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REPUBLIC OF UZBEKISTAN

Syrdarya Water Supply Project
(Project financed by World Bank)

Uzbek Communal Services Agency

DRAFT REPORT ON ENVIRONMENTAL IMPACT ASSESSMENT

of Rehabilitation of Water Supply in Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast-Mekhnatobad Rayons of Syrdarya Region

Tashkent

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ABBREVIATIONS AND ACRONYMS:

WB	World Bank
IDA	International Development Association
CM	Cabinet of Ministers, Government of Uzbekistan
IBRD	International Bank for Reconstruction and Development
DMC	“Donaev Management Consulting” LLC, Uzbekistan
EMP	Environmental Management Plan
SVK	Sydrarya RPE Suvokova
RPE	Regional Production Enterprise
“Ichimlik Suvi”	subordinate subdivision of RPE Suvokova
makhalla	rural community unit
shirkat	farm enterprise
RCC	Rural citizens community
uts	urban type settlement
EA, EIA	Environmental Assessment
FS	Feasibility Study
MAWR	Ministry of Agriculture and Water Resources
NGO	Non-governmental organization
O&M	operation and maintenance
OP	Operational Policy (World Bank)
PIU	Project Implementation Unit
SA	Social Assessment
SEE	State Ecological Expertise
ToR	Terms of Reference
USD	US Dollar
UZS	Uzbek Soum
Uzgidromet	Centre of hydrometeo service under the Cabinet of Ministers of the Republic of Uzbekistan
Goskompriroda	State Committee of the Republic of Uzbekistan on Protection of Environment (Nature)
GosSIAK	State specialized inspection of analytical control
GOST/O'z DSt	State Standard
Uzkommunkhizmat	Uzbek Communal Services Agency
Glavgosekspertiza	Main Department of Environmental Expertise of Goskompriroda
CA	Central Asia
GWL	ground water level
GW	ground water
WDC	water distribution center
GWD	ground water deposit

CWR	clean water reservoir
SDW	solid domestic wastes
LW	liquid wastes
SGSC	South Golodnaya Steppe Channel
CSSES/SES	Centre for State Sanitary Epidemiologic Supervision
WPI	water pollution index
DDT	4,4 – Dichlordiphenyltrimethylmethane-insecticide
HCCH	Hexachlorocyclohexane
gamma –HCCH	Hexachlorocyclohexane, gamma-isomer-insecticide
alpha-HCCH	Hexachlorocyclohexane, alpha-isomer-insecticide
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
MAC	Maximum admissible concentration of polluting substances
SSAM	synthetic surface active material
Ha/ha	hectare
km	kilometer
KW	kilowatt
m	meter
UWD	underground water deposit

EXECUTIVE SUMMARY

Project preparation

Syrdarya Water Supply Project is implemented under financial assistance of the World Bank and the borrower for the Project is the Government of the Republic of Uzbekistan, the Implementing Agency is the Uzkommunkhizmat Agency, and the local implementing organization is the Regional Production Enterprise (RPE) Suvokova of Syrdarya Region. Elaboration of Feasibility Study and Environmental Impact Assessment is started in September 2009 by consortium of AHT Group AG – Donaev Management Consulting (DMC). The accomplishment of the report on EA is planned for the end of February 2010.

Environmental assessment

Project development requires elaboration of Environmental Assessment of the Project, which is implemented according to the World Bank and the Government of Uzbekistan. EA is conducted by the team of Donaev Management Consulting. The work on environmental assessment is started in September 2009. As technical measures under FS are elaborated in the mid January 2010, the preliminary EA report was accomplished in December 2009 and the final draft will be finished till the end of February 2010, after finalization of FS development.

Project area and problems of water supply

Low populated and intensively cultivated project area is located in Syrdarya region within the bounds of Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast-Mekhnatobad rayons, where the main source of income for the population is agriculture. The key problem of selected rayons is the utmost scarcity of water resources, access to sources of drinking water supply, inadequate condition of water supply system as well as high level of ground water, which leads to widely spread waterlogging and land salinization, reduce of agricultural crop production and finally low income of population.

National nature preservation sector

The State Committee of the Republic of Uzbekistan on protection of nature (*Goskompriroda*) is the key executive body on protection of environment and natural resources. The State Environmental Expertise is responsible for of environmental impact assessment. The Committee coordinates also the state monitoring of environment.

Nature protection policy and regulation framework

A legal basis in the sphere of protection and the use of environment has been established in Uzbekistan, which is aimed at guaranteeing rights and duties stipulated by Articles 50 and 55 of the Constitution of the Republic of Uzbekistan. These are over than 20 laws, approximately 50 decrees of the President and of the Cabinet of Ministers of the Republic of Uzbekistan as well as other subordinate acts and normative documentation on management of resources, for example, on nature protection, water and water use, land code, state environmental expertise, as well as other adopted and appropriate decrees of the Cabinet of Ministers. For the purpose of strengthening of social protection of the population as well as implementing resource-saving policy and improvement of drinking water supply the instruction of the Cabinet of Ministers of Uzbekistan №217-F as of 12/05/2009, which provides for development and rehabilitation of water supply networks of Syrdarya region for the years of 2010-2020.

National and local water supply sector

Uzkommunkhizmat Agency is the project organizer on the republican level, khokimiyats of the region and rayons, where proposed project will be implemented as well as Syrdarya vodokanal

and its rayon departments are the implementing organizations and the Syrdarya regional committee on nature protection (Syrdarya Oblkompriroda); all of them are the key organizations responsible for water supply to the population, rational use and water resources protection.

Project environmental classification

The results of this Environmental Assessment (EA) confirm that proposed project arrangements will have a general positive environmental impact. In the process of project implementation there expected to be temporary and local disturbances (negative impacts) in connection with construction and rehabilitation works, but it is expected that in the majority of cases these impacts can be reduced by implementing proper construction standards. Therefore EA research team confirms that the project is subject to Category B.

According to the Decree by the Cabinet of Ministers №152 Category 3 (low risk) is applicable for the project as it comprises item 4 «Water intake facilities of ground water of regional significance» and item 5 «Water conduits of regional and rayon importance».

Project activities

The overall objective of Syrdarya Water Supply Project is to improve drinking water supply to rural population of Syrdarya region. The main activities under the current project are: new construction of drinking water supply system infrastructure and/or rehabilitation with re-equipment and replacement of deteriorated equipment; institutional strengthening of the potential of project rayon Suvokova organizations; construction of technical capacities for O&M; proposing measures on strengthening of commercial structure of Suvokova; study of environmental and social issues.

Physical resources in Syrdarya region

Syrdarya region is situated in the east of the country, on left bank of Syrdarya River at its outflow point from Ferghana valley. There are 4 towns and 8 rayons in the region; population comprises over 677,600 people, 78% – covered with water supply. Project activity area covers population amounting of 406,986 capita. Climate of Syrdarya region is sharply continental with rather mild winter and long-term hot summer. The average annual air temperature in cities of Syrdarya is + 14.5 ^{o}C, Yangier + 15.8 ^{o}C, average annual temperature of the hottest month – July in Syrdarya town is + 36.7 ^{o}C, minimal – 3.2 ^{o}C; in Yangier accordingly + 37.3 ^{o}C and - 1.5 ^{o}C. The soil in winter time can reach 70.0-71.0 ^{o}C, in winter the temperature falls till 15.0^{o}C.

Precipitations are about 340 mm, where 80% are in winter-spring time. The relative air humidity in winter time is 74-78%, but in winter is 29-31%, per annual average values is 56%. The annual evaporating capacity is equal to 1500 mm.

According to seismic zoning the area of the region is attributed to the zone of 7 magnitude on Richter's scale.

The project area is located in Tashkent-Golodny Steppe depression, where pale and partially brackish sierozems predominate. In peripheral part of the depression typical sierozems are spread. Meadow and meadow-marsh soils are developed in floodplain of Syrdarya river. Typical and dark grey soils prevail within foothill plains and low-hill terrains of Western Tien-Shan, light and typical grey soils – within foothills of Turkestan ridge. In flat areas of Syrdarya region the ground waters are laid in the depth from 0.5 – 1.0 m to 3-4 m. In foothills the depth of ground waters bedding is varying from 2 to 5 m. In spring period ground waters are very close to the surface, sometimes they rise. Most deep level they take in autumn and winter. Ground waters are strongly mineralized and they rise up causing in soil salinization.

Water resources

There are no own natural waterways in Syrdarya region. Inflow of transboundary river waters to Syrdarya is equal to 240 cub.m/s. Main water supplies to the territory of the region are accomplished by canals springing from Farkhad Dam, South Golodnosteppe canal and Dustlik canal (named after Kirov).

Collector-drainage waters formed at the territory of the region at volume of 1,800-2,100 cub.m are drained to Syrdarya river and Arnasay depression. Main collectors in the project zone are: Shuruzyak, Main Flood Collector (MFC) and Central Golodnosteppe collector (CGC).

Main volume of fresh waters is concentrated in the northern and eastern site of the region in Syrdarya river valley. Underground waters are confined to quaternary and upper-Pliocene sediments. Reserves of 5 deposits of fresh underground waters are established on the territory of Syrdarya region: Syrdarya, Central-Gulistan, Upper-Pliocene, Khavast and Dustlik.

Major annual underground waters intake is accomplished from Syrdarya and Central-Gulistan deposits and made up over 300,000 cub.m/day in 2007.

There are 13 public communal and water service enterprises acting in the region. The rest of populated areas are supplied with water from local underground water intakes. Underground water is mainly used for organization of economical and drinking purposed water supply.

Land resources

The most part of Syrdarya region is occupied by agricultural land. Arable lands occupy 256,061 ha, technical cultures crops (mainly cotton), grain and legumes – 75,360 ha and 66,988 ha accordingly. Irrigated agriculture is one of the main sources of water resources pollution. The sources of pollution are covered by the structure of irrigated agriculture itself. Hayfileds and pastures comprises approximately 8% of agricultural lands, digression on them is inconsiderable.

Due to deterioration of components of irrigation and drainage system, water use for the irrigation is increased and that leads to water scarcity causing rise of ground water.

Flora and fauna

Forest zone by region occupies inconsiderable area – 3477 ha and consists of field-protecting plantings along roads and between fields as well as plantings within parks and settlements. Planted trees and bushes in parks and dwelling settlements differ by their diversity. Site at channels and collectors, especially in land beds are overgrown by riverside vegetation and also vegetation under water. Bushes of collector and drainage network are grown along the edges of irrigated plots and on along the left bank of Syrdarya river, where permanent and seasonal types of animals and birds inhabit. Contamination of water sources impacts negatively the avifauna in the region, amount of species reduce and quantity of migrating species decrease, however number of species, marked at the territory of Syrdarya region, got into Red Book of the Republic of Uzbekistan is insignificant. There are no protected national parks, natural reserves or zones with similar potential in the region.

Social resources

Social assessment (SA) of the Project was conducted by other team of experts and corresponding report was submitted at the end of December 2009. The population number for the beginning of 2009 – 703.4 thousand capita, out of which male individuals comprise 353,5 thousand capita and female – 349,9 thousand. The natural increase of the population per 1000 capita was observed from 15.3 up to 19.3. The population of Syrdarya region is mainly occupied in the agricultural sector and forestry as well as healthcare, physical culture, social security,

public education, culture and arts. About 78% of the population is connected to water supply network. Centralized sewerage network and wastewater treatment in project rayons is absent. There are no historical and cultural monuments within the project area.

Positive environmental impact by Project intervention

Expected positive impact from project intervention - improvement of drinking waters supply, leakages elimination is expected, that shall favorably affect the environment and population health, since shall eliminate infiltration of drinking water from waterline pipes into the ground/ground waters and infiltration of ground waters that penetrate into waterline networks, having polluted and worsened the drinking waters quality in waterline pipes; reduce in losses by transportation shall result in economy and rational use of underground waters; reduce of soils flooding and ground waters rise shall result in improvement of trees and bushes root system condition and accordingly the vegetation shall change to the best.

As a result of rehabilitation/construction of waterline network, facilities, coverage of population connected to waterline network shall increase and shall make 100% for cities and from 79 to 94% and for rural population, network efficiency shall increase.

Exhaust of fresh underground waters reserve is not expected, providing their use for drinking needs only. Index of fresh and saline waters operational reserves utilization shall increase up to 0.44.

Possible environmental impact by Project intervention and mitigation measures

Possible environmental impact of the project will be mainly represented by temporary and local violations during the construction and rehabilitation of water intake infrastructure. The most part of possible impact can be mitigated with observance of construction rules and safety measures, such as measures on minimizing pollution, protection of workers and local population, adequate utilization of wastes (sediments from mechanical cleaning of pipes, soil wastes from preparing objects for laying water supply pipes, materials resulted in repair works over damaged ferroconcrete and duct-iron pipes), road traffic control, rehabilitation of construction sites. To reduce possible impact of the project to the environment, the Report on EIA provides for the plan of mitigation measures for the period on construction works, plans of environmental monitoring and management over the condition of environment.

Expansion of waterline system shall allow increasing the number of connections of population to waterline network that, in its turn, can increase unorganized discharge of wastes to environment, as well as shall adversely impact the soils and ground waters without solution to the issue of collection and treatment of waste waters from population.

In this case waste waters as a result of high specific water consumption rate will burst onto area relief, drainage system and irrigational network, which will worsen environment sanitary-hygienic situation of the region.

Assessment of emergency situations showed the violation of integrity of water pipe line networks and facilities, which cross canal route, due to pipes corrosion, and also disasters will lead to contamination of grounds, ground waters, soil, underflooding of territories at the sites of pipeline breaking. To reduce such factors as emergency situations it is necessary to lay down pipes of appropriate anticorrosion material.

