

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
IMPROVEMENT OF EQUIPMENT
FOR
MELIORATION AND IRRIGATION
IN
AZERBAIJAN REPUBLIC**

March 2004

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO., LTD.

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US\$1.00 = AZM 4,972.17 (1 Yen = AZM 43.48)
US\$ = United States Dollars
Yen = Japanese Yen
AZM = Azerbaijan Manat

PREFACE

In response to a request from the Government of Azerbaijan Republic, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Equipment for Melioration and Irrigation and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Azerbaijan a study team from January 5 to January 24, 2004.

The team held discussions with the officials concerned of the Government of Azerbaijan Republic, and conducted a field study at the study area. After the team returned to Japan, further studies were made. As this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Azerbaijan Republic for their close cooperation extended to the teams.

March, 2004

Kunimitsu YOSHINAGA

Vice-President
Japan International Cooperation Agency

March, 2004

Letter of Transmittal

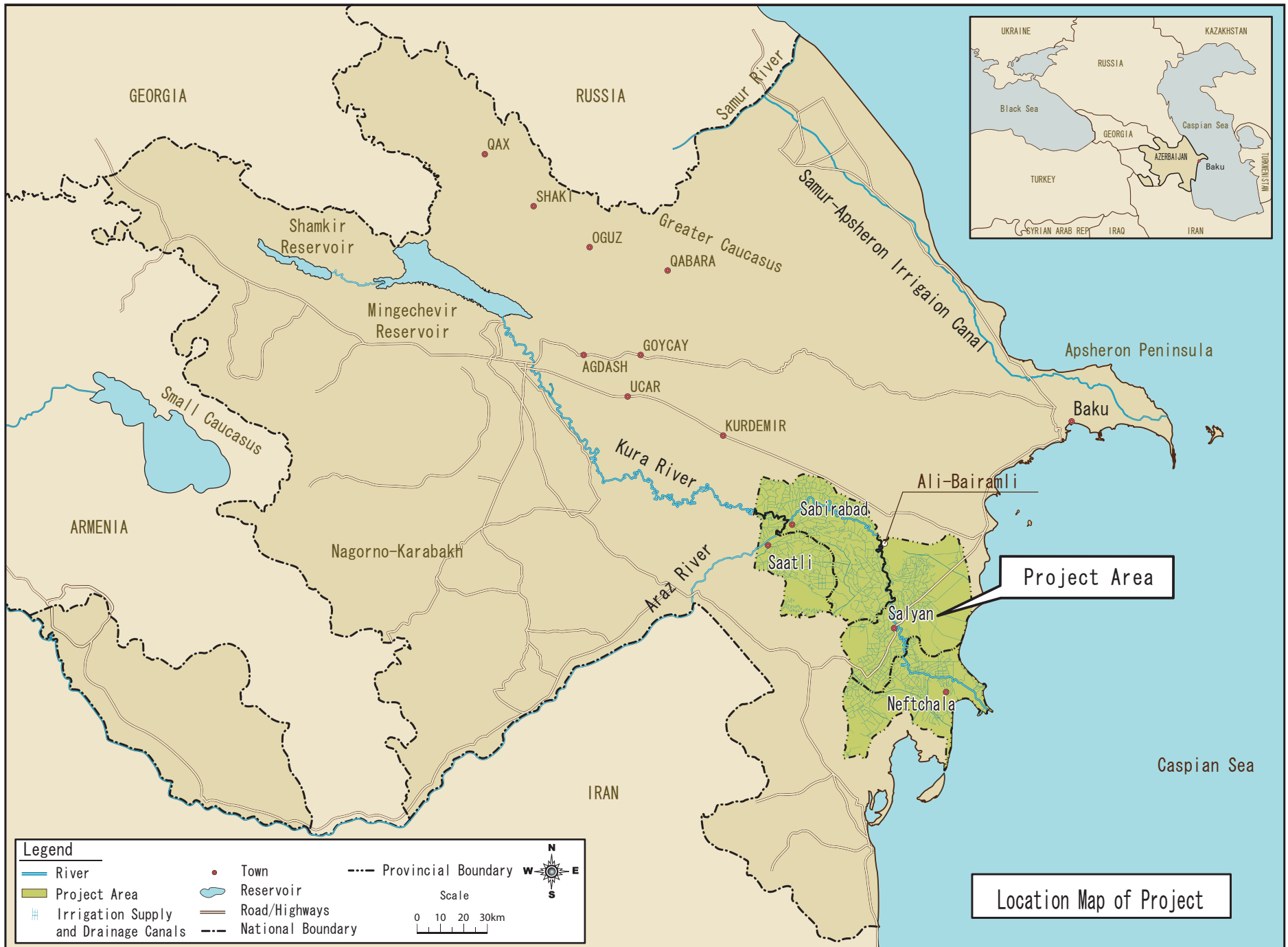
We are pleased to submit to you the basic design study report on the Project for Improvement of Equipment for Melioration and Irrigation in Azerbaijan Republic.

