

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION REPORT

Supplementary Appendix to the
Report and Recommendation of the President
to the Board of Directors

on the

AMU ZANG IRRIGATION REHABILITATION

UZBEKISTAN

This report was prepared by the Borrower and is not an ADB
Document. The IEE is available on request.

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SUMMARY INITIAL ENVIRONMENTAL EVALUATION (SIEE)

I. INTRODUCTION

1. The Project falls into Category B of Asian Development Bank's (ADB) environmental classification, e.g. the Project is judged to have limited potential environmental impacts. An Initial Environmental Examination (IEE) study was conducted under the Project Preparation Technical Assistance (PPTA). The IEE report was prepared based on a review of available reports, the analysis of existing data, discussions with stakeholders and various experts and field visits. The findings of the study were discussed with, and supported by representatives of the State Nature Protection Committee and prospective beneficiaries in the workshop held on 01 August 2003. This IEE brings together the findings of the IEE of the Project, and presents analysis of the generic environmental benefits, adverse impacts, and recommended mitigation and monitoring measures for each component.

II. DESCRIPTION OF THE PROJECT

2. The Project will help the Government of Uzbekistan to improve water resources management in the south of Surkhandarya Province and to rehabilitate the Amu Zang Irrigation System covering an area of 96,800 hectares (ha), improving the livelihood of about 400,000 rural people. The immediate objectives of the Project are to increase the reliability, efficiency and sustainability of irrigation supplies of the Amu Zang Irrigation System and to facilitate and accelerate the on-going agricultural sector reforms in the project area.

3. The Project will have four components:

- (i) Rehabilitation of the Amu Zang Irrigation System;
- (ii) Support to improved water resources management;
- (iii) Support to private farm development;
- (iv) Project management, monitoring and evaluation.

4. Major rehabilitation works will focus on (i) construction of a sediment control facility at the approach canal between the Amu Darya river and the Amu Zang I pumping station, (ii) partial/full rehabilitation of the three main pumping stations, (iii) improvement of the main irrigation and drainage system, and (iv) improvement of workshop facilities at pumping stations. The total length of main canals to be cleaned and rehabilitated amounts to 170 kilometers (km). In addition, the Project will rehabilitate 102 km of drainage canals, 90 km of field canals and 258 km of field drains.

5. Support to private farm development, agricultural reforms, and rehabilitation of on-farm irrigation and drainage structures will be undertaken in six pilot areas covering 9,450 ha with a population of about 40,000 people. The proposed total investment would amount to \$113.5 million.

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical and Ecological Environment

6. The project area covers 96,800 ha in a desert environment with an average annual precipitation of less than 200 millimeters (mm). It is located near the confluence of the Amu Darya and Surkhandarya rivers, at an altitude between 300 and 450 meters above sea level. A map showing Project location is provided in Appendix 1. The project area has predominantly agricultural landscapes comprising cultivated fields, orchards and vineyards, with mulberry and poplar plantations along roads and other boundaries, plus canals, drains, and irrigation reservoirs.

7. The soils in the Project area are mainly the result of depositions by the Surkhandarya and outwash from the upper mountains. The predominant soils are cracking heavy and medium loamy desert clays. Soil erosion occurs mainly in the form of wind erosion following cotton harvesting, and locally in the form of water erosion following poor irrigation practices. On agricultural lands, about 45% of the soils suffer from light to medium salinization problems, due to water-logging, inappropriate water application rates, poor drainage, high evaporation and use of collector drain water in times of scarcity.