Alternatives

The chapter discusses the key concept of technological part of the project, possible options and proposals to final technical solutions. Selection of the most suitable technical solution was made according to international and Uzbek standards, taking into account minimization of investment

amount and operational costs; preference of durable and reliable materials; minimization of efforts on operation and maintenance.

The chapter also provides for application of new materials during construction of water supply networks

Environmental Mitigation Plan and Environmental Monitoring Plan (EMMP)

Initially, environmental management will be implemented by organizations responsible for water supply as well as by the contractor responsible for the project. Further it will be followed by the competent organizations responsible for monitoring of environment under supervision of Goskompriroda. The set of preliminary indicators is defined in the Environmental Mitigation and Monitoring Plan.

Consultations and public awareness

Various consultations with stakeholders were conducted by the EA research team. One-day seminars were conducted in each project rayon, where technical, social and environmental aspects of the project were presented and discussed. Wide publicity including rayon population, NGOs and other relevant stakeholders were informed on the proposed activities on rehabilitation of water supply systems within the framework of Syrdarya Water Supply Project. Draft report on environmental impact assessment was discussed with participants.

Key discussions of these consultations include the following: limited awareness on the project activities; concerns of participants with regard to damage to be possibly caused by the project; concerns with regard to insufficiency of equipment for project implementation; maintenance of water quality and its treatment; perspectives of sewerage and wastewater treatment; irrational use and saving of drinking water against its use for watering plots, car washing and etc.; necessity of full soils and landscape rehabilitation to initial condition after installation of pipes especially in sites of water intake facilities location; proposals to accelerate project preparation due to sharp necessity in activities implementation. Relatively too much time was dedicated to technical issues. Necessity in institutional changes was also expressed by stakeholders. Brief information on proposed project and results of EA was published in local regional newspaper (Syrdaryo Khakikati”/ “Syrdaryinskaya Pravda) as of 18 and 21 November 2009.

INTRODUCTION

In order to implement the Decree by the President of the Republic of Uzbekistan #890 as of 12 June 2008 it is necessary to implement the Project on Improvement of Water Supply Systems in Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast-Mekhnatobad Rayons of Syrdarya Region. The Project is a part of the Program of Projects to be implemented during the period of 2009-2016 and approved together with World Bank.

The Instruction of the Cabinet of Ministers of the Republic of Uzbekistan #217-F as of 12.05.2009 stipulates for the provision of development and modernization of water supply networks of Syrdarya region for the years of 2010-2020 – Project on Improvement of Water Supply Systems in Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast-Mekhnatobad Rayons of Syrdarya Region, as those suffering utmost deficit of water resources, inadequate access to sources of drinking water and having unsatisfactory condition of water supply systems.

The implementation of the proposed Syrdarya Water Supply Project is triggered by the necessity to find solutions for the problems related to drinking water supply of rural population of five project rayons (Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast).

The Project will be implemented with the purpose of strengthening of social security of population as well as for implementation resources preserving policy, improvement of drinking water supply infrastructure and provision of effective functioning of rayon and regional PE Suvokova with preserving optimal level of tariffs for services rendered by the mentioned enterprises.

The proposed project will complement investments financed by the Asian Development Bank through the program of measures on improvement of water supply of Gulistan city.

The Borrower for the Project is the Government of the Republic of Uzbekistan, the Implementing Agency is the Uzkommunkhizmat Agency, and the local implementing organization is the Regional Production Enterprise (RPE) Suvokova of Syrdarya Region. The Project requires the establishment of Project Coordination Unit and Project Implementation Unit, which are entitled to carry out duties on behalf of RPE Suvokova. The Project Coordination Unit (PCU) is located in Tashkent city under the Uzkommunkhizmat Agency and was established for coordination of activities over the project between the World Bank and ministries and agencies of Uzbekistan. The PIU will be located in the city of Gulistan.

The main activities of the Project will be rehabilitation and limited new construction of drinking water supply systems with re-equipment and replacement of worn-out equipment.

The proposed Syrdarya Water Supply Project provides for financing of the following activities:

- Reconstruction of existing water supply system, rehabilitation, modernization and limited construction of new objects of water supply system and auxiliary facilities and buildings (as well as supporting buildings and facilities);
- Consultant services within the Project;
- Institutional strengthening of the potential of five rayon Suvokova;
- Project Management and Administration.

1. ENVIRONMENTAL ASSESSMENT METHODOLOGY

General methodology of environmental assessment study includes certain stages for the overall assessment of the proposed activity. The most important of them are the following:

- Study of current condition of environment and identification of key issues within the rayons;
- Determination of the scope of these problems
- Analysis of main project activities and identification of relevant environmental impact sources;
- Analysis of impacts during construction works and after project implementation;
- Defining future condition of natural environment;
- Development of activities on reducing the impact on the environment (mitigation measures);
- Management and monitoring
- Public consultation.

The experts conducted general investigation of the components of natural environment, collection, analysis and processing of information on the condition of the current environment, social aspects and population health of Syrdarya region and of 5 rayons within project area according to data of RPE Suvokova, Uzgidromet, Syrdarya Regional Production Enterprise, Syrdarya Regional Department on Nature Protection, OJSC «Mirzachul Hydro-Geology», regional sanitary and epidemiological station, and central statistical department.

The following ecological aspects have been considered:

- Water resources;
- Land resources;
- Flora and fauna (Ecological resources);
- Social aspects.

1.1. WB EIA Requirements

According to WB Operational Policy, the project will be evaluated within the framework of environmental assessment from the point of impact on project territory and also ways of project design improvement and implementation by means of prevention, minimization or possibly elimination of negative environmental impact and positive impact increase will be defined.

According to type of environmental analysis of the WB, level of detail of environmental analysis depends on scope and environmental impact of proposed works. Categories selected in accordance with the type of investments and related level of environmental impacts is stated below:

- Category A: full EA with EMP is required;
- Category B: it is necessary to provide a recent environmental analysis (although full EA is not required) and EMP;
- Category C: EA or environmental analysis is not required.

The proposed project is classified as EA Category «B» (according to OP/BP 4.01 of the WB Safeguard Policies). Environmental assessment of Category «B» is required due to the civil works proposed regarding water resources usage, expansion/rehabilitation on treatment facilities and sewerage network. Thus, the project requires an environmental impact assessment (EIA) prepared before project appraisal.

The results of this Environmental Assessment (EA) confirm that proposed project arrangements will have a general positive environmental impact. In the process of project implementation there expected to be temporary and local disturbances (negative impacts) in connection with

construction and rehabilitation works, but it is expected that in the majority of cases these impacts can be reduced by implementing proper construction standards.

1.2. Uzbekistan EIA Requirements

Environmental impact assessment is implemented according to the Laws of the Republic of Uzbekistan «On the Protection of Nature», «On Environmental Expertise», Decree of the Cabinet of Ministers of the Republic of Uzbekistan No 491 as of 31/12/2001 «On approval of the Regulation on the State Environmental Expertise in the Republic of Uzbekistan», No152 as of 5.06.2009 "On introduction of amendments and addenda as well as recognition of cancelation of certain decisions of the Government of the Republic of Uzbekistan" as well as by other laws and legislative acts.

Objects and categories of their environmental impact are provided by above-stated documents, to be subject to state environmental expertise. Objects subjected to the expertise, are to be subjected to four categories of environmental impact.

- Category 1 – high risk;
- Category 2 – mean risk;
- Category 3 – low risk;
- Category 4 – local impact.

In Appendix to the Decree by the Cabinet of Ministers №152 types of activities are structured in detail by each mentioned category. Category 3 (low risk) includes item 4 «Water intake facilities of ground water of regional significance» and item 5 «Water conduits of regional and rayon importance», which are applicable for the given Project.

State ecologic assessment is conducted by specialized departments of unique system of State Department of Ecologic Expertise of the State Nature Protection of the Republic of Uzbekistan in order to determine conformity of outlined or implemented commercial activity to ecologic requirements.

Main State Department of Ecologic Expertise conducts environmental assessment of:

- Objects related to I and II categories;
- Draft state programs, concepts, schemes of production capacity allocation and development;
- Urban planning documents for the objects with population more than 50 thousand people;
- Documents on elaboration of new types of machinery, techniques, materials, substances, products;
- Draft technological normative and instructional methodic documents regulating activity related to nature resources use.

According to the Scheme of organization of conducting of state ecological expertise (SEE) in paragraph 7, for Category 3 projects expertise is implemented by regional bodies of SEE, thus in the this case it will be Syrdarya regional department on nature protection.

For the objects to be planned for design and construction the following documents are submitted for the state ecologic expertise:

- (pre-project and project documents; all types of urban planning documents; objects of special control) – materials of environmental impact assessment (EIA), containing the following stages:
    - Draft declaration on environmental impact, which is implemented at the stage of designing scheduled or forecasted commercial or another activity, before commencement of project financing;
    - Declaration on environmental impact, which is implemented in case when by the results of environmental assessment of draft declaration on environmental impact, the necessity

in conducting additional investigation, nature observations, special analysis, model experiments and development of reasonable nature protection measures was established. Declaration on environmental impact is submitted prior to approval of feasibility study of the object;

- Declaration on environmental consequences, which is implemented prior to acceptance of the object for operation and is final stage of environmental impact assessment of designed objects.

Enterprise or any other organization (institutes, companies with such experience, private experts, etc, may be engaged) implements the arrangement and conduction of environmental assessment, whereas *Glavgosekspertiza* implements expertise of submitted reports on environment impact assessment and issues Conclusions in the order prescribed.

The following chapter represents a brief review of organizational, legal and political framework for the given Project.

2. ORGANIZATIONAL, LEGAL AND POLICY FRAMEWORK FOR PROJECT IMPLEMENTATION

2.1. Legal framework

2.1.1. National legislation on Protection of the Environment

A legal basis in the sphere of protection and the use of environment has been established in Uzbekistan, which is aimed at guaranteeing rights and duties stipulated by Articles 50 and 55 of the Constitution of the Republic of Uzbekistan. These are over than 20 laws, approximately 50 decrees of the President and of the Cabinet of Ministers of the Republic of Uzbekistan as well as other subordinate acts and normative documentation.

With regard to the present project, the following basic legal acts are acting at present in Uzbekistan that are directed to provide environment protection, guaranteeing public healthcare as well as managing the environment protection sector, namely Laws of the Republic of Uzbekistan:

- «On the protection of the environment» (1992);
- «On water and water use» (1993);
- «On the State Environmental Expertise» (2000);
- «On the State sanitary epidemiological supervision in the Republic of Uzbekistan» (1992);
- «On the protection and use of objects of cultural heritage» (2001)
- «On special protected areas» with amendments (30.08.93)
- «On protection and use of flora» (as of 26 December 1997)
- «On protection and use of fauna» (as of 26 December 1997)
- «On protection of atmospheric air» (as of 27 December 1996)
- «On wastes» as of 05/04/2002
- «On protection of the population and areas from emergency situations of natural and anthropogenic character» as of 20/08/1999.

The key acting subordinate acts and normative documents adopted by the Government of Uzbekistan in the sphere of environment protection are as follows:

- “On adoption of the Regulation on State Environmental Expertise” (No 491, 31/12/2001);
- “On amendments, addenda and recognition of some expired decisions of the Government of the Republic of Uzbekistan No 152, 5/06/2009”
- “ On adoption of the Regulation on State Environmental Monitoring” (No 49, 3/04/2002);
- “On assigning the status of special protected areas to zones of sources formation of fresh ground waters” (No 302, 26/08/2002);
- "Regulation on water protection zones of water reservoirs and other natural pools, rivers, trunk channels and collectors as well as of drinking and household water supply sources, including of medical, cultural and health improvement purposes in the Republic of Uzbekistan", 07/04/92.
- "On introduction of fees for excessive discharges (emissions) of polluting substances to the environment and solid wastes removal", 29/06/92.
- “On forecast of key macroeconomic indicators and the State Budget of the Republic of Uzbekistan for the year of 2000”, 31/12/1999.
- “The order of elaboration and fulfilling project standards on maximum permissible emissions of polluting substances to water objects including drainage waters” (RD-118.0027719.5-91);
- “The order of issuing permissions for special water use” (RD-118.0027714.6-92);
- “Instruction on determining of damage caused to the national economy by polluting ground waters” (RD-118.0027714.47-95).

2.1.2. Governmental policy on environment protection

The Government of Uzbekistan under assistance of international organizations and direct support from NGOs has developed and now implements the following programs, strategies and action plans related to activities fulfilled within the present project:

- The Program on protection of environment in the Republic of Uzbekistan for the years of 2008-2012;
- The Program of provision of the population in rural *rayons* and towns with qualitative drinking water and efficient use of natural gas;
- Investment program of the Republic of Uzbekistan for the years of 2009-2012.

2.1.3. International agreements in the sphere of nature protection and prevention of transboundary impacts

Within the framework of cooperation in the sphere of environmental management, Uzbekistan has ratified key conventions adopted in Rio-de-Janeiro: Framework Convention on climate change, Convention on biological diversity and Convention on fighting against desertification as well as row of other conventions, agreements and memoranda of mutual understanding in the sphere of environment protection and sustainable development. As applied to the present project Uzbekistan has ratified a number of multilateral agreements directed for providing interaction with neighboring countries aimed at reducing consequences of transboundary impacts to water reservoirs of regional significance:

- Convention on protection and use of transboundary waterways and international lakes, Helsinki, 17 March 1992 (Decree of the President of the RU as of 9 August 2007 No PP-683, came into force – 3 December 2007);
- Basel Convention on control of transboundary carriage of dangerous wastes and their removal (22/12/1995);
- Convention on prohibition of military or any other hostile use of means of impacts to natural environment (26/05/1993);
- Convention on protection of global cultural and natural heritage, Paris 16 (23) November 1972 (ratified by the Regulation of Oliy Majlis of the RU as of 22 December 1995, No 182-I).