This study was conducted by Nippon Koei Co., Ltd., under a contract to JICA, during the period from December, 2003 to March, 2004. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the Azerbaijan Republic and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Kuninobu NODA
Chief Consultant,
Basic design study team on
the Project for Improvement of Equipment
for Melioration and Irrigation
in Azerbaijan Republic
Nippon Koei Co., Ltd.



Source : 1/500,000 Azerbaijan Respublikasi Dövlət Geodeziya

Abbreviations

ADB	: Asian Development Bank
A/P	: Authorization to Pay
AZM	: Azerbaijan Manat
B/A	: Banking Arrangement
CAWF	: Committee of Amelioration and Water Farm
Cfa	: Humid Subtropical climates
Cs	: Mediterranean climates
EC	: European Community
E/N	: Exchange of Notes
GOA	: Government of Azerbaijan
GOJ	: Government of Japan
HP	: Horse Power
IDB	: Islamic Development Bank
JICA	: Japan International Cooperation Agency
M/D	: Minutes of Discussions
MOA	: Ministry of Agriculture
O&M	: Operation and Maintenance
ODA	: Official Development Assistance
VAT	: Value Added Tax
WB	: World Bank
WUA	: Water Users Association
2KR	: Kennedy Round 2

SUMMARY

The Azerbaijan Republic is a new country that became independent from the former Soviet Union in 1991 and joined the European Community (EC) in 2001. The area of the national land is 86,600 km², which is equivalent to one fourth of Japan, and the population is 8.20 million¹. It faces Dagestan in the Russian Federation to the north, Georgia to the northwest, Armenia to the southwest, Iran and Turkey to the south and the Caspian Sea to the east. The topography is complex and varied. Three fifth of the whole area is mountainous region. A plain extends along the Kura River flowing down to the southeast. The climate differs from place to place. As for the area facing the Caspian Sea, the northern part is classified into the Humid Subtropical climates (Cfa) with rather less precipitation that is about 570 mm/year in Guba, and southern part is into the Mediterranean climates (Cs) with further less precipitation about 280 mm/year in Salyan. Because of such less precipitation, 90% of the farm products are cultivated with irrigation. Under such condition, extensive networks of irrigation and drainage systems consisting of canals, pumping stations, regulating reservoirs, etc. have been constructed in Azerbaijan.

One of the important networks of irrigation and drainage systems is located in the project area, which is composed of the four (4) regions of Salyan, Sabirabad, Saatli and Neftchala (hereinafter referred to as “the Project Sites”) and forms the major agricultural production area in the country. In the Project Sites, there are 202,000 ha of irrigated area, covered by 5,900 km of irrigation canal networks and 10,400 km of drainage canal networks.

In the existing irrigation and drainage canals in the Project Sites, serious reduction of flow capacity has been caused due to sedimentation and weed growth. Respective management offices concerned are carrying out dredging work. However, actual dredged volume is much smaller than the required volume to be dredged. That is due to lack of equipment and operational budget. In some secondary canals of the areas, appropriate water flow is disturbed because of the sedimentation. Sedimentation at the beginning point of tertiary canals disturbs the distribution of water to the on-farm systems. Then, the irrigation water shortage, as well as the poor drainage caused due to the sedimentation, results in salinization damage in many irrigated areas. Taking into consideration of the situation mentioned above, it is judged that urgent dredging rehabilitation of such canals in the Project Sites is indispensable.

