

Environmental Monitoring Report

Project Number: 44458-013
Bi-Annual Report
January–June 2016

UZB: Amu Bukhara Irrigation System Rehabilitation Project (Loans 3025 and 3026)

Prepared by JV Temelsu International Engineering Services, Inc. and Sheladia Associates, Inc
for the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan and the
Asian Development Bank.

This environmental monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

(i)

Bi-annual Environmental Monitoring Report

Project Number: 44458-013

Reporting period: January – June 2016

Uzbekistan: Amu Bukhara Irrigation System Rehabilitation Project

(Financed by the ADB Loan 3025-UZB/ 3025-UZB)

Prepared by: JV Temelsu International Engineering Services Inc.
Sheladia Assisiates Inc
Tashkent, Uzbekistan

For the: Ministry of Agriculture and Water Resources of Uzbekistan republic
Project Management Unit

Endorsed by: Naimova Sh.  27.07.2016

July 2016

Table of Contents

Part I Introduction	3
Project Background	3
1.1 Construction activities and project progress during the previous 6 months.....	4
1.2 Changes in project organization and environmental management team.....	5
1.3 Relationships with contractors, owner, lender, etc.	7
Part II Environmental Monitoring.....	8
Part III Environmental Management	8
3.1 The status of IEE/EMP and SSEMP.....	8
3.2 Site inspections and audits	9
3.4 Consultation and complains	9
Part IV. Action plan for the next period	10
Annex I	11

Part I – Introduction

1.1 Project Background

1. The Amu Bukhara Irrigation System (ABIS) Rehabilitation Project is located in the central part of Uzbekistan on the right bank of Amu Darya River bordering to Turkmenistan. Bukhara is 563 km far from the capital Tashkent. The project covers lands of Bukhara and Navoi provinces. The ABIS is very important for the area and gives life as an oasis.

2. The ABIS supplies water to already irrigated lands, cities, settlements, and industries in Bukhara and Navoi provinces through a series of large cascading pump stations and thousands of kilometres of conveyance canals. It also drains the excess water through drainage system outside of the project area.

3. The ABIS, with a command area of 315,000 ha, serves the irrigated lands of the Bukhara-Zarafshan and Karakul oases and the Karaul Bazar massif. The population in the ABIS command area is about 1,788,000 people, including 1,550,000 in Bukhara and 239,000 in two districts of Navoi, of which 68% live in rural areas and fully rely on irrigated agriculture. It is very important to supply reliable water to these people in the region. ABIS also supplies water for municipal and industrial purposes.

4. The aim of the Project is to improve the irrigated agriculture and water resources management in the ABIS, with the goal of promoting sustainable economic and social welfare of communities dependent upon ABIS. The Project objectives are:

- modernization and rehabilitation of obsolete pump stations;
- increase of conveyance efficiency in ABIS main canal;
- increase climate change adaptation capacity; and
- increase efficiency of project management and irrigation system management.

5. In order to realize a sustainable and reliable water supply in ABIS, the Project is expected to achieve the following outputs:

- a) Construction of one new pump station, and modernization and rehabilitation of four existing ones;
- b) Increase in the conveyance efficiency of the main canal of ABIS;
- c) Increase in the capacity of Basin Irrigation System Administration (BISA), Irrigation System Administrations (ISAs), water consumers' associations (WCAs), and farmers to adapt to climate change; and
- d) Efficient management of project and ABIS.