8. The two main water sources in the Project area are the Surkhandarya and Amu Darya rivers. The Surkhandarya has an average annual flow of 3,700 million cubic meters (m^3). The flow is regulated by the South Surkhan reservoir with a current storage capacity of around 500 million m^3 . Further downstream, the river receives 0.1 cubic kilometer (km^3) of water from drainage collectors hence and its mineralization increases from 0.4- to 0.5 grams per liter (g/L) in the upper reaches, to from 0.5- to 0.8 g/L in the middle reaches and from 1- to 1.4 g/L in the lower reaches. The annual discharge of the Surkhandarya River into the Amu Darya is between 0.1- to 0.2 km^3 /year. At Termez the Amu Darya has an average annual flow of 65,000 million m^3 (equivalent to 2,060 m^3 per second). The amount of water pumped through the Amu Zang pumping cascade ranges from 980 to 1.990 million m^3 per year, and depends primarily on the requirements to supplement the flow of the Surkhandarya. The mineralization levels of the Amu Darya range from 0.5- to 0.7 g/L. The turbidity (suspended load) of the Amu Darya is about 5 g/L of which about 40% consists of sand particles (size between 1.0 and 0.05 mm). Currently, much of the suspended load in the pumped discharge (particularly the sand particles) is settling in the Amu Zang irrigation system, notably in the main canals downstream of the first pumping stations. The coarse sediment fractions, in particular sharp sand, passing through the main pumps cause severe abrasion of vital parts of the pumps.

9. Outside the irrigation schemes, the land is sparsely covered with low desert shrubs like camel thorn. Thickets and riverine vegetation with species, such as Tamarix, reeds and poplar, occur in more humid places, e.g. along rivers. Natural grasslands and some few forests still occur in the upper catchment of the Province, where rainfall is higher. During the last two-and-half Millennia, the population has steadily increased, causing deforestation of the now denuded land. Timber and fuel wood shortages are evident throughout the area, and many people use cotton stalks as an alternative energy source. In the irrigation scheme, the desert has been modified into irrigated arable lands with monoculture crops (cotton, wheat and rice) and home gardens (dekhan) with a large variety of horticultural crops. Along canals and roads, several tree species have been planted, such as pine, poplar, maple and mulberry.

10. Most of the natural fauna has disappeared with the gradual habitation and population increase over time. Typical wildlife species, which can be encountered within the Project area, include gofer, mouse, fox, hare, jackal, badger, monitor lizard and snakes.

11. Aquatic biodiversity has been much reduced since the start of agricultural and industrial development in the 1940s. In particular, the original migratory fish assemblages of the Amu Darya have been destroyed by loss of habitat (dams and diversions) and reduced water quality (salts and other pollutants). Common fish species are carp and catfish. Fish also occur in the irrigation canals and reservoirs. There is no fishing on a commercial basis, while local people fish in an artisan manner. Of particular mention is an endemic fish species, which only occurs in the Amu Darya River.

12. Surkhandarya Province is rich in endemic species and out of the 400 species mentioned in the Red Book for Uzbekistan, 136 occur in the Province, notably in the high mountains, outside the irrigation scheme. No evidence was found that these artificial landscapes provide habitat for any endangered species.

13. Two protected areas are located near the project area. The recently created Aktepe Zapovednik (protected area) is located along the shores of the Aktepe Aktepinsk reservoir, immediately adjacent to the irrigation scheme, but there are no rehabilitation works associated with the reservoir envisaged under the Project. The provincial committee for nature protection is presently restoring the vegetation at this site. The other protected area is Aral Payghambar, an island within the Amu Darya River at 25 km from Amu Zang intake, with typical riverine vegetation. The Zul-kifl mosque (11th century) is situated on the island, which is now 'off-limits' due to the prevailing security situation.

B. HUMAN AND ECONOMIC DEVELOPMENT AND QUALITY OF LIVE VALUES

14. The total population of the Project area is estimated at about 400,000 people, of which 85% live in rural areas. The density of population is 110.4 people per square kilometers (km²), which is more than the average of Surkhandarya province (89.6 per km²). The economy of the area is predominantly agricultural and the agricultural sector accounts to about 65% of the total employment in the Province. The provincial contribution to country GDP in 2002 was 7.9%, mainly from agriculture. The mainstay of the rural economy is crop production on shirkat¹ farms and private farms, with a heavy focus on cotton production, winter wheat and to a lesser extent rice. Many of these farms are heavily indebted and are unable to pay adequate and regular wages. Opportunities for diversification of income are limited. Coping strategies include the selling of assets, borrowing money and migration to the Russian Federation to look for work.