Within the framework of CIS cooperation Uzbekistan is the member of Interstate Environmental Council on harmonization of environmental legislation, elaboration of EA and development of economic instruments on environmental protection as well as the member of Interstate Environmental Foundation on financing of environment protection measures within interstate and regional programs. The following key agreements have been signed:

- Agreement on interaction in the sphere of environment protection, Moscow, 8 February 1992 (coming into force on 8 February 1992);
- Agreement on cooperation in the sphere of environmental monitoring, Saratov, 13 January 1999.
- Decision of the leaders of CA countries on «Basic trends of the Program of concrete actions on improvement of environmental and socio-economic situation in Aral Sea basin for the period of 2003-2010», signed on 06/10/2002 in Dushanbe.

2.2. General national structure for environmental assessment

For the purpose of the present environmental assessment actions of the project “Water supply improvement in Akaltyn, Bayaut, Khavast-Mehnatobad zone, Mirzaabad and Sardoba rayons of Syrdarya region” the following governmental bodies shall be considered:

- «*Uzkommunkhizmat*» Agency, projects organizer.
- *Khokimiyats* of provinces and cities, where the current project is located.

- Syrdarya *oblast* VK and its rayon divisions, project executors.
- Syrdarya Regional Committee on nature protection (Syrdarya *Oblkompriroda*), the body responsible for overall protection of environment on the territory of project, subdivision of Goskompriroda.

Uzbek Agency "Uzkommunkhizmat"

Uzbek Agency "*Uzkommunkhizmat*" (and so forth as "Agency") is a body responsible for policy development in the sector of communal servicing including coordination of organizational activities, development of standards and other guiding and technical documentation with regard to operation of water supply and sewerage networks. The activity of the Agency is regulated by the appropriate Regulations adopted by the Government of Uzbekistan. The Agency is considered as an implementing agency for the proposed project.

Local bodies of state power (regional khokimiyats)

Khokimiyat is an executive body of state power at the level of *oblasts*, *rayons* and towns of the republic. *Khokim* heads executive and representative branches of state power on the corresponding territory and ensures implementation of acts of legislation including those related to the sector of provision of water supply and sewerage. *Khokim* is appointed by the President of the RU and approved by the *Kengash of peoples' deputies*.

State Committee of the Republic of Uzbekistan on protection of nature

The State Committee of the Republic of Uzbekistan on protection of nature (*Goskompriroda*) is the basic executive body exercising functions on protection of environment and natural resources. The Committee is directly subordinated to Oliy Majlis (bicameral parliament) of the Republic of Uzbekistan and is responsible for coordination of activities of other national structures and institutions on environment protection on central, regional and *rayon* levels.

Other corresponding governmental agencies:

- ***Ministry of Health of the RU*** is competent to exercise state sanitary supervision over observance of sanitary norms, rules and hygienic standards by all organizations located in the territory of Uzbekistan in line with bodies comprising the system of state sanitary an epidemiological supervision. Centers of state sanitary an epidemiological supervision provides organization and fulfillment of a complex of sanitary and epidemiological measures.

- ***Republican extraordinary anti-epidemiological commission*** is authorized to coordinate activities of ministries, agencies, *khokimiyats*, economic entities directed to localizing of inflectional diseases out-breaks. The commission is entitled to control activities related to provision of sewerage to populated areas, effective cleaning measures and disinfection of waste waters discharged to superficial water reservoirs. The Commission is authorized to prohibit or temporarily suspend operation of water supply, sewerage, hydro technical and other communal facilities.

- **Ministry of culture and sports issues of the RU** (*Main scientific and production department on protection and use of objects of cultural heritage*). Ministry of culture and sports issues of the RU ensures state protection of objects of cultural heritage by way of (and in addition) issuing permissions on conducting land, construction, land improvement, economic and other works on conservation of objects of cultural heritage as well as research activity on the territories of cultural heritage objects (Article 10 of the Law of the RU «On the protection of the objects of cultural heritage»).

2.3. Organizational structure

The system of bodies of state power engaged in the process of management and regulation of environment protection and governed by the Law "On the protection of nature" comprises the following:

- **The Legislative Chamber and the Senate of Oliy Majlis of the Republic of Uzbekistan (Parliament) -** within the framework of joint competences in the area of nature protection.

- **The Cabinet of Ministers of the Republic of Uzbekistan –** exercising common policy in the area of nature protection.

- **Local bodies of state power (regional khokimiyats) –** defining key trends of nature protection on respective territories, adoption of regional (territorial) environmental programs.

  Functions of Gulistan Regional Khokimiyat are defined according to the Decree of the President of the Republic of Uzbekistan as of 19.12.2000 No UP-2791 «On further reforming system of management of communal infrastructure».

- **The State Committee of the Republic of Uzbekistan on protection of nature** (*Goskompriroda* of the RU) is a specially authorized over-ministerial and coordinating body exercising state supervision and inter-branch management in the sphere of nature protection, use and reproduction of natural sources. *Goskompriroda* is subordinate and accountable to Oliy Majlis of the Republic of Uzbekistan. The system of bodies is comprised as follows: *Goskompriroda* of the Republic of Karakalpakstan, regional (*oblast*) and Tashkent city committees on nature protection, *inter-rayon*, *rayon* and town committees (inspections) on nature protection as well as lower organizations and institutions. *Goskompriroda* interacts with respective nature protection bodies of other countries in solving international and regional problems including issues of polluting transboundary rivers and water reservoirs.

2.4 Institutional arrangements in the water supply and sewerage sector

Uzbek Agency "Uzkommunkhizmat"

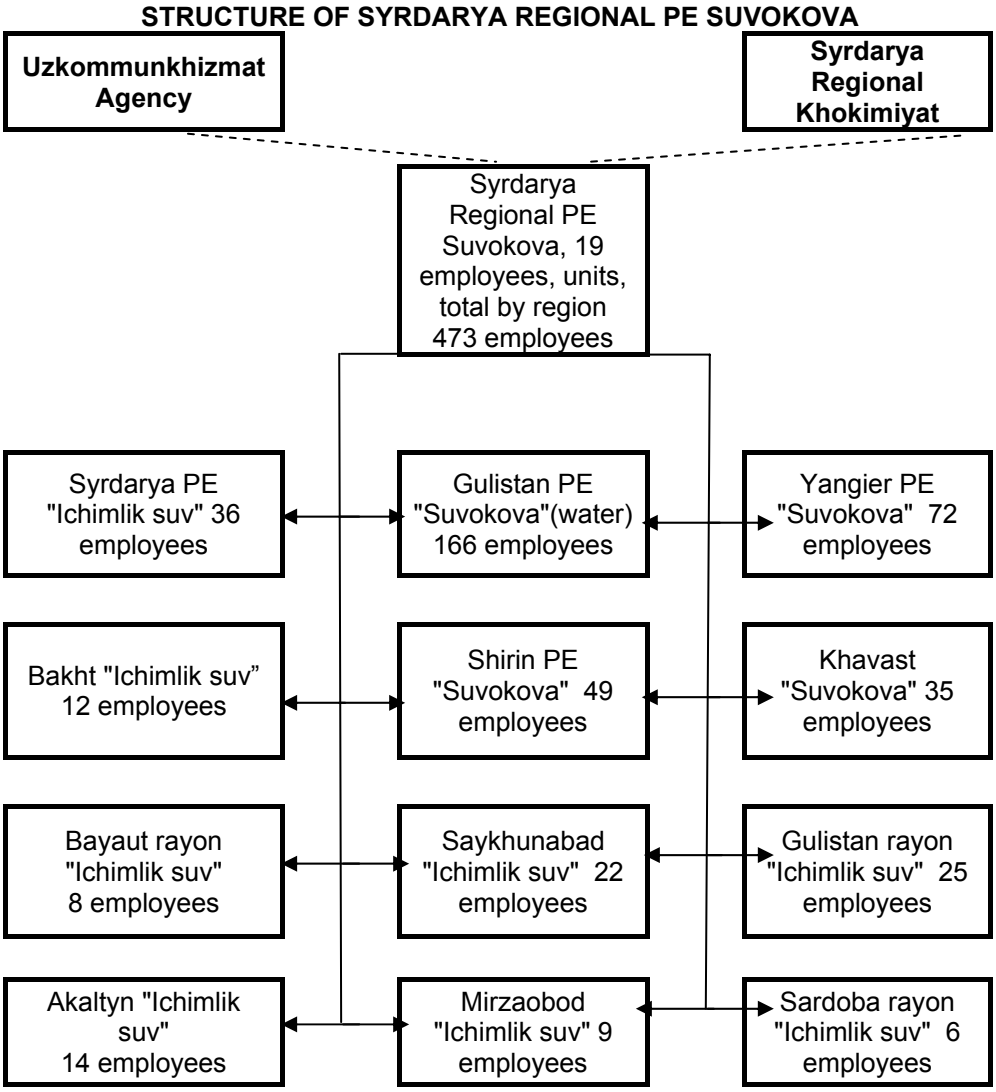
The activity of "*Uzkommunkhizmat*" Agency is regulated by the Decree of the President of the Republic of Uzbekistan as of 17/08/2006, No PP-445 «On measures of improving the activity of Uzbek Agency "*Uzkommunkhizmat*" and financial recovery of enterprises of communal system», which also defines the reformed system of management of issues of communal economy in the country.

Regional Vodokanals

Issues related to water supply and sewerage systems are in direct operation of economically independent subjects «vodokanals», which are specially established by decisions of authorized state bodies according to territorial division. In particular and as for present project Syrdarya Regional PE Suvokova acts on the basis of operational management in the form of a unitary enterprise. The activity of vodokanal is regulated by common legislation that is applicable to regulating the activity of economic subjects of various types of ownership; however, this organization has a status of natural monopoly and is subject to the Law on Natural Monopolies. RPE Suvokova is subjected to Syrdarya Regional Khokimiyat for the exploitation of water supply systems and provision of population and organizations with drinking water within its area of responsibility.

The main task of Syrdarya Regional PE Suvokova is to provide population and organizations with drinking water and treatment of waste water. There are 12 subordinate enterprises titled as «Ichimlik suv» (“Drinking water”). Total number of employees is 456 including women comprising 100. The Suvokova is exclusive water supply the organization in Syrdarya area.

Figure. 2.4.1.Structure of Syrdarya Regional PE Suvokova



2.5. Legal framework of NGO and civil society participation

At present, interaction of the government with environmental NGOs is conducted within cooperation with Uzbek Ecological Forum of NGOs. Uzbek Ecological Forum of NGOs (*Ecoforum*) is a union of environmental and environment-oriented non-governmental and non-commercial organizations and initiative groups. Its activity is directed to consolidation of public environmental organizations’ efforts in solving problems of environmental character.

Ecoforum of non-governmental and non-commercial organizations of Uzbekistan was registered in April 2007 by the Ministry of Justice of the Republic of Uzbekistan and united environmental NGOs acting in the country. The key objective of establishing Uzbek *Ecoforum* of NGOs was uniting NGOs’ efforts for improvement of effectiveness of civil society participation in environment protection as well as undertaking joint actions upon solving environmental problems. In its actions directed to solve environmental problems and assist sustainable development, *Ecoforum* cooperates with state, international and regional organizations, NGOs

and mass media. At present *Ecoforum* has signed memoranda on cooperation with Goskompriroda of the RU as well as other regional organizations such as RECCA.

2.5.1 Legal framework of NGOs participation

In general, the basis of participation of citizens, public associations in the sphere of nature protection management is laid down by the Constitution of the Republic of Uzbekistan (Article 50, 55). Law of the RU as of 09/12/1992 «On nature protection» by Articles 12-13 regulates the right of citizens to unite in public associations on nature protection, request and receive information on the condition of environment and also measures undertaken for its protection as well as competences of established NGOs. Legislation on environmental protection stipulates civil society participation as for a) single citizen or groups of citizen; b) via citizens' self-governing bodies and c) via non-governmental and non-commercial organizations.

Directly the participation of non-commercial nature protection organizations is ensured at the stage of environmental expertise of documentation for construction of new objects and reconstruction of existing objects with the economic purposes. Particularly, Article 27 of the Law «On nature protection», as well as Article 23 of the Law "On environmental expertise" as of 25/05/2000 provides NGOs and citizens with possibility to exercise public (social) environmental expertise of an economic activity in any sphere of sector, which needs to have environmental justification from the part of independent groups of specialist on the initiative of NGOs itself and at their own account or charge free basis. Conducting of public expertise can be implemented independently from undertaking of the state environmental expertise. It is prohibited to interfere into the process of public environmental expertise implementation. Although it is established that conclusions of public environmental expertise are considered to be of voluntary character.

2.5.2 Legal framework of participation of citizens' self-governing bodies

In accordance to Article 7 of the Law "On citizens' self-governing bodies" citizens' self-governing bodies do not enter the system of bodies of state power, and accordingly, they represent one of forms of civil society organization. The Law "On citizens' self-governing bodies" as of 14 April 1999 provides an opportunity for development and implementation of local initiatives including those that touch upon environmental problems.