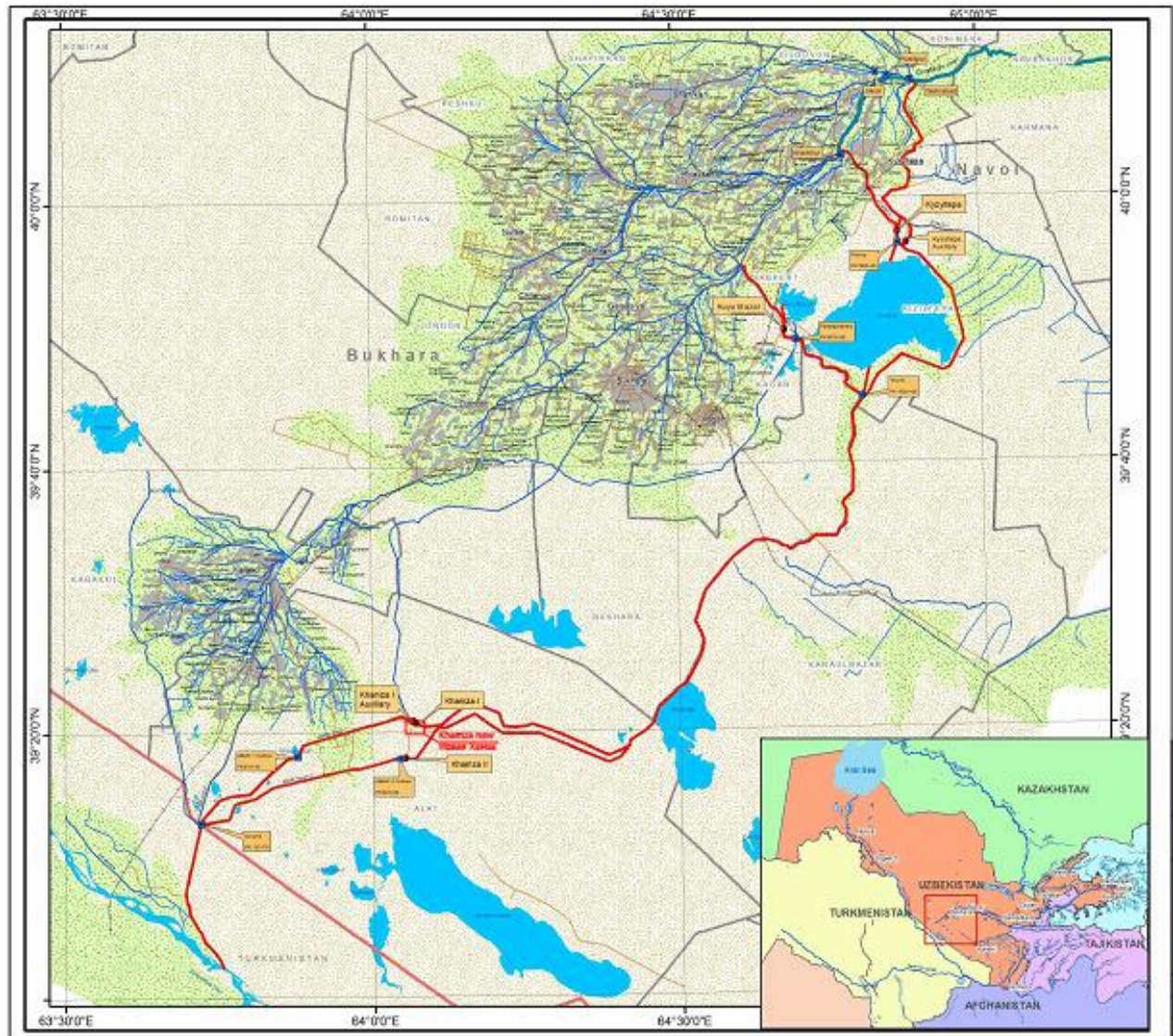
6. In order to realize the first output of ABISR, there will be two main contracts for civil works. These are:

- 1) Construction of Amu Bukhara 1 New Pump Station (ABISR/ICB/01)
- 2) Modernization and Rehabilitation of Kizil Tepa and Kuyu Mazar Pump Stations (ABISR/ICB/03)

7. The second output will be achieved by the implementation of the following construction project: Modernization and Rehabilitation of Amu Bukhara Main Canal Regulation Structures (ABISR/ICB/02).

8. The third output is expected to be delivered by the Technical Assistance Project associated with the project, whereas the activities for achieving the fourth output will comprise project management, institutional, and operational support of Technical Assistance.

Figure 1. Project area map



1.2 Construction activities and project progress during the previous 6 months

9. The Project during the reporting period was in tendering stage and no physical activities have taken place over the last 6 months. Only two contracts have been signed under ABISRP/ICB/02 and ABISRP/NCB/04. The main project activities carried out in the reporting period include the following:

- Tendering procedure for construction of Amu-Bukhara 1 New Pump Station (ABISRP/ICB/01). The expected start of construction period – late 2016
- Contract signed for modernization and rehabilitation of Amu Bukhara Main Canal Regulating Structure contract (ABISRP/ICB/02). The expected start of construction period – mid 2016

- Tendering procedure for Modernization and Rehabilitation of Kuyu Mazar and Kizil Tepa Pump Stations (ABISRP/ICB/03). The expected start of construction period – late 2016
- Contract signed for Rehabilitation of inter-farm and on-farm pilot irrigation network (ABISRP/NCB/04). The expected start of construction period - mid 2016.

10. Project organization for the awarded contracts listed above is given in the table 1 below.

Table 1: Awarded contracts within Amu-Bukhara irrigation system rehabilitation project

#	Contract name	Contractor's name	Consulting company	Number of Contract	Date of signing	Duration of contract
1	Modernization & Rehabilitation of Amu Bukhara Main Canal Regulation Structures	Consortium LLC "Kogon Suv Kurilish" and JSC "Amubukhorokanalkurilish"	«Temelsu International Engineering Services Inc.» «Sheladia Associates Inc.»	ABISRP 02	March 18, 2016	1080 days
2	Civil works for Inter-farm and On-farm Irrigation system	LLC "Kogon Suv Kurilish"	«Temelsu International Engineering Services Inc.» «Sheladia Associates Inc.»	ABISRP 04	June 30, 2016	426 days

1.3 Changes in project organization and environmental management team.

11. The following organizations and/or staff will be responsible for environmental monitoring activities. Their relationship has been illustrated in the figure given below.

- Basin Irrigation System Authority of Regions
- Contractor of any Subcomponent
- Civil Engineer of Consultant
- Climate Change Mitigation Specialist
- Environmental Expert of Consultant
- Electrical Engineer of Consultant
- Ministry of Health
- Project Manager of Consultant

- Project Management Office
- Water Consumer Associations

12. The key staff for the environmental management and monitoring activities will be the PMO's Monitoring and Evaluation Specialist (M&ES).

