Miss Hamera Aisha Manager (WWF-Pak)

O. Indus River Dolphin Conservation Indus River Dolphin Boat Safari:

Miss Hamera Aish presented on ‘Indus River Dolphin Conservation and Indus river dolphin boat safari’ and said during her presentation that there is requirement of A myriad of environmental awareness activity, to gain support from general public, Alternate livelihood opportunities for the fishers. Average annual tourist turn-out 700

She stressed on organizing Capacity building programmes of all stakeholders regarding Regular capacity building events for Indus Dolphin rescue, Population assessments Postmortem /sample preservation techniques. She further mentioned that some of the knowledge gaps should be fulfilled for conservation of Indus Dolphin

- Dolphin translocation feasibility studies
- Satellite tagging to determine actual home range size and movement across the barrages
- Comprehensive population assessment
• Habitat quality and carrying capacity assessments of Indus River Dolphin Game Reserve
• Experiment by catch mitigation technologies
• Genetics studies to assess in-breeding and population diversity

Dr. Uzma Khan (Technical Advisor- WWF-Pak)

P. Indus River Dolphin Management

Dr. Uzma Khan imparted presentation on Indus River Dolphin Management’ and raise many question regarding Dolphin Management plan such as
He asked the question from audience regarding sustainable development for Indus Dolphin What can be done to sustain? He further said during presentation first all is required Indus Dolphin Conservation Fund, controlling Industrial pollution along with Indus River Dolphin Game Reserve, Green Pakistan Programme (Launched earlier this year), required Environmental flow for conservation of Indus Dolphin, Preparation of Pesticide policy for controlling over pest residue disposal through agricultural runoff or directly. She suggested and asked that What can be done to sustain? She suggested forum for framing Sindh Wildlife Board through Inter departmental Indus dolphin conservation committee (Irrigation, EPA, Wildlife, Fisheries, WWF, IUCN) for more protected areas for the Indus River Dolphin.

Dr. Suleman Mazhar (Director BiSMiL Lab) Computer Science Dept., Information Technology University of the Punjab

Q. Passive Acoustic techniques for Indus River Dolphin Survey and Conservation

Dr. Suleman Mazhar delivered presentation on Passive Acoustic techniques for Indus River Dolphin Survey and Conservation and said that there modern techniques are being for survey of aquatic life through Passive Acoustic Monitoring Systems. He said Underwater Acoustics a key sensory can be used for Indus Dolphin survey which has long range underwater signals. Therefore, this technique can be applied for large scale monitoring of marine life and human-induced noise pollution. He also said that Passive Acoustics is better than active SONAR, tagging or visual based surveys.
In last but not least, many questions were raised during questions and Answers sections.

R. Questions and Answers

The floor was briefly opened up for questions and a selection of questions and answers are provided below:

Q: Is it possible to keep dolphins out of irrigation canals?

A: This is the obvious course of action, because dolphins are easily killed in shallow and accessible canals. However, it is not possible to put a grill or grid or physical obstruction over the gates of the barrages as they would become clogged with debris very fast. One option that has been discussed us the use of acoustic pingers that might deter dolphins from entering canals. Another option suggested by Chief Resident Engineer Chris Hall was a bubble curtain, which is a very good suggestion.

Q: Why are the numbers of dolphins going up but the numbers of fish going down?

A: I am not sure that there is actually strong data on the number of fish that can be relied upon. The understand fish populations would require a stock assessment and that has not been done. However, dolphins don’t eat all fish, and its possible that fishermen are targeting different fish than the dolphins eat, therefore fish catches by fishermen may decline but that doesn’t mean dolphin food necessarily declines, it might even increase.

Q: Are acoustics a good way to survey dolphins?

A: Yes absolutely, this method is very effective especially when used together with visual surveys. Dolphins are underwater unable to be seen for much for the time but they make a lot of noise and can be heard using acoustics very easily. There is a lot of potential for using acoustics with Indus dolphins however the biggest issue is anchoring hydrophones in the river and not losing them because the current and submerged debris means they are easily lost.

S. Preliminary Recommendations

1. Water Flow – Under no circumstances should water flows in the river be dropped very low to allow maintenance of either Guddu or Sukkur barrage. This would cause massive dolphin mortality. A way of working on the gates whilst keeping river flows at normal levels must be found.