Gathering of citizens of a rural settlement, *kishlak*, *aul* and town (city) *makhalla* quarterly hears the account of heads of *rayon*, town and regional (oblast) *khokimiyats* on issues comprising the sphere of self-governing bodies' competences, and also within its competences – reports of heads of enterprises, institutions, organizations located in appropriate area on the matters of environment protection, beatification and etc. Besides, citizens' gatherings exercise public control over implementation of laws and other acts of legislation as well as their own decisions. They undertake decisions on the use of financial resources of enterprises and organizations located in the appropriate area on contractual basis and for purposes of beautification, gardening and sanitary cleaning; as well as activities directed to preserve surrounding environment.

3. PROJECT ENVIRONMENTAL BASELINE CONDITIONS

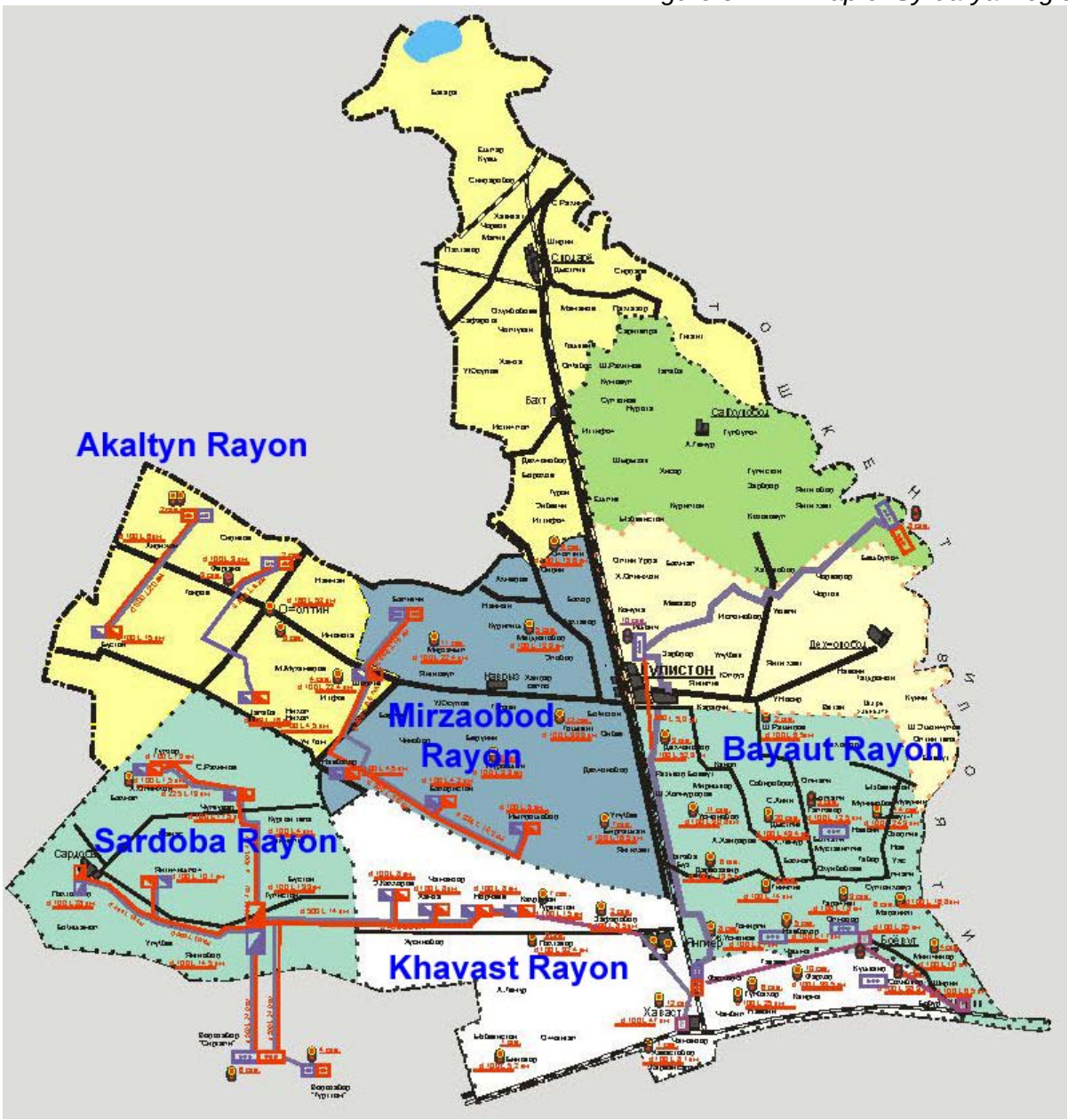
Actual environmental condition is considered as a whole on Syrdarya region and on project rayons. Information on biological resources is given in the chapter describing regional characteristics applicable to all project rayons.

3.1. Syrdarya Region

3.1.1. Physical resources

Syrdarya region is situated in the east of the country, on left bank of Syrdarya river at its outflow point from Ferghana valley. It borders in the north with Kazakhstan and in the south with Tajikistan. Total area comprises 4,300 km^2. There are 4 towns and 8 rayons in the region; population comprises over 677,600 people, 527,400 capita – covered with water supply. Water supply consists as per reports of "Suvokova" Regional Production Enterprises – 78%.

Figure 3.1.1.1 Map of Syrdarya Region



Project activity area covers 5 rayons: Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast-Mekhnatobad zone. Project rayons are situated in southern and central parts of Syrdarya region and cover the territory from western up to eastern borders of the region (see Figure 3.1.1.1). Project covers population of makhallas and settlements to 2008 total amounting of 406,986 capita.

Table 3.1.1.2 Population and Households in Syrdarya Region

Rayons	Population	Households
Akaltyn	45,663	8,078
Bayaut	106,042	21,366
Mirzaobod	58,630	9,783
Sardoba	52,292	9,177
Khavast rayon - Mekhnatobad zone	11,958	2,159
Khavast	68,517	13,321
Total	**343,102**	**63,884**

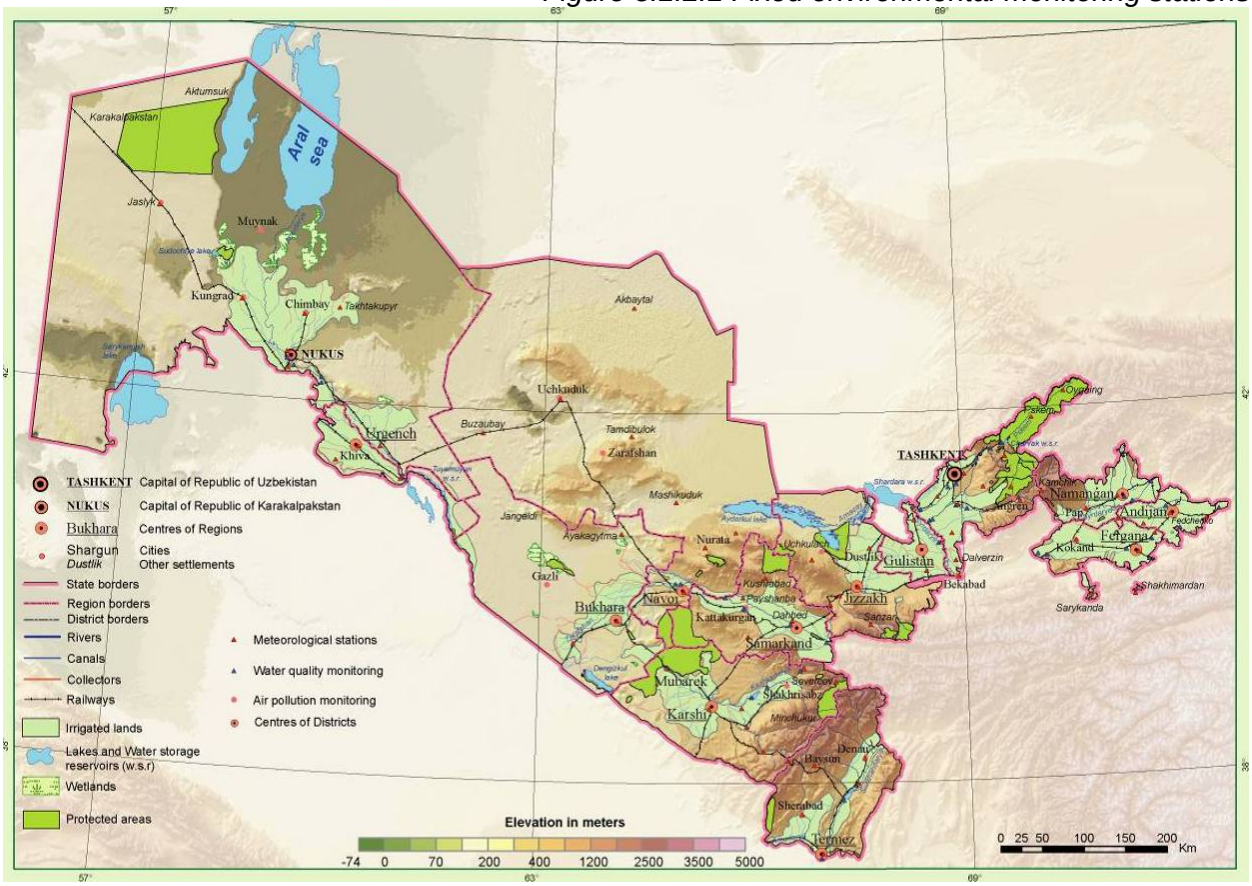
3.1.2. Water resources

Surface waters.

Hydrographical network of Syrdarya region is represented by the section of Syrdarya river, which is neighboring with Tashkent region) from Bekabad town up to the site below the inflow of Main Flood Collector (MFC), irrigation canals and collectors.

There are no own natural waterways in Syrdarya region. Inflow of transboundary river waters to Syrdarya is equal to 240 cub.m/s and outflow to Kazakhstan area - 225 cub.m/s. Main water supplies to the territory of the region are accomplished by canals springing from Farkhad Dam, South Golodnosteppe canal and Dustlik canal (named after Kirov). Via main Dustlik canal water is delivered to supply Syrdarya region and it partially flows to Kazakhstan. General water consumption of Syrdarya region consists of 2,700 – 3,800 mln. cub.m/year

Figure 3.1.2.1 Fixed environmental monitoring stations



Source: Atlas "Appraisal of Uzbekistan environmental condition by environmental indicators", 2008.

Water of Syrdarya river up to Bekabad town is polluted by flows from different objects and collector-drainage waters located on the territory of Kyrgyzstan and Ferghana valley. In 2008 the water quality in this site was conforming to 3rd class – moderate-polluted waters and was remaining such all way along up to Nadejdinskiy post.

Figure 3.1.2.2. Quality of Syrdarya River Water

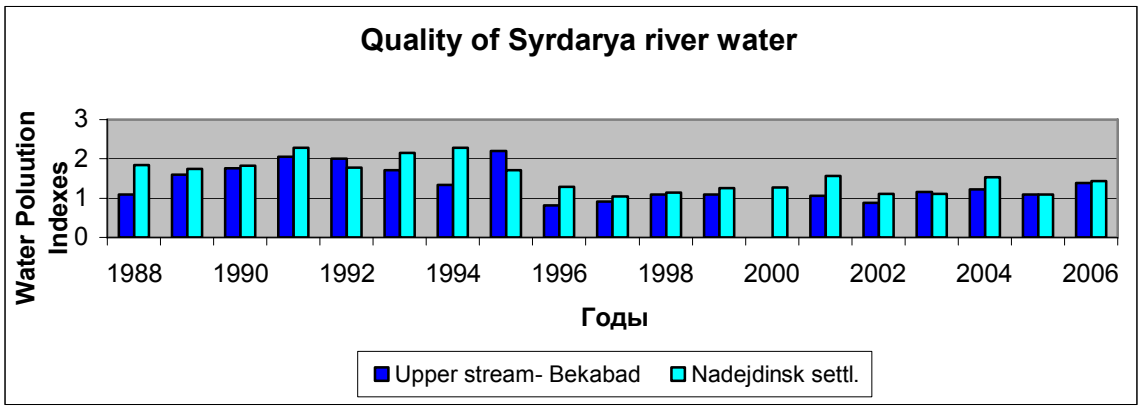
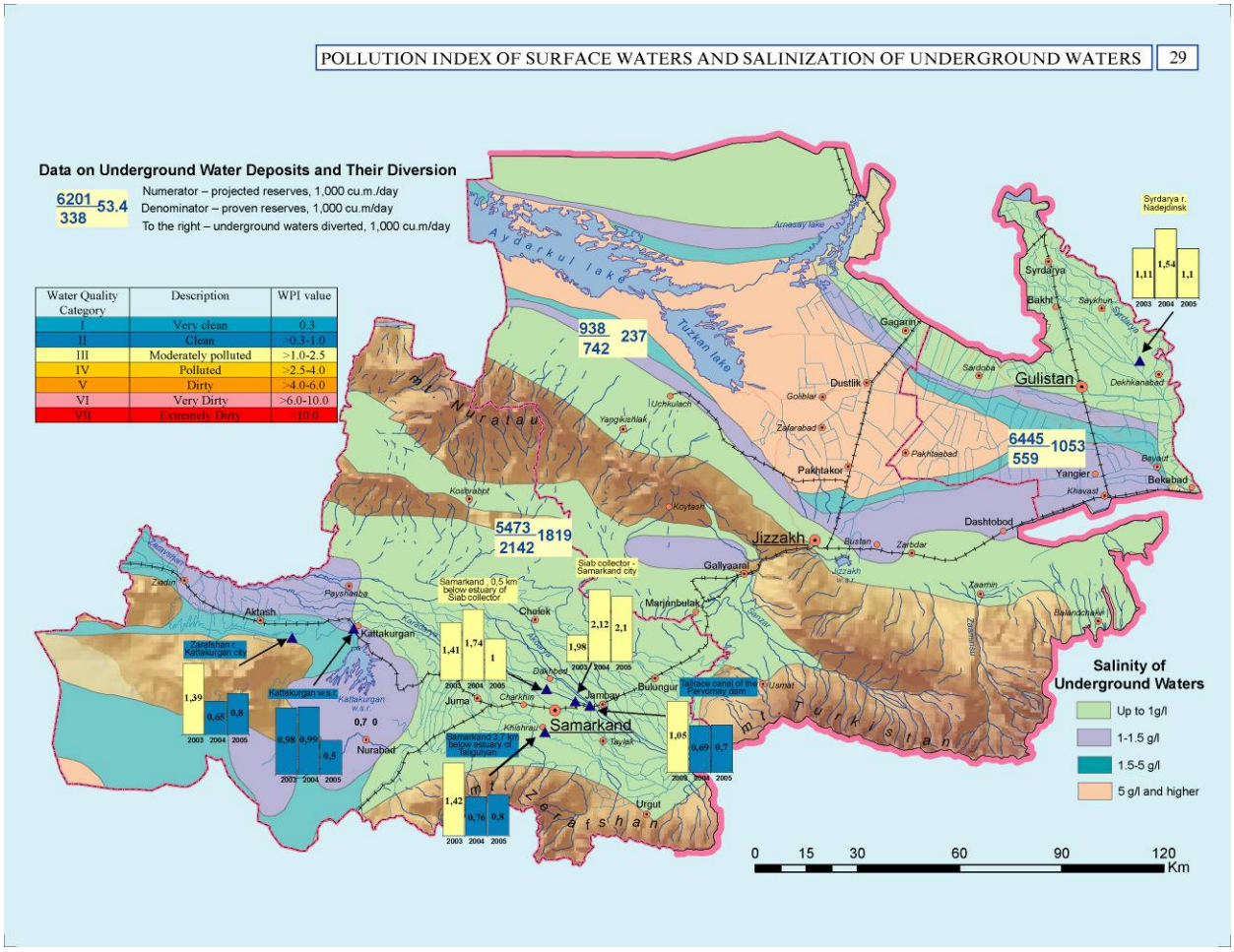