13. PMO as responsible IA for the project recruited a Supervision Consultant (SC) – consortium: «Temelsu International Engineering Services Inc» and «Sheladia Associates Inc.». The International environmental expert (Saban Cimen) and national environmental specialist of Supervision Consultant (SC) – Jakhongir Gadaev assist M&ES of PMO in the supervision of the construction activities under the Project.

14. The part of the work of the Environmental Experts of the Consultant is to develop a capacity building training program for Basin Irrigation System Administration (BISA) in implementing the EMP/SEMP. The timing of this program will be just before the commencement of civil works. The content of training will be developed by Environmental Experts of the Consultant.

15. As it was mentioned above two Contractors were hired for the ABISRP 02 and ABISRP 04 contracts. The Environmental Officers of the Contractors shall be responsible for the preparation of site-specific EMPs (SSEMPs) before commencement of civil works and implementation of EMP/SEMP related to the construction activities.

16. Monitoring of the environmental performance will be done using checklists and reporting format which will be completed quarterly as the relevant parts of the Appendix A. This reporting process has been included into the bidding documents as a regular reviewing requirement. The achievements and failures in each reporting period will be evaluated by the Environmental Experts of the Supervision Consultant.

17. Field supervision will be realized mainly by regular or unexpected field visits, by taking photographs, videos, by making inquiries with the staff or public affected from activities, conducting observations or observations.

18. Meetings and discussions might be required during the implementation phase with Contractor's Environmental Officer and/or Safety Officer, with the other technical members of Technical Assistance Team of PMU.