15. Cotton is the major cash crop on most farms and the country heavily depends on cotton exports (over 50% of export earnings) to obtain foreign currency and to service the national debt. Cotton is considered as one of the least environmentally friendly crops due to its high use of fertilizers, pesticides and defoliants, although the application rates of these chemicals have considerably declined since the collapse of the Former Soviet Union (FSU). The use of defoliants is still widespread, although much less than previously, but spraying from airplanes is now forbidden.

16. Public health in the Project area is affected by both agricultural practices, sanitation and drinking water supplies. Official figures indicate a low incidence of diseases, but the socio-economic survey revealed that the health situation is poor, particularly due to poor sanitation. In general, most rural people do not have pit toilets or latrines. In addition, the survey showed that there is a lack of health posts, medicines and laboratories.

IV. SCREEN OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Environmental Benefits Associated with the Project

17. The Project will have considerable positive environmental impacts in the Amu Zang area. The new sediment control facility will reduce sediment entering the system by 50%. The cleaning and lining of canals will result in restoration of canal capacity and a reduction in water losses improving water availability. Improvements to the drainage system will reduce water logging and soil salinity.

18. The Project will support the strengthening of the water resources management through installation of a modern control and communication system, capacity building and improved Operation and Maintenance procedures, the establishment of Water Users

¹ Shirkat farm: large cooperative farm converted from collective and state farms under the central planning with an average size of 1,500 to 2,500 ha

Association's (WUA) and development of an integrated Water Resources Management Model. The improved water resources management component would optimize the utilization of the available water resources in the Surkhandarya Basin and will result in reductions in water abstractions from the Amu Darya River. The overall efficiency of the system because of these measures will be increased by at least 5%, resulting in water savings of about 60 million m³ annually.

19. The rehabilitation of on-farm infrastructure in the pilot areas will improve the water management at farm level and this will reduce wastage of water and drainage requirements. The farm demonstrations will improve the soil management and introduce sustainable cropping practices. Training sessions emphasizing new crop technologies and improved water management methods would raise the awareness of sustainable environmental development among government staff and water users.

B. POTENTIAL ENVIRONMENTAL IMPACTS RELATED TO PROJECT LOCATION

20. The Project will rehabilitate existing systems for irrigation water supply. As the overall system capacity will be kept unchanged, this will not require new land acquisition nor resettlement.

21. A new sediment control facility will be constructed with the aim to reduce the amount of sediments entering the main canal. The new facility will consist of (i) a new entrance from the Amu Darya river, about 1,000 meters (m) upstream of the present intake; (ii) a new connecting settling basin to the Amu Zang I pumping station with a length of 1,000 m, a maximum depth of 20 m and a bottom width of 20-50 m. The construction site is located in a restricted (border) area, which belongs to the State and it is inhabited. Therefore, no significant impacts are expected during construction.

22. Two protected areas are located near the Project area: Aktepe Zapovjednik and Aral Payghambar. The latter is an island in the middle of the Amu Darya River at about 25 km downstream of the Amu Zang intake. The island is not accessible due to security regulations, which contributes to the conservation of biodiversity values. Aktepe Aktepinsk reservoir is part of the irrigation scheme and serves as a back-up storage reservoir receiving any overflow of the Amu Zang canal resulting from discrepancies between the operation of pumping stations Amu Zang I and being replenished from the Amu Zang canal downstream of Amu Zang II pump station. The recently created Aktepe Zapovjednik protected area is located along the shores of the reservoir. No impacts on the Zapovjednik are expected from the Amu Zang Canal rehabilitation, since there are no rehabilitation works associated with the reservoir envisaged under the Project.

V. POTENTIAL ENVIRONMENTAL IMPACT RELATED TO DESIGN AND MITIGATION MEASURES

A. Amu Darya Water Resources

23. The Amu Zang irrigation scheme, which was established in the seventies, has affected the quantity and quality of the Amu Darya flow. The scheme abstracts on average 1,450 million m³ of water per year, which represents 2% of the annual Amu Darya flow measured at Termez, which is about 65 km³ per year.