2. Coordination – Regular Inter-governmental coordination in a special panel including Irrigation Department, Wildlife Department and NGOs involved with river dolphin conservation would be highly beneficial to coordinate information on river discharge and canal man-
3. River dolphin Fund – an established fund for river dolphin conservation that could be available for funding to ensure that current programmes are maintained would be highly useful.

4. It is essential that there is adaptive management of the construction phase and that all described mitigation measures for dolphins are implemented rigorously.

5. There needs to be a commitment to implement the 9 Action points listed in the ESIA. If these go ahead then it is possible that the rehabilitation work might produce an improvement in the environment between Guddu and Sukkur.

6. Building on existing dolphin conservation programmes and expertise within WWF and Sindh Wildlife who have been working on the dolphin conservation each for 20 years would be the best approach for implementing these 9 points.

T. Conclusion Remarks for Conference

Mr. Takeaki Sato spoke in conclusion Remarks on ‘International Conference on the Conservation and Management of Indus River dolphin in Sindh, Pakistan’. In the conclusion remarks, he said that first of all appreciations go to the team of Project Management Office (PMO), Sindh Barrages Improvement Project (SBIP), Sindh Irrigation Department for organizing this International event. He said thanks to all the International and National Speakers and Participants for their sparing costly time and attending conference. He also appreciated the speakers for imparting delicious presentations on covering all aspects of Indus Dolphin Conservation. In last but not least, he said, once again congratulation to all POM team, Speakers and Participants for succeeding this event.

With best wishes

U. Participants

The following organizations have participated in the International Conference:

Irrigation Department, Sindh Wildlife Department, Descon Eng ltd., IO/BM, PMO-SBIP Irrigation Department, National Institute of Oceanography (NIO), MMP-MMI, ICC, Project Implementation Consultant (Engineers), Sindh University Jamsho, SPMC, PCMU Planning Department, PMC/A WISP.TEKECELLANT, Sindh Fisheries Department, WWF-Pakistan, Mehran University and Engineering Technology Jamshoro, Sindh Irrigation and Drainage Authority, ITU/BISMI, Revenue department, Sindh Abadgar Board, ALGP, Ecological Consultant, The News, Asso-

Engr. Shafqat Hussain Wadho
Project Director
Sindh Barrages Improvement Project, Irrigation Department

have the pleasure of inviting you to the
1-DAY INTERNATIONAL CONFERENCE ON
CONSERVATION AND MANAGEMENT OF INDUS BLIND DOLPHIN IN
INDUS RIVER SINDH, PAKISTAN
at Governor Hall
Karachi Marriott Hotel

Syed Murad Ali Shah
Honorable Chief Minister Sindh Province
has consented to be the Chief Guest at the Inaugural Session

CONFERENCE PROGRAM

Inaugural session
09:30-09:40 Registration
09:30-09:45 Recitation from Holy Quran
09:45-09:50 Welcome Address & purpose of workshop
Secretary, Irrigation Department, Government of Sindh

Introduction of Rehabilitation of Indus and Sindh Barrages Project
Mr. Shafqat Hussain Wadho, Project Director, PNO, SHIP, Irrigation Department

Keynote on Dolphins
Dr. Jafar Haider

Overview of Dolphins work
Secretary, Forests and Wildlife, Department of
Sindh

Concerts Keynote of the World Bank on
Safeguarding of Barrages in Sindh/Pakistan
Country Director, World Bank

Concluding remarks
Chief Minister Sindh

10:55-11:00 Tea break

Technical Session 1: Experiences/knowledge sharing on river dolphin rehabilitation: conservation and research

11:00-11:15 Technical Component of Rehabilitation of Indus and Sindh Barrages Project
Mr. Chris Hall (CRE), Mr. Steven MacAlpine, U.S.