19. Structure diagram of the agencies Involved in Project Implementation is shown in the Fig. 2 below:

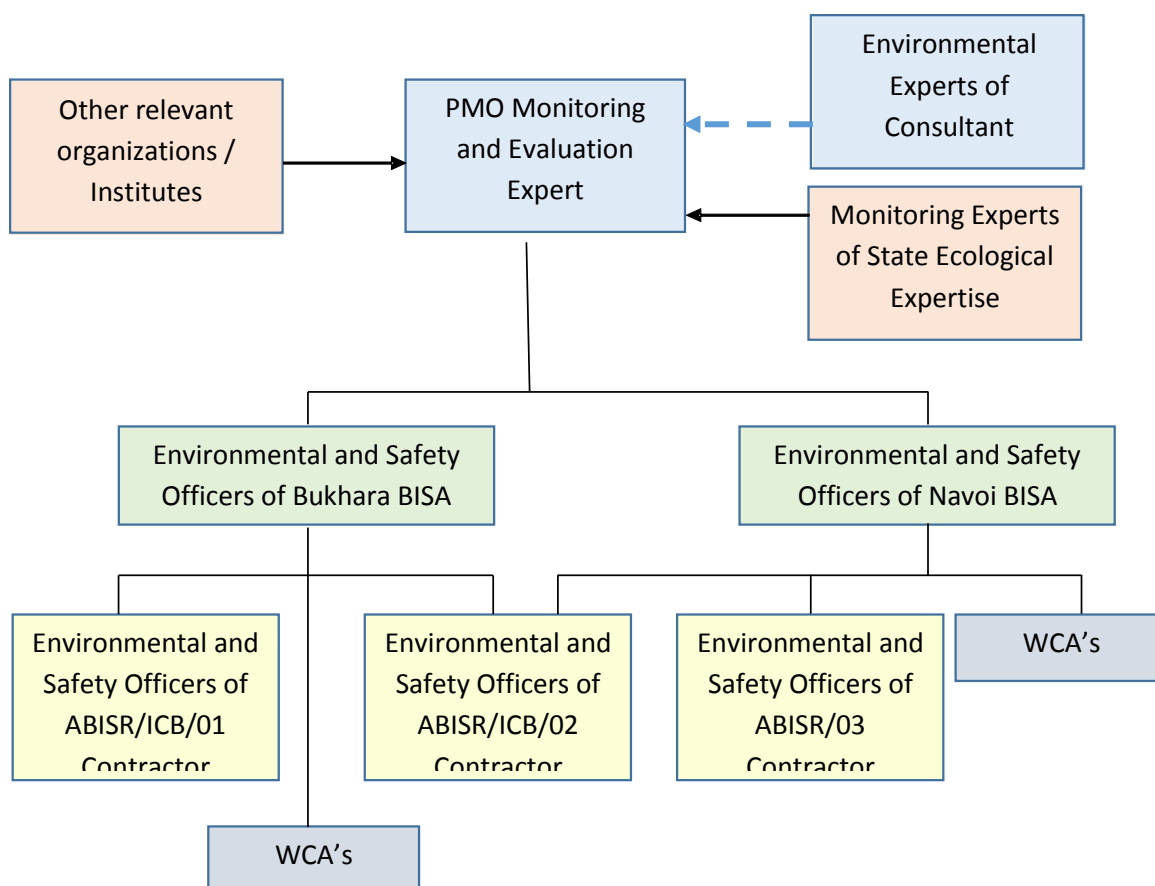


Figure 2. Structure Diagram of the Agencies Involved in Project Implementation

1.4 Relationships with contractors, owner, lender, etc.

14. The Ministry of Agriculture and Water Resources (MAWR) is the national institution responsible for irrigation and drainage with offices at central, provincial (12) and district level. Since 2003, water management is based on natural irrigation boundaries with the formation of basin authorities, Basin Irrigation System Administration (BISA). BISAs are contained within the MAWR structure as semi-autonomous organizations. There are 10 BISAs and each BISA is further subdivided into (i) canal Administration which looks after the canal systems, and (ii) irrigation system administration (ISA) that look after the irrigated areas. The subproject is situated in the Amu-Bukhara BISA.

15. The main institutions that are involved in IEEs/EMPs/SSEMPs implementation and monitoring, are the executing agency (EA) - MAWR, PMU, PIU, BISA, ISA, HGME, Uzhydromet, the Supervision Consultant, the Contractors, local branches of State Committee of Nature Protection and Municipal Authorities. EA represented by PMU/PIU and the Supervision Consultant are responsible for ensuring monitoring of the projects implementation at the construction stage. State Committee of Nature Protection has the authority for periodic audits but should not be considered as a party responsible for monitoring.

16. The overall responsibility for the completion of the work and direction of the contractor to meet the EMMP requirements will be the responsibility of the Construction Engineer (of the Project Management Consultants) supported by the Monitoring Engineer (of the PMO). They

will be supported by the SO. The contractor will have his own representative on site – the Site Engineer (SE) who will be responsible for implementing the contract and complying with the EMMP.

Part II - Environmental Monitoring

17. Since the construction activities have not been started the Environmental Monitoring study has been based upon the collection of existing background environmental data from the relevant government authorities. The requested information is given in below table 2.

Table 2: Existing Background Environmental Data

Indicator	Data source	Frequency	Responsibility	Reporting
Quality of irrigation water (pH, salinity, hardness, BOD, COD, nitrate, nitrite, ammonium, phosphate, pesticides, oil products, phenol)	Measurement	Project area, twice a year	PIU, HGMEs, Uzhydromet	Bi-Annual EMR
Soil quality/pollution (SOM (humus), soil carbon, mobile and gross NPK, nitrates, nitrites, ammonium, phosphate, pesticides).	Measurement	Project area, twice a year	PIU, BISA, HGMEs, and WCAs	Bi-Annual EMR

18. Environmental impact monitoring and mitigation is carried out in accordance with the updated EMPs and Site-Specific Environmental Management Plans (SSEMPs) prepared by the Contractors. A comprehensive list indicators including the frequency of measurements is given in Annex II.

19. During reporting period environmental monitoring has not been conducted yet. Environmental Monitoring will start immediately after the commencement of the civil works under the Project.

Part III - Environmental Management

3.1 The status of IEE/EMP and SSEMP

20. The Initial Environmental Examination Report (IEE) has been reviewed carefully by the Environmental Experts of the Technical Assistance Team. In following a brief information is given about this review.

21. In general, the prepared IEE has been regarded as a comprehensive document which explains the project activities as required and gives clear identification of the prevailing environmental conditions. The IEE explains the projects impacts on the environment and proposes the necessary mitigation measures to overcome project. On base of this and previous assessment IEE categorizes ABISR is “Category B” according to OM Section

F1/OP of ADB. The project impacts on environment is lead it to be considered as Category III Project according to the national requirements. Also comparison of project alternatives has been carried out within IEE.

22. The IEE provides an Environmental Management Plan (EMP) as an appendix, which clearly gives the activities related potential environmental impacts for each phase of the project, e.g. pre-construction, construction and operation and maintenance phases.

23. The EMP identifies also implementing and monitoring responsibilities, parameters to be monitored, frequencies and costs. However, it does not clearly give the cost amounts since they are associated either construction activities or consultant activities.

24. The IEE has been translated in Russian in 2013 and send tot NPC for approval. The approval of IEE has been obtained for the IEE on 23rd January 2013. The IEE has been published ADB's website on May 2013.

25. Since more than 2 years have passed over this approval, according to the national requirements this approval has to be also renewed.

26. Based on this requirement, Environmental Experts of the Technical Assistance Team have already updated both English and Russian versions of IEE. The Russian Version of the updated IEE will be sent to the NPC for renewal of approval. During this approval process, if any comments received from NPC necessary changes will be reflected also to the English version. Whenever the renewal of the approval is received from NPC, the English Version of IEE will be send to ADB for issuing in the website.

27. Technical Consultant has integrated the Environmental Management Plan and its requirements to the Bidding Documents like preparation of SEMP plans, designation of staff responsible for environmental monitoring activities., etc.