24. **Water Flow.** The Project will rehabilitate the pumping stations without changing the installed capacity. The amount of water that will be drawn from the Amu Darya river after the project completion has been calculated as 1,200 million m³ per year, which is about 5% lower than the average withdrawals volumes withdrawn before the Project during the last 5 years,

which vary from 980 million m³ per year to 1,980 million m³ per year. The expected lower withdrawal is due to the envisaged improvements in water management after implementation of the Project. The Project will rehabilitate the pumping stations without changing their capacity, and therefore will not trigger negative impacts on the total Amu Darya flow².

25. **Water Quality** With respect to mineralization, no negative changes are expected once the Project is rehabilitated. The average level of mineralization of the Amu Darya at Termez is 0.4- to 0.7 g/L, and of Surkhandarya at Mangusar (near the confluence with the Amu Darya) is 1.0- to 1.5 g/L. Mineralization levels of the various collectors directly draining into Amu Darya are much higher and range from 3.0- to 5.0 g/L. The Project will include improvements of the existing drainage system, which will result in environmental benefits such as reduced water tables and reduced salinization. The introduction of measures for adoption of sustainable agriculture systems will, on in the long term, improve the quality of the return flows. Improved water management in the project area would result in a reduction of water abstractions, and corresponding drainage flows from the Amu Darya, which reduces the salt load concentration in the river.

26. **Sedimentation.** The Project envisages the construction of a 1,000 m long sediment basin at the Amu Zang I pumping station. Conventional dredgers will provide for the removal of the trapped sediments. The sediment interception facility is designed to trap about 50% of the total sediment load. The remaining sediments (mostly coarse and fine silt and clay fractions) will partly settle in the smaller canals and field ditches or will be transported to the farmers' fields. In general, farmers appreciate these finer sediments, since they contribute to soil fertility.

27. After the construction of the sediment control facility, the amount of sediments entering the irrigation system will be reduced and most of the intercepted sediments will be returned back to the Amu Darya River through dredging pipes. These sediments were obtained from the river, and therefore do not constitute an introduction of exotic materials into the river. Nevertheless, the sediment regime of the Amu Darya River should be monitored to detect any potential changes on in the downstream parts reaches of the river. This monitoring program will be supported by the Project.

VI. POTENTIAL ENVIRONMENTAL IMPACT RELATED TO CONSTRUCTION AND MITIGATION MEASURES

A. Excavation Materials

28. Canal cleaning requires excavation of important amounts of sediment from the three main canals (total length 190 km), which has been calculated as follows: 220,000 cubic meters (m³) from the Amu Zang canal, 10,000 m³ from the Zang canal, and 38,400 m³ from the Babatag canal. Where there is not enough space along the canal to deposit the excavated materials, these will be transported and deposited further away on unproductive

² It should be noted that the actual amount of water pumped is based on the available flow of in the Surkhandarya river and does not only depend on the capacity or the design of the pumping stations. In this respect, the South Surkhan reservoir, which is located upstream the Amu Zang Irrigation System plays an important role, as its capacity has decreased, and would continue to decrease, hence supplementation of water from the Amu Darya river could potentially increase in the long run. To address this issue, the Government has commenced the construction of a second reservoir upstream of South Surkhan reservoir. It is anticipated, that the commissioning of this reservoir would reduce, in the long term, the total abstraction of water from the Amu Darya River. On the other hand, it would also reduce the inflow from the Surkhandarya River into the Amu Darya River. Overall, it is estimated that as a net, the rehabilitation of Amu Zang irrigation system will result in 5% reduction in water intake from Amu Darya, i.e. 60 million c.m water saving per annum.

lands. In addition, spoil already dumped on access berms and embankments amounting to 264,000 m³ on the Amu Zang canal, 30,000 m³ on the Zang canal and 102,000 m³ on the Babatag canal will be removed, and corresponding costs are included in the Project estimates. Most of the spoil will be coarse grained (mostly medium to very fine sand and coarse silt) and is not suitable for deposition on farmers' fields. Spoil disposal will be regulated through specific clauses in standard contract documents. Most areas adjacent to the irrigation scheme, which are not irrigated, are unproductive desert lands, where the spoil can be disposed of without negative environmental impacts. Where large quantities are excavated, and the space near the canal is limited, it is recommended to dispose of the spoil further away from the canals. The specific locations will be determined during the detailed design. All construction sites should be properly cleaned up, leveled and re-planted if required. All corresponding costs are included in the Project estimates.