Figure 3.1.2.3. Pollution Index of Surface Waters and Salinization of Underground Waters



Source: Atlas "Appraisal of Uzbekistan environmental condition by environmental indicators", 2008.

Dustlik canal is fed by Syrdarya river and the quality of water in it does not change lengthwise due to discharges from Gulistan town enterprises and collector-drainage waters inflow. In 2008 content of organic substances (chemical oxygen demand-COD) was – 20.06 mg/l, mineralization – 869.5mg/l (100mg/l), nitric nitrogen – 0,016mg/l (MAC 0,02mg/l). Concentrations of α- and γ-HCCH were not identified.

Collector-drainage waters formed at the territory of the region at volume of 1,800-2,100 cub.m are drained to Syrdarya river and Arnasay depression. Main collectors in the project zone are: Shuruzyak, Main Flood Collector (MFC) and Central Golodnosteppe collector (CGC).

Table 3.1.2.4.

Information on quantity and quality of collector and drainage waters emitted into main water sources on Syrdarya region as of 01.01.2009.

Main collector name	Collector length, km	Hydro posts location, sites	Average water consumption, cub.m/s	Collector-drainage waters volume, mln.cub.m	Chlorine, g/l	Solid residues mineralization, g/l	Discharge receiver
Jettisay	20,53	Pk-0+-50	2,41	72,46	0,26	3,21	CGC
Bayaut	22,93	PK-0+65	2,24	62,87	0,25	2,5	CGC
CC-6	15,88	PK-0+70	1,97	68,85	0,39	4,09	CGC
CC-7	22,58	PK-0+	2,93	108,55	0,31	4,06	CGC
17-C-17	12,6	PK-2+-50	1,88	63,75	0,34	3,72	CGC
Shuruzyak	42,93	PK-6+60	10,8	344,01	0,24	2,86	Syrdarya river
MFC-42C	1,15	PK-0+60	2,12	69,71	0,18	2,24	Syrdarya r.
MFC-C	1,3	PK-0+80	1,9	52,52	0,22	2,54	Syrdarya r.
MFC-2т	2,3	PK+20	1,12	28,61	0,21	2,4	Syrdarya r.
MFC-56C	0,8	PK-0+80	0,31	10,92	0,19	2,58	Syrdarya r.

Shuruzyak collector flows across Syrdarya region and flows into Chardarya water storage basin. Collector's length is 42.093km, average water consumption – 10.8 cub.m/s; in 2008 water volume distributed by collector comprised 344.01 mln. cub.m. Quality of water is formed under the influence of drains from farmlands. In 2008 content of organic substances (COD) was – 41.3mgO/l, mineralization – 1.86 g/l, nitric nitrogen – 0.016mg/l (MAC 0.02mg/l). Maximum concentrations of α- and γ-HCCH comprised 0.002 and 0.003mkg/l, their average content in water was not identified.

Condition of surface waterways of the region is characterized by 3rd class – as moderate polluted waters.

There is Juravlinoe lake located on the territory of Mirzaabad rayon of Syrdarya region with water-surface area equal to 0.41 sq.kms, capacity – 0.82 mln. cub.m; as of 01.01.2009 its capacity comprised 0.41 mln. cub.m.

Ground waters

In flat areas of Syrdarya region the ground waters are laid in the depth from 0.5 – 1.0 m to 3-4 m. In foothills the depth of ground waters bedding is varying from 2 to 5 m. In spring period ground waters are very close to the surface, sometimes they rise. Most deep level they take in autumn and winter. Ground waters are strongly mineralized and they rise up causing in soil salinization.

Distribution of irrigated lands according to location of ground waters is shown below separately by each project rayon.

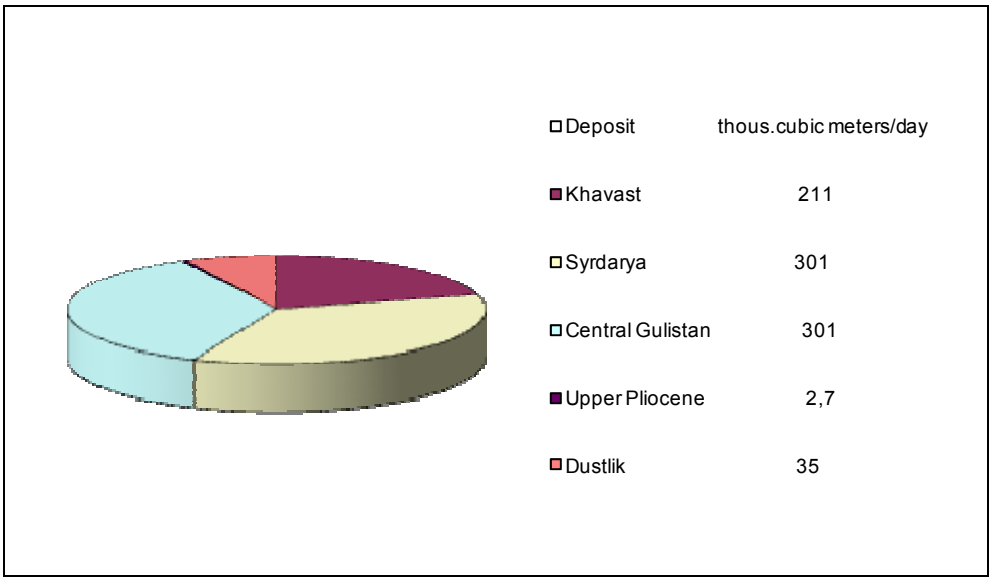
Underground waters. Main volume of fresh waters is concentrated in the northern and eastern site of the region in Syrdarya river valley. Underground waters are confined to quaternary and upper-Pliocene sediments. Reserves of 5 deposits of fresh underground waters are established on the territory of Syrdarya region: Syrdarya, Central-Gulistan, Upper-Pliocene, Khavast and Dustlik.

Fresh underground waters are located at 100-500m depth. From above they are overlaid by strong layer of pit-run fines serving as barrier from pollutions penetration.

Fresh underground waters of Golodnaya steppe are formed on behalf of fresh underground waters inflow from left bank of Syrdarya river, occurred in modern valley of Chirchik, Akhangaran, Sardob and Utkensay rivers and in the southern part – due to underground waters inflow from Turkestan ridge side. Ground waters – first water-bearing horizon located from land surface is formed due to infiltration of irrigation canals, networks, irrigated fields waters and atmospheric precipitations.

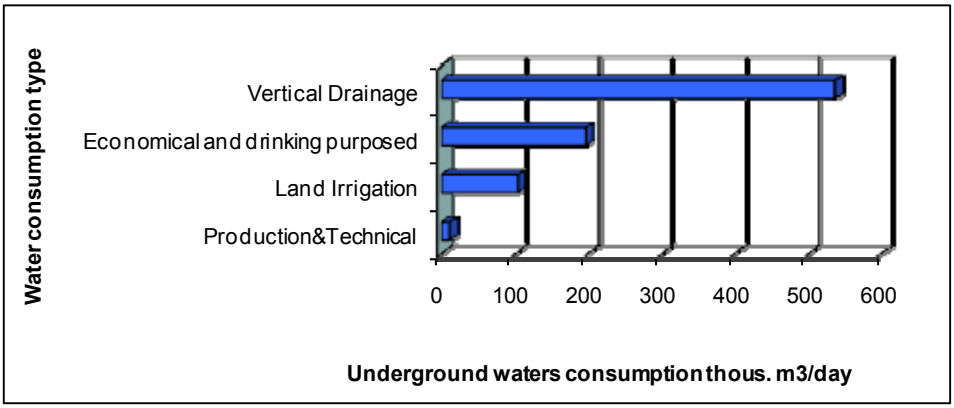
Major annual underground waters intake is accomplished from Syrdarya and Central-Gulistan deposits and made up over 300,000 cub.m/day in 2007.

Figure 3.1.2.5. Utilization of underground waters of Syrdarya region



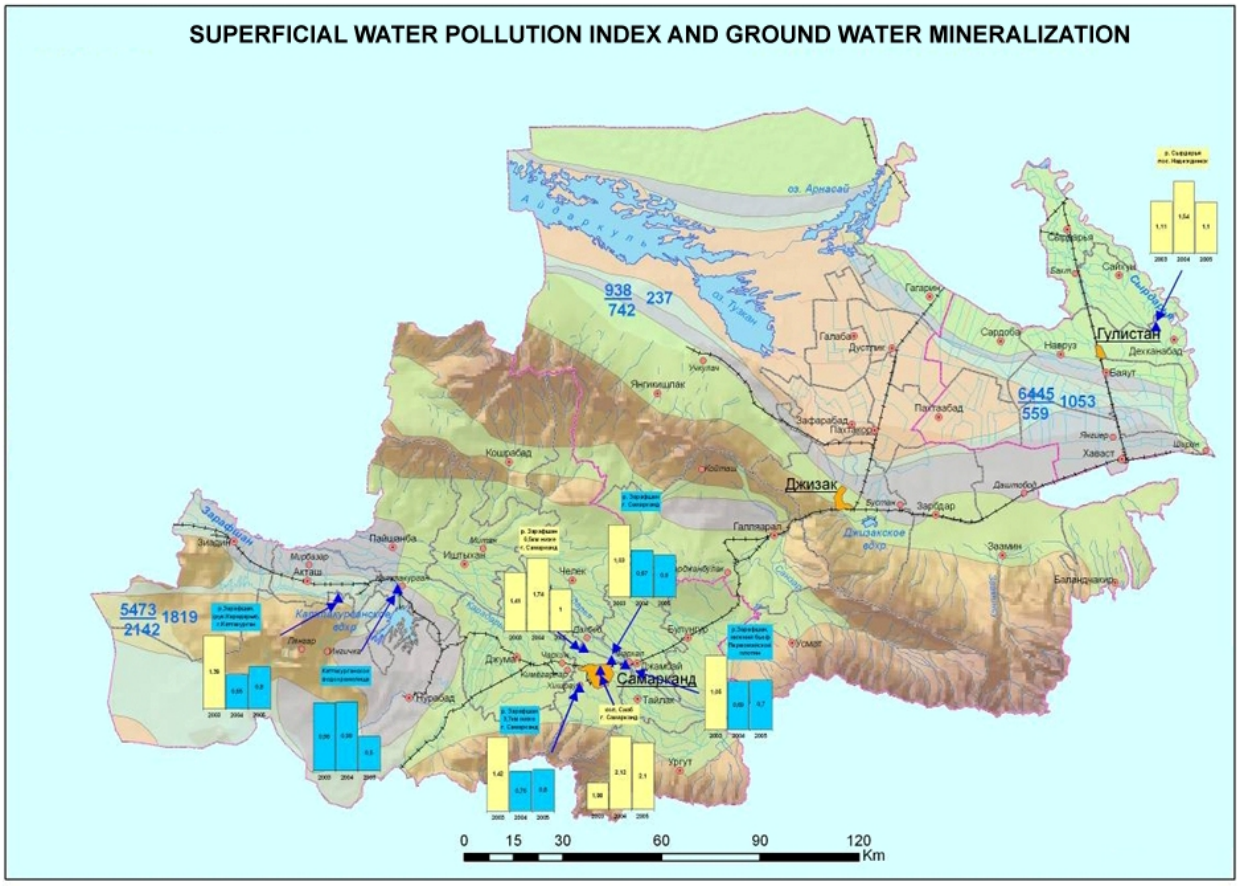
Underground waters are mainly used for household water use organization.