28. The progress achieved about the implementation of IEE has been given at the table in Annex I.

29. The Contractors have to prepare and implement a Site Specific Environmental Management Plan (SSEMP) which will be based on the Environmental Management Plan. The project foresees at least four civil and erection contracts with expected commencing date as a middle and end of 2016. Consequently, preparation of at least four SSEMP's are anticipated under the project. The SSEMP is expected to comprise a clear statement of environmental policy to be adopted for the Contract. The SSEMP shall be subject to approval by the Project Manager of PMO.

3.2 Site inspections and audits

30. "Not yet applicable".

3.3 Non-compliance notices and corrective action plan

31. "Not yet applicable".

3.4 Consultation and complains

32. In case of occurrence of complaints from non-staff or the affected population, the project management office (PMO) is the designated a complaint receiver. However, since the population is having more access to Hokimiyat, local mahallas, the environmental consultant from PMO will routinely check at least 1 times/month with local hokim and mahallas where the project located to gather information whether any complaint has been received by them. In addition, the supervision consultant will also oversee and record to PMO, if there is any inconvenience caused by the project that could cause a complaint from affected people. The

Grievance Logs will be developed and managed by the Contact Person and will be kept at site as well as at Hokimiyat.

33. The PMO, environmental consultant will coordinate with local authorities, mahalla, and committee on nature protection to resolve any complaint within 5 working days by identifying how the solution will be implemented, and communicating with the complainants. If within 5 working days, complaint cannot be resolved, complainants have the right to bring the complaint to high authorities, such as Hokim, or Ministry of Agriculture by following the Government Resolution on Civil Right. All complaints received and handled will be recorded in systematic manner and both resolved or unresolved have to be directly reported to ADB.

Part IV - Action plan for the next period

34. The anticipated physical activities have been planned for the middle and the second half of the 2016. Therefore the main activities related to environmental monitoring will be focused on collection of baseline information related to the project area, ensuring the inclusion of safeguard and environmental mitigation measures in bid proposals. These activities will be carried out by environmental and safeguard officers of PMU/PIU with the support of local and international consultants.

35. The following activities will be performed during the next reporting period:

- Preparation of Site –Specific Environmental Management Plan under the contract (ABISRP/ICB/02) - August 2016;
- Preparation of Site –Specific Environmental Management Plan under the contract (ABISRP/NCB/04) - August 2016;
- Contractors will be hired under the contracts ABISRP/ICB/01 and ABISRP/NCB/04 till the end of 2016;
- Conducting capacity building training related to ADB environmental safeguards requirements for the representatives of PMO, SC and CC by ADB/RETA Regional Environmental Safeguards Consultant – October and/or December 2016
-

Annex I

Implementation report on the Initial Environmental Examination

Reference	Requirement	Action to date	Action required/comment
EMP Pre-Construction Article 1	Incorporation of Health and Safety working requirements in the pump house and other designs	Tender Documents prepared to include the requirements	Check whether the engineering design includes the requirements.
EMP Pre-Construction Article 2	Incorporation of wildlife avoidance management plan into project scheduling	Tender Documents prepared to include the requirements	Check whether SEMP includes the necessary activities.
EMP Pre-Construction Article 3	Development and incorporation of Best Management Practice Topographic and Hypsometric survey standards	Tender Documents prepared to include the requirements	Check whether the engineering material and methodology that includes the requirements.
EMP Pre-Construction Article 4	Incorporation of structural stability for safety purposes and sustainability of facilities (pump house facilities)	Tender Documents prepared to include the requirements	Check whether the engineering design includes the requirements.
EMP Pre-Construction Article 5	Reduction of sand at the pump intakes	Tender Documents prepared to include the requirements	Check whether the engineering design includes the requirements.
EMP Pre-Construction Article 6	Provision of oil and water separators if surface drainage from pump house enter irrigation canals	Tender Documents prepared to include the requirements	Check whether the engineering design includes the requirements.
EMP Pre-Construction Article 7	Development of Worker Safety Plan (WSP)	Tender Documents prepared to include the requirements	Check whether the contractor submitted a Worker Safety Plan.

Reference	Requirement	Action to date	Action required/comment
EMP Pre-Construction Article 8	Evaluation of ground condition of rising main	Tender Documents prepared to include the requirements	Check whether the engineering methodology that includes the requirements.
EMP Pre-Construction Article 9	Provision of canal and open drain crossings	Tender Documents prepared to include the requirements	Check whether the engineering methodology that includes the requirements.
EMP Pre-Construction Article 10	Incorporation of landscaping, tree planting, pavements and beatification of buildings/ sites	Tender Documents prepared to include the requirements	Check whether SEMP includes the necessary activities.
EMP Pre-Construction Article 11	Procurement: i. supply of training maintenance programs. ii. Exclusion of PCB from goods included in procurement	Tender Documents prepared to include the requirements	Check whether the procurement includes training and PCB free goods.
EMP Pre-Construction Article 12	Incorporation of EMMP in bid and contract documents	Tender Documents prepared to include the requirements	Completed
EMP Pre-Construction Article 13	Design of rehabilitation of canals, drains, structures, and demonstration farms	Tender Documents prepared to include the requirements	Check whether the engineering design includes the requirements.
EMP Pre-Construction Article 14	Selection of Contractor based on EMP	Tender Documents prepared to include the requirements	Check the EMP's submitted with the tender documents submitted.