29. The construction activities associated with the sedimentation control facility at the intake of Amu Zang I pumping station will produce large amounts of excavation materials (2,000,000 m³). There are extensive areas of unproductive lands in the desert areas adjacent to the pumping station, where the materials should be deposited. The specific location will be determined during the detailed design. The impacts of the construction activities are considered not significant, provided the excavated soil is properly disposed of on the unproductive wastelands see para 63 64 above.

B. Canal Protection

30. According to the existing government instructions, irrigation canals should be flanked with by buffer strips alongside where intensive agriculture, using fertilizers and pesticides, is not allowed. These strips would serve to provide space for inspection roads (the inner buffer zone), to protect the canal against infiltration of polluted water from nearby agricultural fields, and contribute to the general amenity of the environment through the establishment of vegetative strips (the outer buffer zone), which do not require intensive irrigation and/or application of agro-chemicals. The width of these strips depends on the capacity of the canals and has been determined by Government regulation as tabulated below.

Table 1: Government Regulation

Capacity of the Irrigation canal (m ³ /sec)	Width of the Inner Buffer Zone for Inspection Roads and Deposit of Sediment from Canal (m)	Width of the Outer Buffer Zone for Vegetation and Limited Agriculture (m)
1	6	n.a.
5	10	n.a.
25	20	50
50	75	100
100 or more	100	200

m³/sec = cubic meter per second, m = meter, n.a. = not available

Source: MWAR

The buffer strip zones (right of way of canals) are state owned lands. In some places along the canals, farmers have illegally encroached the buffer strips to cultivate crops. Through consultations with farmers, the Project Implementation Unit (PIU) will ensure that buffer zones are restored, where required, and maintained according to the regulations.³

³ During the feasibility study it was established that 1.1 ha of encroached land and 1 small farm building fall under the area where the project rehabilitation will take place. According to the Decree No.174 issued in 1992, construction of farm buildings is allowed in the buffer zones. However, the Government has agreed that if these zones need to be restored (i) the farmers will be adequately compensated for crops and the building; and (ii) no additional land or assets will be acquired from the farmers. In case such a need arises, the Executing Agency

C. Waste Material

31. Replacement and repair of the pumps at the various pumping stations requires properly disposing of disposal and disassembling the old pumps and materials. Any waste materials containing oil products or other polluting substances will be treated in such a way that the polluting substance is collected and disposed properly.

D. Domestic Wastewater and Solid Wastes Generated from Construction Workers

32. Civil work contracts will ensure that the technical operations (replacement of pumps, construction activities and cleaning of canals) are carried out according to the standard instructions for the appropriate disposal of waste, minimization of nuisances during construction, and proper after-care of the construction sites. The Project will ensure that contractors for civil works also comply with national safety and hygiene requirements for domestic wastewater and solid waste, which will be included in the contract documents for civil works.

E. Dust and Noise

33. During construction of the sediment control facility and rehabilitation of canals dust and noise may be created. Dust may be caused especially during the periods of strong winds from Afghanistan. To minimize impacts to workers water spraying will be utilized. For the health and safety of workers, dust creation from construction and the noise impact from machinery will be mitigated by personal protection equipment.

VII. POTENTIAL ENVIRONMENTAL IMPACT RELATED TO OPERATION AND MITIGATING MEASURES**A. Water Flows**

34. No major changes of the water abstractions are expected once the rehabilitated project is in operation. Similar or even somewhat (5%) lower amounts of water will be extracted from the Amu Darya River, as currently is the case. The Amu Zang operation staff will monitor the water abstractions throughout Project implementation.

B. Sediment Reduction

35. The sediment interception facility will result in an important reduction of sedimentation and siltation of irrigation canals and drains. It is estimated that about 50% of the suspended solids currently entering the irrigation system, will be intercepted at the Amu Zang intake. The other 50% consists mostly of fine-grained sediments, and will be settled in the field canals and on farmers' fields. These finer sediments are generally appreciated by farmers.