¹ Ref. 2003 Statistical Yearbook of Azerbaijan

In accordance with the presidential decree of November 2003, the national development plan is now under preparation. As to the agricultural sector, “The Amelioration and Irrigation Development Program 2004-2010” was worked out by the Committee of Amelioration and Water Farm (hereinafter referred to as “CAWF”). This program includes development of new irrigation area of 31,000 ha and rehabilitation of existing irrigation and drainage facilities in 61,000 ha. With this background, the dredging of the canals has been decided to be partly implemented with use of equipment to be procured by Japan’s Grant Aid Project (hereinafter referred to as “the Project”)

The original request for procurement of equipment by Japan’s Grant Aid was made by the Government of Azerbaijan in August 1999. Then, the Preparatory Study was conducted by the Japan International Cooperation Agency (hereinafter referred to as “JICA”) in September 2003 to examine the background, purpose, contents and effect of the requested project. As a result of the study, the Project Sites were changed from the whole of the country to the four (4) regions as confirmed in the Minutes of Discussions on the Preparatory Study dated September 26, 2003. The type and number of equipment were also modified from those of the original request as mentioned in the Preparatory Study Report of October 2003. This modified list of equipment has been recognized as the equipment of the modified request.

This Basic Design Study has been conducted based on the modified request. The field survey was carried out from January 4 to January 25, 2004 and then the home work has been conducted for analysis of the collected data and information. The Draft Basic Design Report was sent to the Government of Azerbaijan by the end of February 2004. The explanation mission of the draft report was not dispatched to Azerbaijan. As a result of the Basic Design, the following have been finally determined.

The Grant Aid Project is to procure necessary equipment for rehabilitation of the selected 15 canals and one (1) floodway that have serious sedimentation and are in need of dredging. The following equipment has been selected and agreed between the Japanese Basic Design Study Team and the Azerbaijan Republic.

- | | | |
|----|---|------------|
| 1) | Wheel type hydraulic excavator, 1.4 m ³ (heaped) | : 4 units |
| 2) | Wheel type hydraulic excavator, 0.8 m ³ (heaped) | : 19 units |
| 3) | Wheel type hydraulic excavator, 0.5 m ³ (heaped) | : 2 units |
| 4) | Bulldozer, 21 ton | : 2 units |
| 5) | Bulldozer, 15 ton | : 10 units |
| 6) | Hydraulic type truck crane, 20 ton or more | : 1 unit |

- | | | | |
|-----|--|---|---------------|
| 7) | Cargo truck, 14 ton or more | : | 1 unit |
| 8) | Tractor with semi-trailer, 40 ton or more | : | 1 unit |
| 9) | Mobile workshop with repairing equipment and tools | : | 1 unit, 1 set |
| 10) | Spare parts | : | 1 set |

As a result of the field work of this Basic Design Study and discussion with the Azerbaijan officials, the following canals and a floodway were selected in the four (4) regions in consideration of the urgent necessity for dredging work.

- | | | |
|---|-------------------|----------------------------------|
| ① | Secondary canals | (15 routes, total length 256 km) |
| ② | Girdiman floodway | (1 route, total length 15 km) |

Bottom width of the secondary canals ranges from 1.0 m to 4.5 m. Because of the small size of the canals, it has become necessary to select smaller size excavators.

Therefore, it has also been necessary to reduce the size of the proposed bulldozers that are to be used for spreading and leveling of the dredged soil in combination with the excavator. The standard combinations are as follows:

Standard Combination of Equipment

- | | | | |
|-----------------|---------------|---|---|
| Small canals : | Small volume | : | 0.5 m ³ (0.4 m ³ struck) Excavator + 15 ton Bulldozer |
| Medium canals : | Medium volume | : | 0.8 m ³ (0.6 m ³ struck) Excavator + 15 ton Bulldozer |
| Large canals : | Large volume | : | 1.4 m ³ (1.0 m ³ struck) Excavator + 21 ton Bulldozer |

As for the implementation period of the dredging work, it was planned that the work for the objective canals should be completed within three (3) years in consideration of the urgency. As a result of the above study, the following modification was agreed to in the Minutes of Discussions (M/D).