ANNEX II**ENVIRONMENTAL MONITORING FRAMEWORK OF ABISR**

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
PRE-CONSTRUCTION PHASE				
Has the Consultant reviewed IEE?	By the activities of PMO Technical Assistance Team	Once in the initial phase of project.	EEC	Bi-annual EMR
If the IEE has been updated has it been send to the ADB for approval?	By the activities of PMO Technical Assistance Team	Once in the initial phase of project.	EEC	Bi-annual EMR
Has the PMO submitted IEE assessment report for approval to the National Authorities?	By the activities of PMO Technical Assistance Team	Once in the initial phase of project.	PMO	Bi-annual EMR
Has the Consultant included the EMP as a special Condition in the Bid Document?	By the activities of PMO Technical Assistance Team	Once in the initial phase of project.	PEC	Bi-annual EMR
Has the Contractor designed adequate staff facilities in the pump house redesigns (water-seal toilets, furbished rest rooms, dining rooms, etc.)	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the Contractor's design include raised walking ways?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the Contractor's design provide safety guards on the areas exposed to the machinery?	By technical review	Once in the review of design documents	MEC	Bi-annual EMR
Does the Contractor's design have any drainage facility to lower ground water?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the design meet the internationally acceptable safety standards of electricity for wet working areas?	By technical review	Once in the review of design documents	EIEC	Bi-annual EMR
Does the design consider critical periods for biological life and adhere any avoidance plan?	By technical review	Once in the review of design documents	EEC	Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Does the Contractor have proper survey equipment?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the design ensures free access to the facilities and availability of roads to them for O&M?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the design take care the placement of building and facilities considering fire breaks?	By technical review	Once in the review of design documents	MEC	Bi-annual EMR
Does the design considers Corrosion protection of buildings by ground water?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the design care the fire proof materials where necessary?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Has the Contractor checked the desilting efficiency of inlet canal design and desilting basins?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Has the Contractor developed inlet having sand trap and/or other alternative devices?	By technical review	Once in the review of design documents	CEC/MEC	Bi-annual EMR
Does the design consider oil separators to have oil concentration less than 0.3 mg/l?	By technical review	Once in the review of design documents	CEC/MEC	Bi-annual EMR
Does the Contractor developed a Worker Safety Plan in compliance with Uzbekistan Labor Code?	By technical review	Once in the review of design documents	EEC	Bi-annual EMR
Does the design consider protection measures for pipes laid in saline areas ?	By technical review	Once in the review of design documents	MEC	Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Does the design consider safety conditions of crossing, bridges that will be used for transportation of vehicles, equipment and staff?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Does the design consider landscaping convenient to the prevailing natural conditions?	By technical review	Once in the review of design documents	EEC	Bi-annual EMR
Does the design consider training of O&M staff on mechanical and electrical equipment?	By technical review	Once in the review of design documents	EIEC	Bi-annual EMR
Does the design consider to supply transformers free of PCB?	By technical review	Once in the review of design documents	EIEC	Bi-annual EMR
Is the EMP attached to the Contract to form a part of Contract Documents?	By technical review	Once in the review of design documents	PEC	Bi-annual EMR
Does the design consider the irrigational and drinking water requirements?	By technical review	Once in the review of design documents	MEC	Bi-annual EMR
Has PMO evaluated the bidder by checking EMP requirements?	By technical review	Once in the review of design documents	PEC	Bi-annual EMR
Has the Contractor prepared an acceptable EMP based on the Approved IEE?	By technical review	Once in the review of design documents	CEC	Bi-annual EMR
Has the Contractor developed Contingency Plan for accidents including spill of fuel?	By technical review	Once in the review of design documents	EEC	Bi-annual EMR
Has the Contractor submitted the Site Environmental Management Plan?	By technical review	Once in the review of design documents	EEC	Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
CONSTRUCTION PHASE				
Does the Contractor published a public notice regarding the nature and location of the project?	Questionaries	Once in the initial phase of construction project.	C	Bi-annual EMR
Has the Consultant conducted training program for WCA?	By the activities of PMO Technical Assitance Team	Once according to the time schedule of the training program	WCAC	Bi-annual EMR
Has the Consultant conducted training program for BISA?	By the activities of PMO Technical Assitance Team	Once according to the time schedule of the training program	WCAC/EEC/MC	Bi-annual EMR
Has the EMP been explained to the Contractor before the commencement of works?	By the activities of PMO Technical Assitance Team	Once before the commencement of construction project.	PMC/EEC/PMO	Bi-annual EMR
Has the Contractor defined Environmental Management Officer?	Biding Documents	Once in bid evaluation phase	C	MROc and Bi-annual EMR
Has the Contractor defined Safety Officer?	Biding Documents	Once in bid evaluation phase	C	MROc and Bi-annual EMR
Does the Contractor handle the protected plant species, trees taking care of environmental concerns and/or permissions?	Questionaries	monthly	C	MROc and Bi-annual EMR
Does the Contractor excavate and preserve the top soil?	Questionaries	monthly	C	MROc and Bi-annual EMR
Does the Contractor maximize the use of excavated material for construction works?	Questionaries	monthly	C	MROc and Bi-annual EMR
Has the Contractor defined the licensed or got permissions borrow area for usage of construction material?	Questionaries	monthly	C	MROc and Bi-annual EMR