36. The impacts of the return flow from the sediment control facility on the river are considered not significant and can be absorbed by the Amu Darya flow, as discussed previously.

C. Water Losses

37. Operational procedures following implementation of the Project are likely to be improved by management strengthening programs and introduction of a decision support

(EA) will prepare a resettlement plan according to the ADB's Involuntary Resettlement Policy, and submit it to ADB for its approval prior to award of civil works contracts (Ref. RRP paras. 99 and 108).

system. Improvements in operation efficiencies are further expected from the rehabilitation of canals, collectors and the installation of hydro-posts, which allow better monitoring and control of water delivery. Therefore, water savings of at least 5% or 60 million m³ annually can be expected.

38. Once the main canals are cleaned and lined, infiltration losses during operation will be reduced substantially. At present, the infiltration losses at Babatag canal, for example, are estimated at 20- to 30%. Particularly the area at Oltyndan suffers from infiltration losses, where a large waterlogged area has developed with saline lands and occurrence of active gully erosion. Canal deformation and erosion, now occurring in various places, will be reduced considerably once the rehabilitated system is in operation. A monitoring program for water flows has been included under the Project.

39. At the pilot areas, water losses will be reduced due to introduction of water savings techniques. Techniques that could be adopted by the farmers include: (i) land leveling so that water is better spread over the land and less water is needed; (ii) better application rates, which are adjusted to the growing periods of the crops, and (iii) mulching of soils to reduce evaporation from the soil and enhance water holding capacity of soils. Water losses will be further reduced due to construction and repair of canal linings.

40. A total of \$180,000 (about 0.02% of total Project cost) will be invested for implementing the recommended mitigation measures (please see Appendix 2 for details).

VIII. ENVIRONMENTAL MONITORING PROGRAM AND INSTITUTIONAL REQUIREMENTS

41. The environmental monitoring program will be part of an integrated Project monitoring program to be set up by the Project Management Office (PMO). The PMO and PIU will be responsible for implementing all environmental mitigation measures. The PMO will establish a Monitoring and Evaluation Unit (MEU), which will develop a procedure and system to monitor both progress and effects. The PMO, supported by consultants, will undertake formulation of a detailed monitoring system and will select monitoring indicators and frequency of measurement. The PMO will include one national environmental specialist (6 person-months) and one international environmental specialist (1 person-months) to assist with environmental compliance monitoring as well as with environmental monitoring carried out by national or local environmental monitoring authorities. The main tasks of the environmental specialists will be to assist in the setting up of a monitoring system, draw up clauses to be included in the civil works contracts, assist with environmental enhancement measures, provide training for environmental management, and assist with preparation of terms of reference for environmental studies and work.

42. Contracts with sub-contractors for civil works will include clauses to ensure minimum environmental impacts. The staff of PMO will prepare the contract documents and supervise the activities. The Provincial Committee on Nature Protection would be responsible for environmental clearance. Procedures will have to be followed as established in the national regulations (i.e. the "National Guidelines on Conducting Environmental Studies", 1993).

43. The Project support that, wherever possible, the authorized and specialized national institutes will carry out the environmental monitoring activities in the Project area, which will ensure sustainability and continuation during Project operation after Project completion. During the first six months of Project implementation, the PMO environmental specialists will develop a monitoring program to be undertaken during the Project implementation. Specialized national institutes will take part in the program according to their field of expertise. The following monitoring currently takes place in the Project area.

44. Water quality monitoring of surface water is carried out by the State Hydromet. Water table monitoring in Surkhandarya Province is carried out by the specialized “Land Reclamation and Hydrological Expedition Department” (“Land Reclamation and Hydrological Expedition Department”) of Ministry of Agriculture and Water Resources (MAWR) on a monthly basis. Meteorological monitoring is also conducted by Hydromet. Drinking water quality monitoring is undertaken by the Provincial Office of the Ministry of Health. Ecological monitoring is undertaken by the Analytical Inspection under the State Committee of Nature Protection. The Project will support the fish monitoring at the Amu Zang approach canal to quantify the fish populations living in the Amu Zang canal, and to estimate the amount (and type) of fish sucked-up by the pumps. The Provincial Committee on Nature Protection will undertake this activity and funds will be provided under the Project.