Figure 3.1.2.6. Utilization of ground waters in Syrdarya region.



In Syrdarya region on Dustlik, Khavast deposits and western part of Upper-Pliocene deposit the mineralization of underground waters is consisting 1,4-1,8 g/l, general hardness 10,8-17,5 mg-eq./l, sulfates content from 570 to 980 mg/l. Image 3.1.2.4.

Figure 3.1.2.7 Superficial Water Pollution index and ground water mineralization



Data on deposits of ground waters and their withdrawal

Fraction numerator – forecast deposits in thous.cub.m/day

2574
_____ 732
421

Term of fraction – explored deposits in thous.cub.m/day

Figure (to the right) – ground water withdrawal in in thous.cub.m/day

Water quality class	Characteristics	WPI value
I	Very clean	<=0.3
II	Clean	>0.3-1.0
III	Moderately polluted	>1.0-2.5
IV	Polluted	>2.5-4.0
V	Dirty	>4.0-6.0
VI	Very dirty	>6.0-10.0
VII	Extremely Dirty	>10.0

Ground Water Mineralization

	up to 1 g/l
	up to 1.5 g/l
	1.5-5 g/l
	5 g/l and

Syrdarya deposit is formed by underground inflow from Chirchik, Akhangaran and Dalverzin deposits, inflow from the south and Ferghana valley. Populated areas of Pakhtaabad and Kakhramon are fed from Zaamin water intake situated on the territory of Jizzakh region.

There are operational reserves of fresh underground waters at four registered deposits in the volume of 697.15 thous. cub.m/day.

Table 3.1.2.8.

Utilization of fresh and brackish underground waters collected from registered reserves on Syrdarya region deposits as of 01. 01. 2007 (thous. cub.m/day)

Name of deposits and underground waters area	Registered reserves of underground waters, thous. cub.m/day	Date of commencement of operation	Number of drilled well	Number of operated wells	Takeoff, thous. cub.m/day
Syrdarya					
Akhunbabaev	7,3	1976	5	5	4,06
Pravda	55,20	1993	2	1	-
Bakht	21,2	1986	9	8	4,08
Krestyanskiy	259,3	1993	12	6	42,14
Sardoba-1	5,86	1986	3	1	1,5
Sardoba-2	28,0	Not operated	-	-	-
On single water intakes	37,27	Different	253	95	33,52
Chinaz site	136,08	Not operated	11	-	-
Total on deposit	550,21		295	116	86,15
Central					
Sovkhoz №17-19	40,95	1964	14	3	5,06
Gulistan	42,30	1959	25	12	7,49
On single water intakes	25,84		351	65	4,05
Total on deposit	109,09		390	80	16,6
Upper-Pliocene					
Communism	17,28	1979	6	1	0,3
Mirzachul	12,96	1987	7	2	0,9
Bayavut	3,3	1987	5	1	0,4
On single water intakes	0,82		7	2	0,3
Total on deposit	34,36		25	6	1,9
Khavast on single well	3,49	1998	12	6	1,3
Total on region	697,15		722	208	105,95

There are 13 public communal and water service enterprises acting in the region. The rest of populated areas are supplied with water from local underground water intakes.

Besides that, 733,040 cub.m/day is used by enterprises and organizations from unregistered reserves of fresh and brackish underground waters (see Table 3.1.2.9).

Table 3.1.2.9.

Utilization of fresh and brackish underground waters collected from unregistered reserves on deposits of Syrdarya region as of 01. 01. 2007 (thous. cub.m/day)

№№	Underground waters deposit	Actual total average annual picking from unapproved reserves	Including by utilization purpose (picking / number of operated wells)					
		Total amount of operated wells on unapproved reserves	Economical and drinking purpose.	Production &Technical	Land Irrigation	Vertical Drainage	Pasture watering	Mine pumping
1	Khavast	174,46/187	25,40/100	1,18/5	67,60/30	80,28/52	n/a	n/a
2	Syrdarya	215,58/242	26,92/140	3,61/12	30,95/14	154,10/76	n/a	n/a
3	Central Gulistan	282,30/330	28,42/155	6,13/19	5,0/3	242,75/153	n/a	n/a
4	Upper-Pliocene	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5	Dustlik	60,70/33	0,70/7	n/a	n/a	60,0/26	n/a	n/a
	Total:	**733,04/792**	**81,44/402**	**10,92/36**	**103,55/47**	**537,13/307**	n/a	n/a

Besides that, there are underground waters deposit sites with registered reserves of underground waters (220,48 thous.cub.m/day), which are inoperable.

Table 3.1.2.10.

Non-operated sites of underground waters deposits with registered operational reserves on Syrdarya region as of 01.01.2007 (thous. cub.m/day)

#	Underground waters deposits, sites names, administrative unit (rayons)	Registration authority, protocol number and approval date	Registered reserves	
			Total	Incl. by categories A+B+C_1
1.	**Khavast UWD:** «Akchangal» Khavast, Mirzachul rayons	«Uzbekhydrogeology» № 2 dd. 12.02.98	1,20	1,20
1.	**Syrdarya UWD:** «Pravda» Syrdarya rayon	GKZ USSR № 7728 dd. 19.11.76	55,20	55,20
2.	«Chinaz» Syrdarya, Dekhkanabad rayons	GKZ RUz. № 186 dd. 28.12.02	136,08	136,08
3.	«Sardoba»-II Akaltyn rayon	«Uzbekhydrogeology» № 26 dd. 25.09.86	28,0	28,0

As it is seen from the Table 3.1.2.10, there are registered deposits of fresh GW in Akaltyn and Khavast rayons of Syrdarya region, which are not utilized, however, corresponds to GOST on «Drinking Water».

Table 3.1.2.11.

Water quality of existing water supply sources

Settlement	Capacity in thous.cub.m /day	Source and water intake facility	Mineralization, g/l	Rigidity mg. equip/l
1	2	3	4	5
Syrdarya deposit				
Gulistan city	21,4 10,3	(sec. Dehkhanabad) Local water intake facility “Northern/Severny” “Southern”	0,3-0,4 0,45	4,1-4,8 4,52
Yangier	14,8	(sec. Dehkhanabad)	0,3-0,4	4,1-4,8
Syrdarya	13,6	Local water intake facility “City” (sec. Akhunbabaev) Local water intake facility “Southern”(sec. Pravda)	0,52 0,3-0,4	4,9 1,5-4,5
Bakht	3,4	Local water intake facility “Bakht”	0,44	0,7-4
Dehkhanabad	5,5	Local water intake facility “Dehkhanabad”	0,62	5,12
Saykhunabad	5,2	Local water intake facility “Saykhun”	0,4	3,7
Khavast deposit				
Bayaut	5,3	Local water intake facility “Bayaut”	1,46	13,42
Farkhad	3,0	Local water intake facility “Farkhad”	1,4	17,0
Yangier	6,2	Local water intake facility “Yangier”	0,82-1,2	8-10
Khavast	9,5	Local water intake facility “Khavast”	1,1-1,4	13,6-14,3
Shirin	3,7	Local water intake facility “Shirin”	1,1-1,4	up to 7
Kakhramon, r/c Pakhtaabad	1,2 4,0	Group water conduit from Zaamin water pipeline	0,27	3-4,8

Note: Maximum admissible concentration of polluting substances (MAC), mineralization -1.0-1.5 g/l, general hardness – 7-10 mg/eq./l

3.1.3. Soil resources

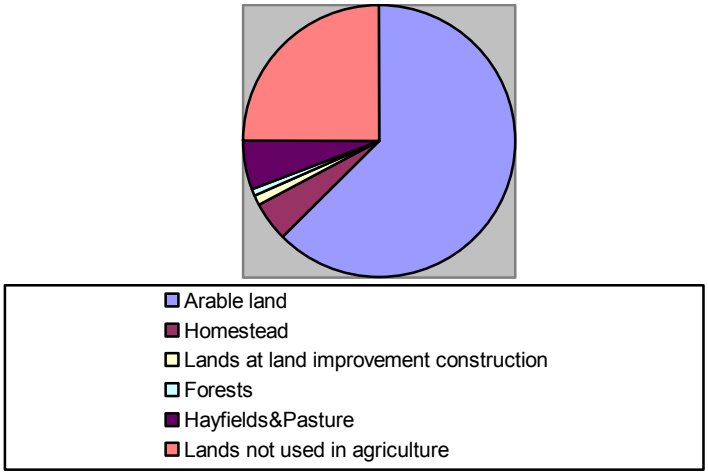
Light grey desert soils and in some areas brackish ones prevail in Tashkent-Golodnosteppe depression. Typical grey soils are widespread by periphery part of the depression. Meadow and meadow-swampy soils are developed in the bottom of Syrdarya river. Typical and dark grey soils prevail within foothill plains and low-hill terrains of Western Tien-Shan, light and typical grey soils – within foothills of Turkestan ridge.

Loamy light grey soils of plains are irrigated and used for farming. Gristly eroded light grey soils, clayey and loamy, are formed on loess, mostly irrigated or can be used for irrigation, their less part is used for dry-farming land and pasture. Meadow soils are used for farming since long ago.

Characteristics of land use are represented in Figure 3.1.3.1.

Figure 3.1.3.1.

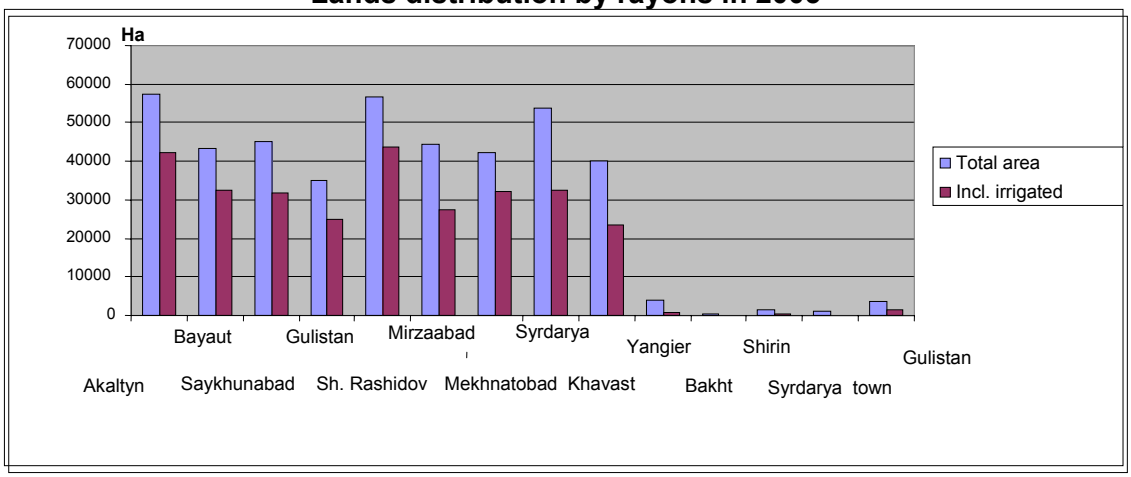
Structure of general land use area and agricultural lands, in thousand hectares



Due to deterioration of irrigation and drainage systems the water consumption for irrigation purposes is increased and that results in water deficit and causes rise of ground waters.

Figure 3.1.3.2.

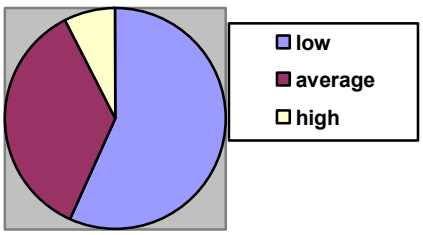
Lands distribution by rayons in 2005



About 13.7% of irrigated area is occupied by gypsum containing soils.

Figure. 3.1.3.3.

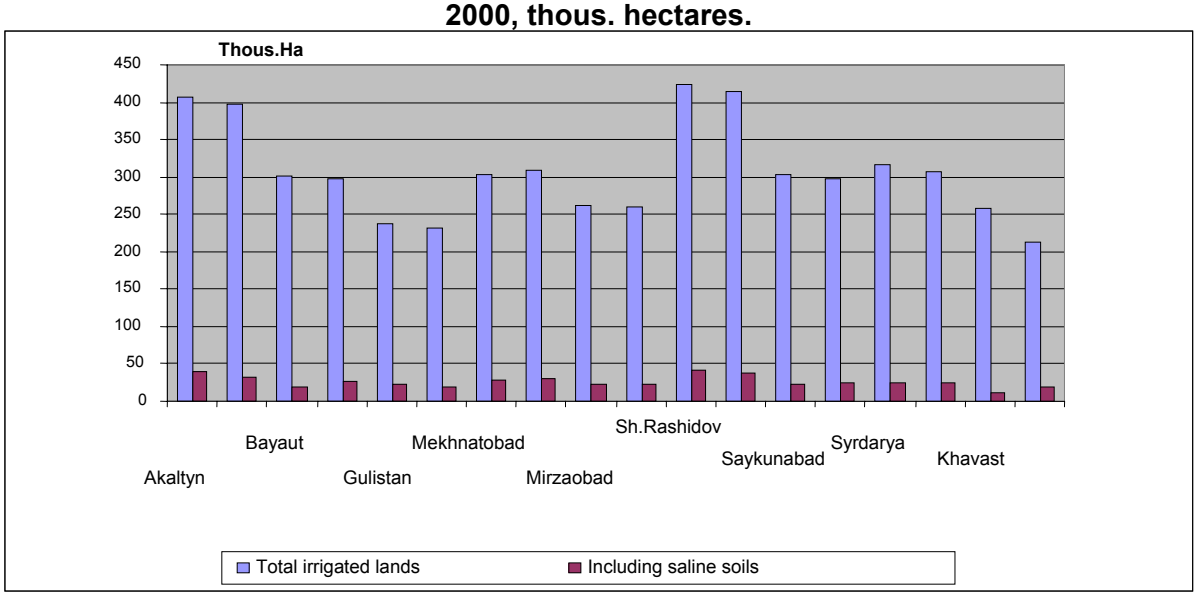
Gypsum content of irrigated lands, ha



For the last 10 years increase of salinity of irrigated agricultural lands is observed from 80,4% in 1990 up to 85,7% in 2000, i.e. by 5,3%: weakly saline lands areas reduced to 3,6%, average saline – increased up to 4,6%, strongly saline – up to 4,3%.