Comparison between Requested Equipment and Agreed Equipment in the M/D

	Equipment	Requested Type & Nos.			Agreed Type & Nos. in the M/D	
1.1	Wheel type excavator	heaped 1.4 m ³	13units	→	heaped 1.4 m ³	4 units
1.2	Wheel type excavator	heaped 0.8 m ³	-	→	heaped 0.8 m ³	19 units
1.3	Wheel type excavator	heaped 0.5 m ³	-	→	heaped 0.5 m ³	2 units
2.1	Bulldozer	32 ton	8 units	→	32 ton	-
2.2	Bulldozer	21 ton	-	→	21 ton	2 units
2.3	Bulldozer	15 ton	-	→	15 ton	10 units
3.1	Hydraulic type truck crane	lifting 20 ton	1 unit	→	lifting 20 ton	1 unit
4.1	Cargo truck	loading 20 ton	1 unit	→	loading 14 ton	1 unit
5.1	Tractor with semi-trailer	loading 50 ton	1 unit	→	loading 40 ton	1 unit
6.1	Mobile workshop with repairing equipment and tools	loading 10 ton	1 unit	→	loading 10 ton	1 unit
7.1	Spare parts	-	1set	→	-	1set
		Total	25 units		Total	41 units

It is noted that the cost of equipment required as estimated at the preliminary stage and that was agreed to in the M/D is almost the same as the equipment originally requested. The reason why the cost is the same even though the number of equipment is increased is that the capacity of the equipment is decreased. The unit price of the 0.8 m³ wheel type hydraulic excavator is 64% of it of 1.4 m³, it of 0.5 m³ is 42%. The unit price of the 21 ton bulldozer is 85% of it of 32 ton and it of 15 ton is 41%. It is confirmed that the equipment of appropriate capacity can be procured within the cost in the request, which was estimated by the Consultant. Then, as a result of this Basic Design Study, it is judged that the agreed equipment is appropriate to be procured by the Japan's Grant Aid.

For implementation of this Project, 1.5 months is necessary for the detailed design, 1.5 months for bidding, 5.5 months for procurement of the equipment, 1.5 months for transportation and 0.5 month for guidance on operation and maintenance, etc.; for a total of 10.5 months altogether.

The total cost of the Project is estimated at 625 million yen (Government of Japan: 624 million yen and Government of Azerbaijan: 1 million yen).

After the procurement of the equipment by the Project, the dredging work for the rehabilitation of the objective canals would be executed by CAWF over three (3) years. The cost required for the canal dredging work for the three (3) years is estimated at 14.7 billion AZM (340 million yen).

The target of the Project is to properly procure the necessary equipment for the dredging work of the objective canals and floodway. It is noted that, as for the Girdiman floodway, the dredging work would partly be executed in combination with the existing equipment.

The purpose of this dredging work is to recover the original irrigation and drainage functions of the objective canals aiming at recovery of the agricultural production in the Project Sites.

The present problems, the possible countermeasures and the effect of improvement with the Project are summarized as follows:

Direct effect

- With completion of the dredging work, the irrigation and drainage functions of the 271 km of the objective canals would be recovered.

- It would make it possible to improve the condition to provide the required irrigation water and drain the excess water in 202,000 ha of the irrigation field in the four (4) regions of the Project Sites.

Indirect effect

- As the 25 hydraulic excavators would be newly procured by this Project, existing hydraulic excavators could be transferred to canals other than the objective canals in the Project Sites. Then, the irrigation and drainage functions of the said other canals would be improved. Therefore, the entire farm household population of 130,000 in the Project Sites is considered as the indirect beneficiaries.
- Agricultural production will be increased by the improvement of the irrigation and drainage conditions in the Project Sites. The increase in agricultural production in the Project Sites would contribute to the activation of the agriculture sector with respect to marketing, distribution, agricultural processing, etc. in and around the Project Sites.

CAWF has submitted the plan to the Basic Design Team to express its intention to secure the budget and assign sufficient staff for smooth and effective operation and maintenance of the equipment to be procured by the Project. It can be expected that the Project and the subsequent dredging work would be properly executed by CAWF.

Further, in order to attain more effect from the rehabilitation work with the equipment of the Project, it is necessary to execute the dredging work for the concerned main and on-farm irrigation and drainage canals simultaneously with the objective canals. Therefore, it is recommended for CAWF to give priority in allocation of the existing equipment to those main and on-farm canals.

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