Has the Contractor caused any landslide or erosion?	Questionaries	monthly	C	MROc and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Has the Contractor stockpiles of excavated material for backfilling?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor realized the work activities during non-cropping periods?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor take measures for providing water continuously during construction work?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor defined spoil disposal site with the local authorities?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor disposed/recycled the waste material from the construction area?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has PCB containing electirical equipment disposed according to the requirements of Gozecoexpertisa?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor defined material storage area?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor defined fuel storage area 20 m away from water course?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Is the noise level in working area below the defined limit 80 dB(A)?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor taken noise prevention measures for staff using noisy equipment, vehicles?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Is the nearest residential area affected by the noise level?	Questionaries	monthly	C	MRoC and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Has the working activities limited by daylight hours?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor have a water tanker for spraying water to roads?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor suppress the dust by watering?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor trained the staff on personnel health and sanitation procedures at the working camp, how to interact with the host communities, subprojects environmental protection measures?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor trained the staff on contingency plan?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor trained the personnel for fuel handling procedure?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor trained any person for the first-aid?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor apply any simple training measure for the visitors?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor keep the records for all kind of training?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Number of accidents occurred during report period?	Questionaries	monthly	C	MRoC and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Does the Contractor supply clean drinking water to the staff?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor provide the staff hygienic living and working conditions?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor have toilets, baths, sleeping quarter, dining hall for the staff?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor have any social facilities like sporting area, canteen, shuttle vehicles to the local centers, etc.?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor check the health of the staff regularly?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor keep the health record of the staff?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor have adequate fire protection measures?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor made available the first aid kit to the staff?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor provided safe floor and hand rails, stairs, lifts where necessary?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor provided the enough ventilation and lightening in the specific areas?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor provided the safety equipment, material to the staff?	Questionaries	monthly	C	MRoC and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Does security staff exist in the working area?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the working area have fencing in order to protect intrusion?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor defined solid waste storage area?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor defined the area for used material storage area?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor defined used material storage?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor apply solid waste separation for recyclable solid waste?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor keeps any record for the waste recycled?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor keep any record for the solid waste disposed?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor keep any record for the hazardous waste disposed?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor use the local public roads even the avoidance from these road(s) possible?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor collected and disposed the solid waste regularly?	Questionaries	monthly	C	MRoC and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Does the Contractor discharge the sewerage after treatment?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor avoid the peak hours of local traffic in case of use of local public roads?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the material carried on public roads covered?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor use the vehicles having the controlled exhaust emissions?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Roads selected by the Contractor effect the protected areas?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the public informed with adequate signs about the working area and vehicles?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Do the Vehicles of the Contractor fit in to the speed limits?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Does the Contractor repair all infrastructure/roads when damage given by them?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor removed the soil if they contaminated?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Contractor left the working area as defined in Landscape section of the Bidding Documents?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Has the Operating Personnel signed and accepted all work sites, labor camps, storage areas and temporary dumping areas?	Questionaries	monthly	C	MRoC and Bi-annual EMR
Number of grievances about the Contractor?	Interview with the relevant authorities	monthly	BISA	MRoC and Bi-annual EMR
Number of grievances solved by the Contractor?	Interview with the relevant authorities	monthly	BISA	MRoC and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
OPERATION PHASE				
Has the Contractor provided the training on the safe use of electricity and pumps for operational staff?	Questionaries	Once when the project activities completed	EEC	Bi-annual EMR
Has the Contractor evalauted the trained O&M staff?	Questionaries	Once when the project activities completed	MEC/EIEC	Bi-annual EMR
Has the Consultant trained the WCA, BISA staff for irrigation canal and drainage canal management?	Questionaries	Once when the project activities completed	EEC	Bi-annual EMR
Has the Consultant evalauted the trained WCA, BISA staff?	Questionaries	Once when the project activities completed	EEC	Bi-annual EMR
Has the Oil Separator regularly checked and properly maintained?	Questionaries	Once when the project activities completed	EEC	Bi-annual EMR
Has the relevant organisations observed the irrigation water quality?	Questionaries	Once when the project activities completed	WCAC	Bi-annual EMR
Has the relevant organisations observed the ground water level in the irrigation area?	Questionaries	Once when the project activities completed	WCAC	Bi-annual EMR
Have the farmers applied crop rotation?	Questionaries	Once when the project activities completed	BISA	Bi-annual EMR
Have the farmers applied environmentally friendly agricultural production techniques?	Questionaries	Once when the project activities completed	BISA	Bi-annual EMR
Has the fertility and productivity been ehnanced?	Questionaries	Once when the project activities completed	BISA	Bi-annual EMR
Has the O&M staff applies the national Worker Safety Plan?	Questionaries	Once when the project activities completed	C	MRoC and Bi-annual EMR