Figure 3.1.3.4.

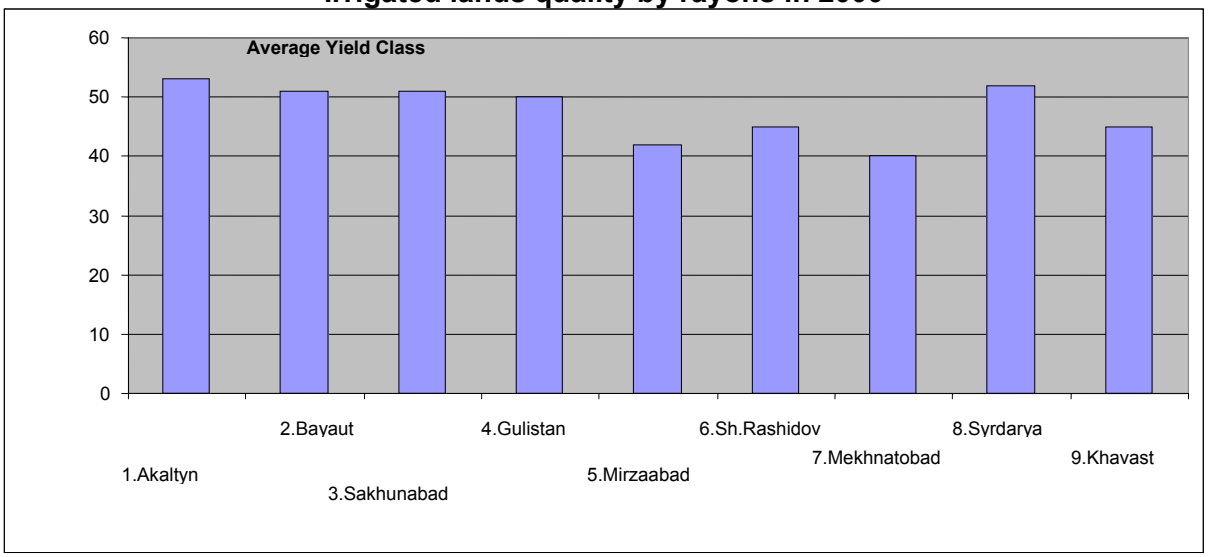
Dynamics of change of irrigated lands salinity areas by rayons for the period of 1990 – 2000, thous. hectares.



Average fertility soil losses rate due to salinity, gipseous content and humus content comprises 49 points, in comparison to the year of 1990 (53 points) it decreased at 4 points (Figure 3.1.3.4.)

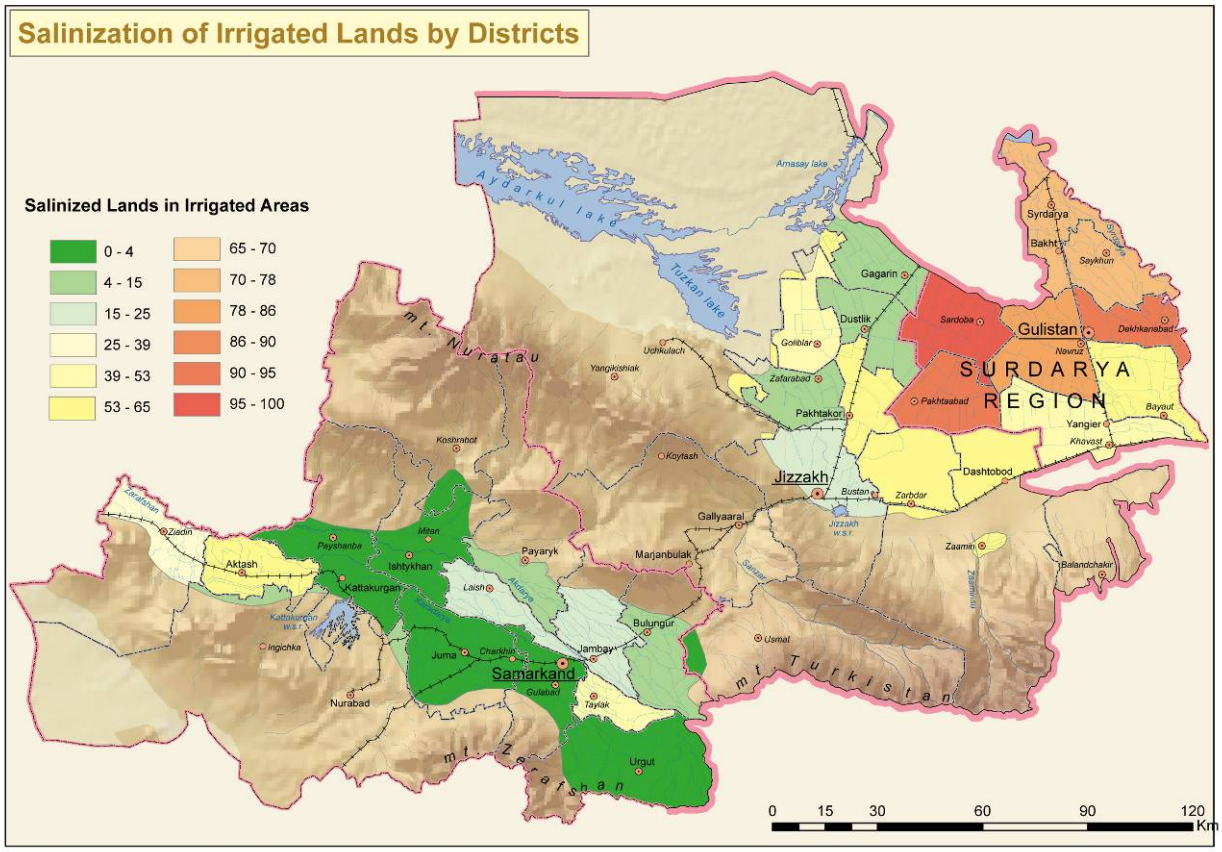
Figure 3.1.3.5.

Irrigated lands quality by rayons in 2000



Only 688 hectares (0.2%) of irrigated lands are subject to water (wind) erosion.

Figure 3.1.3.6. Irrigated Lands Salinization



Source: Atlas “Appraisal of Uzbekistan environmental condition by environmental indicators”, 2008.

Hayfields and pastures occupy about 8% of agricultural lands; digression on them is not significant.

3.1.4. Flora and fauna

The most part of Syrdarya region is occupied by agricultural land. Arable lands occupy 256,061 ha, technical cultures crops (mainly cotton), grain and legumes – 75,360 ha and 66,988 ha accordingly. The main agricultural crops in the region and in project rayons are represented by wheat and cotton. Average annual cotton production by Syrdarya region in 2008 is estimated as 151.4 thous. tons, including by rayons: Akaltyn – 44.5 thous. tons, Bayaut – 48.8 thous. tons, Khavast – 16.9 thous. tons, Mirzaabad – 10.7 thous. tons, Sardoba – 30.5 thous. tons. Average annual wheat production by Syrdarya region comprised 209.7 thous. tons, including by rayons: Akaltyn – 45.3 thous. tons, Bayaut – 55.4 thous. tons, Khavast - 40.7 thous. tons, Mirzaabad – 13.3 thous. tons, Sardoba – 55.0 thous. tons.

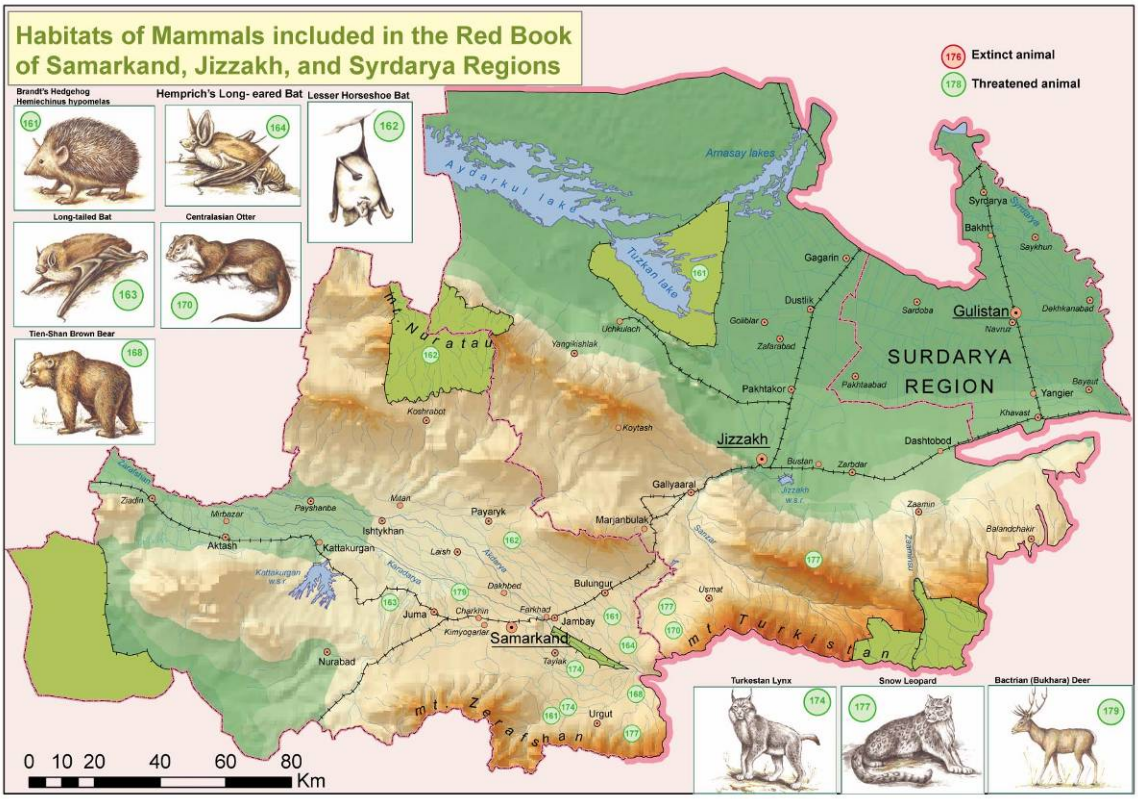
Irrigated agriculture is one of main ground water pollution sources. Preserved monoculture as cotton not only predefines rapid decrease of soils production capacity at account of humus misbalance but also stipulates for toxicity of surface cover. Fertility of such soils is maintained artificially by introduction of considerable doses of mineral fertilizers (nitric, phosphorus, potassium), and the remaining part is collected in soils and after washed out polluting soil itself, grounds and natural waters.

Out of perennial plants in the region gardens and vineyards occupy 6201 ha and are in fruit-bearing age and in disposal of farm and dehkhan plots.

Forest zone by the region occupies insignificant area – 3,477 ha, out of which: 457 ha – in Akaltyn rayon, 285 ha – in Bayaut rayon, 455 ha – in Khavast rayon, 204 ha – in Mirzaabad rayon, 398 ha – in Sardoba rayon. Forest zone is consisting of field-protective plantings along the roads and between the fields, plantings in parks and populated areas: Lombardy poplar (Populus nigra) – the most wide-spread species in forest shelter belts. Planted trees and bushes in parks and dwelling settlements differ by their diversity and include among others the following: (Acer), plane tree (Ulmus) willows (Salix), elms (Acer), plane trees (Ulmus), willows (Salix), mulberry plantations, gardens and vineyards.

Pasture lands occur on the territories of several farms, particularly, where soils are too saline for commercial crop growing. At these sites community of salt-tolerant deciduous plants are growing with height of up to 1 m, many of them are compositae (Compositae or Asteraceae), mixed with herbs, common rush (Phragmites), reed (Juncus) and glasswort. In zones of low intensive breeding tamarisk (Tamarix) and willow beds occur.

Figure 3.1.4.1. Habitat of Mammals included in the Red Book of Samarkand, Jizzakh and Syrdarya Regions



Source: Atlas “Appraisal of Uzbekistan environmental condition by environmental indicators”, 2008.

Swamp lands are formed in places where water flooding is too high to conduct irrigation. In small hollows, where superficial waters are collected and accumulated due to high level of GW; rush and reed form salt-proof and swampy areas. Lack of drainage leads to periodical occurrence of salty lakes surrounded by saline swampy lands covered by willow beds and rush.

Site at channels and collectors, especially in land beds are overgrown by riverside vegetation and also vegetation under water.

The presence of river vegetation positively affects water quality, as it acts together with periphyton in biodegradation of different organic and mineral substances contained in mineralized water and flowing from agricultural lands. As a result a specific biocoenosis forms inside collectors which are mainly represented by benthophytes and periphytonic forms.