IX. PUBLIC INVOLVEMENT

45. Agencies that provided information/consultation for the IEE preparation include the State Committee for Nature Protection in Tashkent, the Ministry of Agriculture and Water Resources, the Environmental Protection Committee in Surkhandarya Province, the Provincial Department of MAWR in Termez, “Land Reclamation and Hydrological Expedition Department”, farmers’ associations in Djaikhun, and various individual farmers in the field. Interviews were conducted with the above stakeholders, to obtain and analyze their views and main concerns. In addition, in April and May 2003, a detailed socio-economic survey using participatory techniques was carried out. Representatives of the “Department of Ecological Expertise” within the State Committee for Nature Protection participated in the final Project workshop on 01 August 2003 held at in Tashkent, where the scope, design and impacts of the Project were presented and discussed in detail. All these consultations concluded that there is an overall support for the rehabilitation project and that no significant negative environmental impacts are associated with the Project.

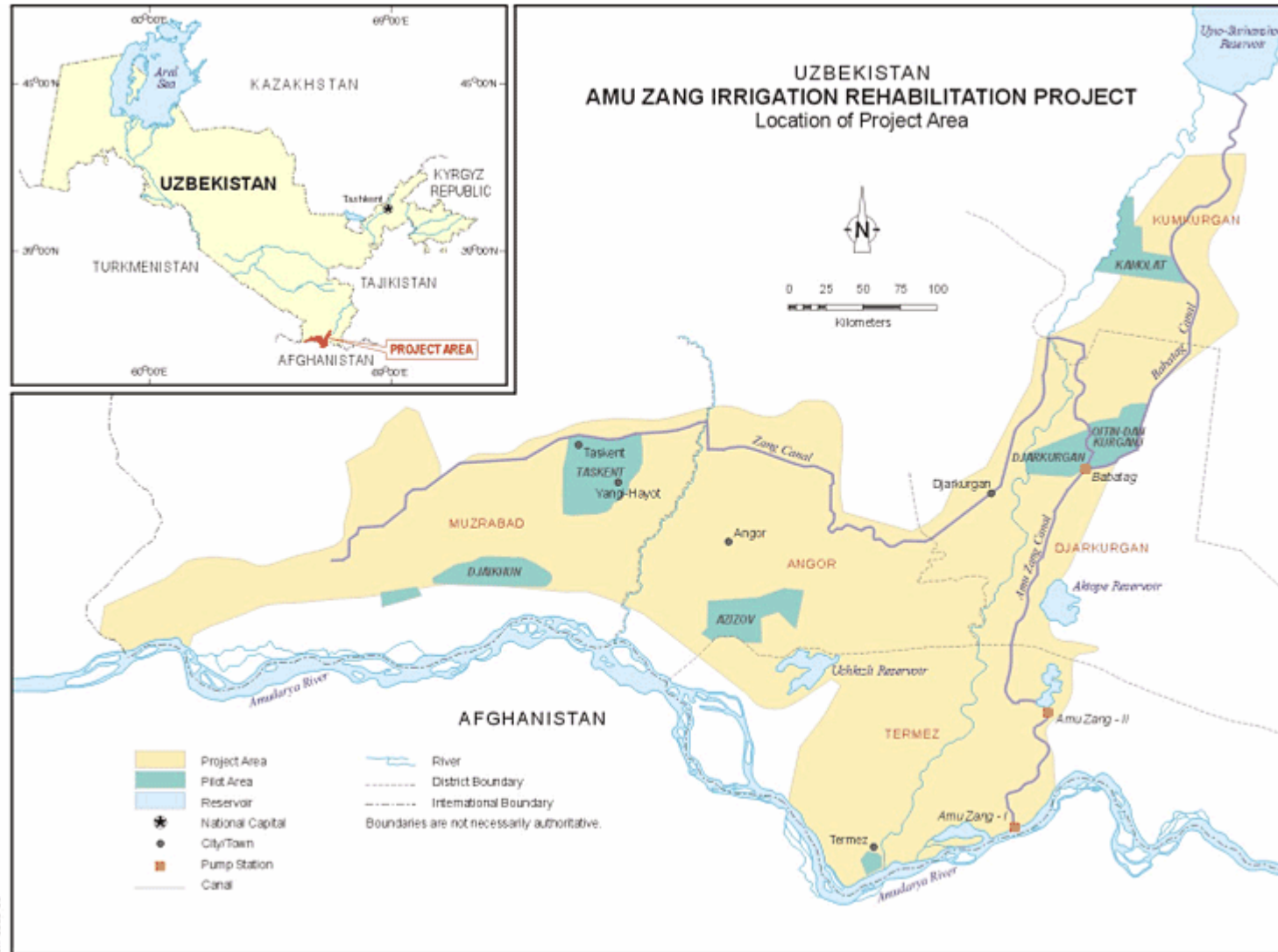
X. FINDINGS AND RECOMMENDATIONS

46. The Project involves rehabilitation of the existing infrastructure rather than construction of new canals or expansion of the pumping capacity or irrigated area. There are a number of environmental benefits associated with the Project. The Project area is not considered environmentally sensitive, and adverse environmental impacts will be minor. Mitigation measures with careful monitoring plan have been formulated, and costs for implementing the measures have been included in the budget.

XI. CONCLUSIONS

47. The findings and assessment of the project area illustrate that there will be no significant adverse environmental impacts on the project affected area. The mitigation measures are deemed sufficient for the small impacts identified. There is no need to carry out a full scale EIA.

APPENDIX 1. PROJECT LOCATION MAP



APPENDIX 2. POTENTIAL ENVIRONMENTAL IMPACTS, POSSIBLE MITIGATION AND ENHANCEMENT MEASURES

Project Phase	Environmental Impacts Positive	Negative	Magnitude		Duration			Mitigation/Enhancement Measures	Budget (US\$)
			D1	D2	S	M	L		
1 Location	No Impact	No Impact						Enhancement measures: ecological baseline study at Aktape Zapovednik	20,000