INDICATORS	Data Source How it will be measured?	Frequency How often it will be measured?	Responsibility Who will measure it?	Reporting Where it will be reporting?
Has the Contractor made facilities available in the operational building with the clean drinking water?	Questionaries	Once when the project activities completed	C	MRoC and Bi-annual EMR
Has the Contractor made facilities available in the operational building with sewerage disposal/handling?	Questionaries	Once when the project activities completed	C	MRoC and Bi-annual EMR
Has the international agreements about the water abstraction been fitted?	Questionaries	Once when the project activities completed	EEC	Bi-annual EMR
GENERAL ENVIRONMENTAL IMPACTS OF THE PROJECT ON THE ENVIRONMENT				
Flow amount of water in channels?	Measurement	Monthly	BISA/WCA	Bi-annual EMR
Irrigated Area (ha)	Measurement	Monthly	BISA/WCA	Bi-annual EMR
Amount of water used for irrigation purposes.	Measurement	Monthly	BISA/WCA	Bi-annual EMR
Water quality of irrigation water (pH, salinity, hardness, BOD, COD, Nitrate, Nitrite, Ammonium, Phosphate, Pesticides, Oil products, phenol) in the project area.	Measurement	Bi-annual	PMO, HGMEs, Uzhydromet	Bi-annual EMR
Soil quality/pollution (SOM) (humus), soil carbon, mobile and gross NPK, nitrates, nitrites, ammonium, phosphate, pesticides)	Measurement	Bi-annual	PMO, BISA, HGMEs, and WCAs	Bi-annual EMR
Water levels of wells in the irrigated areas? (specify wells)	Measurement	Monthly	BISA/WCA	Bi-annual EMR
Amount of water used for irrigation purposes.	Health Statistics of Local Authorities	Yearly	PMO from local MoH	Bi-annual EMR
Electricity Consumed before the project by pumping?	Electricity Meter Records	Monthly Consumed, yearly total	BISA	Bi-annual EMR
Electricity Consumed after the project by pumping?	Electricity Meter Records	Monthly Consumed, yearly total	BISA	Bi-annual EMR
Water quantity pumped before rehabilitation/reconstruction?	Flow Measurement	Monthly, average flow	BISA	Bi-annual EMR
Water quantity pumped after rehabilitation/reconstruction?	Flow Measurement	Monthly, average flow	BISA	Bi-annual EMR
Reduction in % of GHG by implementation of project?	Calculations	Once based on yearly energy consumption amounts	Calculated by PMO CCMS	Bi-annual EMR

BISA : Basin Irrigation System Authority of Regions
C: Contractor of any Subcomponent
CEC: Civil Engineer of Consultant
CCMS: Climate Change Mitigation Specialist
EEC: Environmental Expert of Consultant
EIEC: Electrical Engineer of Consultant
EMR: Environmental Monitoring Report
MEC: Mechanical Engineer of Consultant
MoH : Ministry of Health
MRoC: Monthly Report of the Contractor about the Implementation of EMP
PEC: Procurement Expert of Consultant
PMC: Project Manager of Consultant
PMO: Project Management Office
WCA: Water Consumer Associations
WCAC: Water Consumer Associations of Consultant

Table 1. Main infective diseases in relation to water supplies

1977)	Disease	Frequency	Severity	Chronicity	% suggested reduction by water improvements
I	Cholera	+	+++		90
I	Typhoid	++	+++		80
I	Leptospirosis	+	++		80
I	Tularaemia	+	++		40?
I	Paratyphoid	+	++		40
I	Infective hepatitis	++	+++	+	10?
I	Some enteroviruses	++	+		10?
I, II	Bacillary dysentery	++	+++		50
I, II	Amoebic dysentery	+	++	++	50
I, II	Gastroenteritis	+++	+++		50
II	Skin sepsis and ulcers	+++	+	+	50
II	Trachoma	+++	++	++	60
II	Conjunctivitis	++	+	+	70
II	Scabies	++	+	+	80
II	Yaws	+	++	+	70
II	Leprosy	++	++	++	50
II	Tinea	+	+		50
II	Louse-borne fevers		+++		40
II	Diarrhoeal diseases	+++	+++		50
II	Ascariasis	+++	+	+	40
III a	Schistosomiasis	++	++	++	60
III b	Guinea worm	++	++	+	100
IV	Gambian sleeping sickness	+	+++	+	80
IV	Onchocerciasis	++	++	++	20?
IV	Yellow fever	+	+++		10?

Category	Preventive strategy
I Faecal-oral	Improve water quality. Prevent casual use of unimproved sources
II Water-washed	Improve water quality. improve hygiene. Improve water accessibility
III Water-based	Decrease water contact. Control snails. Improve water quality
a. Penetrating skin	
b. Ingested	
IV Water-related insect vectors	Improve surface water management. Destroy breeding sites. Decrease human-insect contacts

Source: Environmental impact assessment of irrigation and drainage projects, T.C. Dougherty, A.W. Hall, HR Wallingford, UK, 53 FAO Irrigation and Drainage Paper