11:15-11:30 Translocation of Indus River dolphins
Prof. Dr. Gulam Sarwar Ghalib, Biology Department US, Jammu

11:30-11:45 Environmental Cumulative Impact in India
Dr. Manas Karlia, Dr. Vajikra

11:45-12:00 Fish biodiversity of Indus river
Prof. Dr. Wael Bahaj, Freshwater Biology and Fishery Department, UK, Jammu

12:00-12:15 Lunch and prayer break

Technical Session 2: An overview of Indus river dolphin, key challenges to its survival and conservation efforts taken in Pakistan

14:00-14:15 Preliminary and Conservation of Indus River
Dolphins (efforts of PNO)

Water quality assessment of the Indus River and major source of pollution
Emeritus Prof. Dr. Al-Yaseen Khan, University, Shaida

2:15-2:30 Conservation of Indus River dolphins in Pakistan
ReturnValue, WWF-Pakistan

2:30-2:45 Conservation of Indus River dolphins in Matsara
Dr. Anshul Malhotra, Department of Environmental Science, University, Lahore

2:45-3:00 Tea break

3:00-3:15 Conservation of Indus River dolphins through Acoustic method
Prof. Dr. Muhammad Amin, Assistant Professor, Aquatic Science and Information Technology, University, Lahore

3:15-3:30 Conclusion
Mr. Ruhul Islam, MSc, Secretary, Irrigation Department

3:30-3:45 Distribution of certificates
Mr. Ruhul Islam, MSc, Secretary, Irrigation Department

3:45-3:55 Vote of thanks
The following Eight Actions on Dolphin Conservation proposed in ESA reconfirmed in the conference.

**Actions**
1. Dolphin Population Monitoring
2. Dolphin Canal Rescues
3. Environmental flow analysis and application for Indus River Dolphin
4. Dolphin threat and pollution assessment & mitigation
5. Enhancing Sustainable Agriculture
6. Promotion of Sustainable Fishery
7. Fish pass design analysis for barrages
8. Capacity building and awareness raising

In this regard, the meetings of World Bank mission have been arranged with the Sindh Wildlife department, Forest department, Environmental Protection Agency Sindh, Fisheries department and Agricultural department.

V. **World Bank mission meeting and visit of Environmental Protection Agency (EPA) Sindh office, Karachi, on dated: 23rd January, 2018.**

The Task Team Leader and Senior Environmental Specialist of World Bank visited the office of Environmental Protection Agency (EPA) Sindh, Karachi for holding meeting on submitted proposal by EPA Sindh on ‘Dolphin threat and pollution assessment & mitigation’. The World Bank mission made detailed discussion with the Director (Tech) EPA Sindh for rationalizing submitted proposal. The Director (Tech) agreed for revising Proposal and resubmitting to PMO-SBIP to forward to the World Bank for reviewing and approval. The World Bank team visited the laboratory of Environmental Protection Agency which was established in its office.

W. **World Bank mission meeting with Fisheries Department Sindh office, Karachi, on dated: 24th January, 2018.**

The Senior Environmental Special, World Bank visited office of Director General (DG), Fisheries Department, Sindh. He held meeting with the Director General and Deputy Director Fisheries department and he briefed them about the main purpose of holding meeting is to promote of sustainability Fishery between Guddu to Sukkur barrages reach. He further told them that the maximum numbers of Indus Dolphins are available and their many schools between Guddu to Sukkur reach. The fish prey for the Indus Dolphin is reducing that is why there is dire need for promotion of Sustainable Fishery. The Director General Fisheries department informed the forum of meeting that fisheries Department has already established the hatchery of fisheries between Guddu to Sukkur reach and Fishery department has already working for fish sustainability. He told that Fisheries department will submit proposal ‘Promotion of Sustainable Fishery’ before 15th February, 2018 to PMO-SBIP forwarding World Bank reviewing and approval.
The Senior Environmental Specialist of World Bank visit the office Sindh Wildlife Department Karachi and held meeting with the Conservator, Sindh Wildlife department regarding the submitted proposal on ‘Conservation and Management of Indus River Dolphin and Enhancement of the Rescue Programme in Sukkur and Guddu’. The Conservator of Sindh Wildlife department told that the Notifications regarding the establishing Rescue/Squad Units, Project Monitoring Committee, Procurement Committee and Recruitment Committee will be got issued from the Secretary Forest and Wildlife department, Sindh within week.


