



KAZAKHSTAN

SYR DARYA / NORTHERN ARAL SEA



Dike between the Northern Aral Sea (NAS) and the Large Aral Sea (LAS)

Client Ministry of Agriculture,
 Committee of Water Resources (CWR), Almaty

Financing World Bank (WB)

Duration of services 1997 - 1999

Cost of implementation 132 mill. US-\$
 (overall project)

Scope of services

- Definition of development strategies
- Water resources master plan
- Hydraulic river model of the Syr Darya to assess developed structural options
- Feasibility study on the NAS Dike
- Feasibility studies on control weirs on the Syr Darya River
- Assessment of the safety of the Chardara Dam
- Rehabilitation of hydraulic structures
- Environmental assessment and economic appraisals
- Sociological survey
- Stakeholder workshops on the project
- Study on the strengthening of water management institutions

Brief description of the project

The Aral Sea was once the fourth largest inland sea in the world. In the last 40 years, however, the waters of the rivers Amudarya and Syr Darya feeding the Aral Sea were increasingly diverted for irrigation purposes. The dramatic desiccation of the Aral Sea and the consequential increase of its salinity had devastating effects on the environment. Around 1990 the drop in water level caused a separation of the Aral Sea into a smaller northern part (NAS) and a larger southern part (LAS).

In response to this ecological disaster and its serious economic, social and environmental impacts mainly on the NAS and the Syr Darya delta, the Syr Darya Control and Northern Aral Sea Project (SYNAS) was launched as the first phase of an overall Aral Sea Basin program (ASBP).

The SYNAS project includes the construction / rehabilitation of major hydraulic structures (weirs, dikes, canals and bridges) on the Syr Darya as well as the construction of a permanent low-level NAS Dike. Its long-term global objectives are the effective use of the available water resources of the Syr Darya, the sustaining of the agricultural production, the restoration of the Northern Aral Sea that would improve the socio-economic and environmental conditions of the affected population.

The SYNAS project is divided into three phases, namely:

- Phase I covers a feasibility study on the NAS Dike as well as the evaluation of a river hydraulic model of the Syr Darya and a water resources master plan of the Kazak part of the river basin;
- Phase II includes feasibility studies of major weirs on the Syr Darya, investigations on the safety of the Chardara Dam, environmental, economic and sociological assessments, study on the strengthening of water management institutions and evaluation of a project implementation plan;
- Phase III deals with detailed design and tender documents for priority project components

CES was awarded the contract for all three phases..



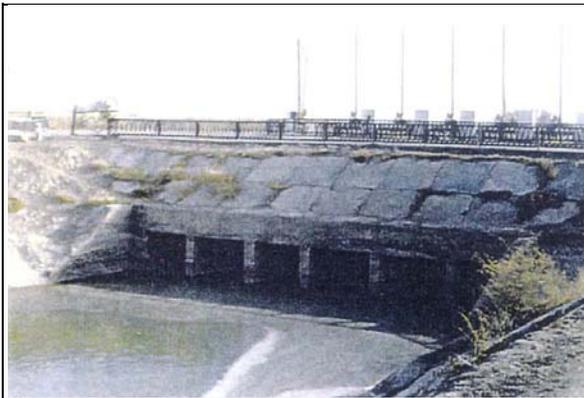
Chardara Dam and Reservoir



Arnasai emergency spillway

Important project data

- Water resources (annual average)
 - Syr Darya runoff 14.20 km³
 - side inflow & return flow 1.20 km³
- Prospective water demand (annual average)
 - irrigation 5.60 km³
 - Syr Darya delta 1.31 km³
 - other consumers 1.08 km³
 - losses in Chardara reservoir 1.40 km³
 - river losses 2.98 km³
- Northern Aral Sea (design values)
 - annual average inflow 3.0 km³
 - max. water area 3288 km²
 - water level 38.7-42 müNN
 - max. storage 27.0 km³
 - salinity 4-17 g/l
- Northern Aral Sea Dike (design values)
 - dike length 12.7 km
 - dike height 3.0 m
 - dike volume 2.Mio. m³
- Rehabilitation of weirs in Kzylorda and Kazalinsk
- Chardara Reservoir
 - total storage capacity 5 000 km³
 - active storage 423 km³
 - dam length 25,5 m
 - dam length 5 300 m
- Structures in the Syr Darya delta
 - new control weirs in Aklak and Raim
 - rehabilitation of 15 water offtakes
- Structures at Aitek
 - new bridge over the Karazoeck Branch
- Flood protection along the Syr Darya
 - new dikes 180 km
 - rehabilitation of dikes 320 km
 - new drainage system of a residential area of Kzlorda city
- Construction of a new bridge over the Syr Darya at Terenozek



Entrance of the Aitek canal (view from downstream)



Aitek canal