2 Design	Sediment settling basin will trap 50% of sediments and return these to Amu Darya River, which will reduce canal cleaning problems. Improvement of the drainage system will reduce shallow water tables and salinization problems. Rehabilitation of canals and structures will improve water efficiency, reduce water logging, and reduce bank erosion of canals and discharge structures	Sediment load concentration in Amu Darya will change	✓					River morphology study and monitoring downstream of return flow of dredgers will be undertaken based on satellite imagery	100,000
		Fish ecology	✓					Study on occurrence of fish in approach canal and fish currently being sucked up by existing pumps will be undertaken	10,000
3 Construction		Disposal of spoil from canal cleaning						Spoil will be deposited alongside canal and where there is insufficient space, deposited on nearby unproductive lands. These costs have already been included in the estimates for civil works.	Pm
		Construction of settlement interception basin						Excavated materials will be deposited on unproductive lands nearby (costs have already been included in engineering calculations). Any possible impacts on river morphology will be studied and monitoring with remote sensing (see 2 above)	Pm
		Disposal of obsolete parts						Following refurbishing of pumps, obsolete parts will be disassembled for recycling and/or property disposed of	5,000
4 Operation	Infiltration losses in canals will be reduced following canal rehabilitation and lining. Agricultural reforms in pilot areas will improve farmers' income and promote diversification of the agricultural system. Mineralization levels of return flow will be reduced.	Pollution with construction waste materials						Appropriate arrangement of construction sites, and clean up of construction sites afterwards will be included in the civil works contracts	Pm
		No impact						Enhancement measures: Promotion of crop diversification in pilot areas will increase sustainability will enhance sustainability of agricultural production system (Costs are included in agricultural program)	Pm
								Enhancement measures: preparation of plan to clean up obsolete stocks of agro-chemicals	25,000
							Enhancement measures: improvement of existing buffer strips through landscaping and amelioration measures along main canals. (Costs included in canal rehabilitation program)		
Total									180,000

D1 = no or a little impact; D2 = significant impact; S = short term, 1 year; M = medium term; L = long term, 10 year; Pm - per memoria (costs included in the project civil works/contracts)