The meeting was held in the office PMO-SBIP which was attended by representatives of the World Bank, Forest department, Project Implementation Consultants (PIC) and SBIP. The Senior Environmental Specialist of World Bank brief the forum of meeting the Irrigation department want to rehabilitate the Guddu and Sukkur barrages with funding of the World Bank. The World Bank and Irrigation department want the sustainable development in Guddu to Sukkur reach. Regarding the sustainable of forest between Guddu to Sukkur reach, Forest department may submit proposal. The Chief Conservator of Forest department told the forum that there is much land of Forest department is available between Guddu and Sukkur reach but the forest trees have been cut down/deforested by locals or shortage of water due to low floods. The forest area can only be flooded during high floods. The Project Director, SBIP told the meeting that the forests can play key role for controlling the Sediment load in Indus Rivers. The barrages and Indus Irrigation system has been receiving the huge quantum of silt due to deforestation of Riverine area of Indus River. Therefore, the forest may be given top priority between Guddu to Sukkur for not only controlling sediment but livelihood of local people. The Chief Conservator of Forest ensured that in this regarding the proposal will be submitted to PMO-SBIP forwarding the World Bank reviewing and approval.

Photo: shows meeting of World Bank with Officers of Forest Department


The meeting of the representatives of the World Bank with Officers of Agricultural department held in PMO-SBIP office, Karachi. The Senior Environmental Specialist and Social Specialist of Bank briefed the Agricultural officers that main purpose of meeting is ‘Enhancing Sustainable Agriculture’ between Guddu Sukkur reach, And Senior Environmental Specialist told them that Agricultural pesticide residue of Riverine area falls into mainstream of Indus River which directly or indirectly makes adverse impact ecology of Indus River but particularly on Indus Dolphin. The Officers told the World Bank team that Agricultural department has already is working by awareness
program on controlling the use of pesticide over crops through establishing agricultural clinics at agricultural/livestock markets in different district of Sindh. They suggested that awareness should be created among farmers of river area for using minimum pesticide or they can use biological treatment for controlling pest within riverine area.

Photo: shows group photo with Agricultural Officer

Z. **Fish pass design analysis for barrages**

Regarding the Fish Pass Design Analysis for barrages study the ToRs have been prepared by MMI Consultants which have been shared with World Bank for reviewing and approval.

AA. **Capacity building and awareness raising**

Photo: shows Communication Specialist of PMO discussing with women in Fisherman home located nearby Rohri city.

She visited the house of fisherman for imparting awareness regarding Indus Dolphin and not using small mesh nets for fishing from Indus river. The house women told Communication Specialist that there is limited fish available so that They adopted other sources of earning livelihood ie sewing Ralies, clothing and daily waging works.

Photo: Fisherman is netting mesh net for fishing at his home.

Fisherman told the Communication Specialist that lack of fish available in Indus between Guddu to Sukkur reach that is why Fishermen have almost migrated in the command area of Canals for cultivating agricultural lands and fishing from private fish ponds of local landlords for earning livelihood.
Photo: shows that the Communication Specialist delivering lecture on Indus Dolphin in School located at Sukkur city.

**BB. World Bank mission meeting with Conservator of Sindh Wildlife department at Sindh Wildlife department Office, Karachi, on dated: 15th February, 2018.**

The meeting of World Bank mission was held with the Conservator in his office regarding the issuance of the Notifications of establishment of Rescue/Squad Unit, Project Monitoring Committee, Procurement and Recruitment Committees. He told during meeting that the file of Notifications was processed and soon will get issued notifications from the Secretary.

**CC. World Bank mission meeting with Director General(DG) Fisheries department at Fisheries department Office, Karachi, on dated: 15th February, 2018**

The meeting of World Bank mission was held with Director of Fisheries regarding preparation of proposal and detailed discussion was carried out fish species breeding in hatchary.

**DD. World Bank mission meetings Officers of Environmental, Protection Agency, Sindh, Forest department and Fisheries department at PMO-SBIP office, Karachi, on dated: 16th February, 2018.**

The meeting was held with the deputy Director (SEPA) regarding the proposal. In this regarding detailed discussed made which further will be discussed and finalzied during workshop.

The meeting was held with the Deputy Conservator Sukkur region regarding proposal. He shared the draft proposal during meeting. The detailed discussion was made about afforestation Sukkur to Guddu reach as per draft proposal and further draft proposal will be updated during workshop in March,2018.
Photo: World Bank mission with the Officers of Fisheries department

Photographs Gallery