In trunk canals the vegetation is represented by reed, blackmoor, doubtful bluejoint and others.

At the distance of 500 and over meters from left bank of Syrdarya river the following trees and bushes are growing: bluish poplar, oleaster, Californian poplar, Bolle's poplar, southern willow, grey poplar, white poplar, ashtree, elm, arbor vitae, juniper, pine, weeping willow, planetree; bushes: wild tamarisk, wild horn-head, dog rose of medicinal plant kind, cane, Great Club-rush, gisha, licorice medicinal, mint, caper, wormwood.

Tamarisk bushes of collector-drainage network are the places of cuckoo nesting, on slopes of drainages and on edges of developed sites, where bushes of carelinia and tamarisk are kept, scrub robin and many other species are nesting: black-headed gull, morwennol and slender-billed gull.

On left-bank of Syrdarya river the following permanent (P) and seasonal (S) species of animals and birds are inhabiting: small glassy ibis (P, Red Book – RB), white stork S RB, white heron, rare species S and P, yellow heron rare species S and P, small golden eagle S RB, sparrow hawk RB S, pheasant P, 9 species of duck P and S, 2 species of teal P and S, little owl P, raven 2 species P and S, coot P & S, doves 3 species P & S, viper P, water snake 4 species, lizard P, reed bunting P & S, quail P, wild boar P, turtle P, muskrat P, jackal P, vixen P, hare P, badger P, nutria P, mouse P, hedgehog P, bat P, snowcock S, 2 species of geese, , 4 species of cormorants, hoopoe S, my-lady's-belt P & S, skylark S & P, blue tit S & P.

Contamination of water sources impacts negatively the avifauna in the region, amount of species reduce and quantity of migrating species decrease, however number of species, marked at the territory of Syrdarya region, got into Red Book of the Republic of Uzbekistan is insignificant.

Following species of fish are found in Syrdarya river and off-takes: carp, crucian carp, soma, mudfish, carp, zander, barbel, asp, redeye, Caspian roach, grass carp, pike, sabrefish, bream, Turkestan barbel.

3.1.5. Social aspects and population health in Syrdarya Region

According to the beginning of 2003 permanent population comprised 664.1 thous.capita, men – 332.9 thous.capita, women – 331.2 thous.capita. Thus for the beginning of 2009 – population comprised 703.4 thous.capita, men – 353.5 thous.capita, women – 349.9 thous.capita.

Birth rate in the Syrdarya region in comparison to 2003 increased from 13,727 capita up to 17,035 capita, natality (per 1000 capita) increased from 20.5 up to 24.3. At the same time mortality (per 1000 capita) decreased from 5.2-5.5 to 5.0. Population natural increase per 1000 capita increased from 15.3 to 19.3.

Population mortality rate from the period of 2003 till 2008 ranged from 3480 to 3790 capita, mainly due to blood circulation diseases (55.5%), accidents, poisoning and injuries (~8%). Considerable percentage of mortality due to tumors (6.0%), though the figure decreased in 2008. 38 people were identified in 2008 as having mental disorders.

Children's mortality at the age of not exceeding 1 year insignificantly decreased: from 251 to 244 children, mainly, due to diseases of respiratory apparatus, conditions occurring in prenatal life, congenital anomalies.

In 2008 out of total population comprising 316.9 thous.capita officially 800 are recognized as unemployed, and 447 of them receive unemployment benefits.

Researched employment status of population in Syrdarya region by sectors of economy evidences that the majority of population is engaged in the agriculture and foresting as well as healthcare, physical culture, social security, public education, culture and arts.

At the end of 2008 total number of hospitals in Syrdarya region was 45, clinics – 208, preschool institutions – 191, out of which: 46 – kindergartens, 131 – daycare centers, 14 – school centers. The number of museums – 2, theaters – 1, located in Gulistan. Primary education schools - 304.

The activity of human during his lifetime is connected to producing wastes. Most part of such wastes is not dangerous for human health in case they are properly organized and managed. Hygienists have calculated norms of accumulation of solid domestic wastes (SDW) per capita a year – in average comprising 1,2 kg/day or 453 kg annually (1,1 cub.m a year). Besides according to data of a number of researches, SDW mainly consist of organic substances (up to 58,3%) and in autumn period – up to 66,0%, therefore SDW not properly removed undoubtedly could pose an epidemic danger. Thus sanitary and epidemic danger of SDW is connected mainly to its biological contamination (occurrence of pathogenic bacteria, simple viruses, helminthes larva) and with role of sinanthropus spread (rats and flies). Besides soil and water environment are polluted. Smells originating from places of SDW accumulation create unfavorable environment for children.

There are 9 landfills in the region with total are occupied at 58.5 hectares. The volume of domestic wastes in all 9 landfills makes up about 300 thousand tons a year.

3.2. Akaltyn Rayon

3.2.1. Physical geographic and climate peculiarities

Akaltyn rayon (see Annex 1) is located in the western part of Syrdarya region. It borders with the Republic of Kazakhstan in the north, with Djizzak region – in the west, Mirzoabad region – in the east and Sardoba region – in the south.

Population of Akaltyn region is 45,663 capita, 8,078 households are in 25 makhallas and 4 cities.

8 settlements are in Akaltyn rayon: Sardoba, Ferghana, S.Sadykov, Andijan, U.Nasyr, Bobur, A.Tairov, M.Mukhamedov. These settlements were established within 1965-1980.

Akaltyn rayon is situated in the central part of Golodnaya Steppe between left bank of the South Canal and Central Golodnaya Steppe Collector. The relief of the surface is plain, absolute marks are in the range from 267.3 to 268.5 meters above-sea level, with gradual lowering from south-east to north-west (inclinations from 0,0008 to 0,0015). The total area is 57.38 thousand hectares.

Low absolute marks of the surface of studied rayon stipulate natural surface yields as well as groundwater runoff from surrounded territories which lead to soil imbibitions, elevation of ground water level with creation of the conditions for salinization and water logging. That is why in order to provide the drainage norm under irrigation of agricultural crop works on rehabilitation and construction of proficient systematic drainage were conducted under the Project «Support to development of infrastructure and restructuring of households in Akaltyn rayon of Syrdarya region» ADB Loan No 1833-UZB.

Climate of Akaltyn region is sharply continental with rather mild winter and long-term hot summer. The climate characteristics are given upon weather stations data of Syrdarya and Yangier (table 3.2.1.1.)

According to data of many years observations the air average annual temperature in cities of Syrdarya is + 14.5 °C, Yangier + 15.8 °C, average annual temperature of the hottest month – July in Syrdarya is + 36.7 °C, minimal – 3.2 °C; in Yangier accordingly + 37.3 °C and - 1.5 °C Sharp continental climate is characterized by large amplitude of temperatures: absolute maximum is in the range of 42.9-43.8 °C, minimum – (-16.5-20.1°C).

The soil in winter time can reach 70.0-71.0 °C, in winter the temperature falls till 15.0°C.

Table 3.2.1.1.

Climate characteristics of the rayon

Weather station	Air temperature,°C					Soil temperature,°C			precipitation, m	mist, hours
	Average annual	Average monthly		Absolute		Average	Maximum	Minimum		
		max	Min	max	min					
Syrdarya	14,5	36,7	-3,2	42,9	-20,1	18,3	71,0	-15,0	323,4	153
Yangier	15,8	37,3	-1,5	43,8	-16,5	18,7	70,0	-15,0	356,6	45,8

Wind regime stipulated by the orography of the rayon which is rather complex. In average annual course the winds of north, east and west directions prevail. In winter time prevail the eastern and southeastern winds, and reach 5,2 m/sec, in summer – northwestern winds followed by separate strong rushes (till 28-30 m/sec) and rare dust storms.

Average annual wind speed is 1.3 m/sec; more frequent weak winds are recorded (0-1 m/sec), which is 62.9 % from total quantity.

The first winter frosts are mainly in late October- early November. The duration of frost-free period in average is 260-270 days.

In conditions of irrigated agriculture the warmth is the main climatic factor, which affects the development and crop of agriculture.

Table 3.2.1.2 represents average annual dates of stable air average daily temperature alternation in spring and autumn via biological minimum of temperature for: grain crops and cabbage is -+5 °C, cotton and corn is +10 °C, tomato is + 12 °C, watermelons is +15 °C

Table 3.2.1.2.

The duration of warm period and total of effective temperatures

Station	The duration of period, days				total of effective temperatures, °C			
	5	10	12	15	5	10	12	15
Syrdarya	264	216	200	173	3370	2190	1770	1215
Yangier	280	230	215	187	3885	2640	2200	1605

Precipitations are about 340 mm, where 80% are in winter-spring time. As it is seen the studied territory is characterized by sufficient humidification.

The relative air humidity in winter time is 74-78%, but in winter is 29-31%, per annual average values is 56%. The annual evaporating capacity is equal to 1500 mm.

Climatic conditions (high summer temperatures, low level of precipitations, in summertime, high wind speeds and high evaporation intensity) of Akaltyn rayon are favorable for soil and ground water salinization causing increase of mineralization of subjacent GW horizons.

3.2.2. Existing sources of impact

The main sources of environmental impact of Akaltyn rayon, which are typical for agricultural territories are irrigated agriculture, livestock farming, agriculture farms and settlements. 840 farms, one shirkat farm and 9 settlements with its center in Sardoba are located on the rayon territory. There are two cotton plants; small juice bottling companies, 8-10 mills, and bakery with capacity of 1000 loafs of bread and network of highways. Main inter-rayon roads Tashkent-Termez and Djizzak – Gulistan pass from south-west to north-east and inter-economical highway passes from west to east.

Irrigated agriculture composes great quantity of return collector-drainage waters, polluted with mineral salts, pesticides and fertilization.

Communal-domestic livestock wastes, most part of which is discharged, as a rule, without purification into open collectors and lay of land. Combinations of nitrogen, grease, surfactant species, oil products etc. come into natural waters with them.

The repair-mechanical workshops, garages, greenhouses, domestic wastes, stored at the landfills, storehouses of mineral fertilizers and pesticides, agricultural aerodromes from which contaminants are washed away by atmospheric precipitation can be the sources of environment impact.

Ablation and wind erosion, which disturb the integrity of soil-vegetable cover can be natural sources of environment impact.

3.2.3. Geological and hydro geological conditions

In geomorphological relation the territory of Akaltyn rayon represents graded slight wavy proluvial plain of Golodnaya Steppe (terrace of Syrdarya River) with erosion accumulative type of relief including flat proluvial plain of Golodnaya Steppe complex and great lowering- Karoy, Sardoba and Jettisay with general surface slope to the north and north-west with slopes not exceeding than 0,002. In low extremely graded part the plain is characterized with slight wavy surface with frequent closed lowering and general slopes from 0.0005 and less.

Karoy lowering and neighboring low plains representing sloping bending with depth 5-10m with general slope about 0.0002 occupy the north part of the territory.

Lithologic formation is characterized by interleaving loams, sandy loams and sands, with inter-layers of clay.

Sardoba cavity located in the northeastern part of the territory is characterized by slight wavy surface with the slope 0.0002. It is formed with sandy loams, pulverescent clays with sand bands.

3.2.4. Water resources.

Surface water resources

Akaltyn rayon is provided with irrigation water from the South Golodnaya Steppe (SGSC) Channel originating from diversion canal at the Farhad hydroelectric power plant on river of Syrdarya and having conveyance capacity of approximately 540 cub.m/sec. Design conveyance capacity of the Central Branch of SGSC that approaches Akaltyn rayon is 140 cub.m/sec. Both channels were built before construction of irrigation and drainage infrastructure in Akaltyn rayon.

The quality of irrigation water is defined by chemical composition of water of Syrdarya river.

Table 3.2.4.1.

Chemical composition of water in Syrdarya River near Bekabad town

Ingredients	2007	2008	MAC
Oxygen, mg/l	11,39	11,46	6,0
BOD5, mg/l	4,40	3,34	3,0
COD, mg/l	26,44	24,62	
Ammonium nitrogen., mg/l	0,11	0,05	0,39
Nitrate nitrogen, mg/l	0,024	0,02	9,1
Nitrite nitrogen, mg/l	2,89	1,77	0,02
Ferrum, mg/l	0,01	0,02	0,5
Copper, mg/l	2,5	4,2	1,0
Zinc, mg/l	3,3	2,9	10,0
Phenols, mg/l	0,002	0,002	0,001
Oil products, mg/l	0,02	0,02	0,05
SSAS, mg/l	0	0	0,1
Suspended substance, mg/l	5,6	14,8	10
DDT, µg/l	0	0	Abs.
alpha-HCCH, µg/l	0	0	Abs.
gamma - HCCH, µg/l	0	0	Abs..
chromium, µg/l	0,3	0,2	1,0
Fluorine, mg/l	0,53	0,45	0,75
Arsenium, µg/l	0	0,3	50,0
Mineralization, mg/l	1233,5	1289,2	1000
Calcium, mg/l	127,8		180,0
Magnesium, mg/l	9,4		40,0
Sodium, mg/l	101,5		120,0
Lead, mg/l	0,2		0,03
Sulphate, mg/l	509,8		100
Cloride, mg/l	98,1		300
Stiffness, mg/l	11,04	11,56	

As it seen from the table, oxygenous regime of water was preserving in satisfactory condition during whole period.

Upon reaching the border of Akaltyn rayon the Central Branch is divided into two large channels: Left and Right Braches which provide irrigation channels of Akaltyn rayon and rayons of neighboring Djizzak region with irrigation water. Their conveyance capacities are 69.5 cub.m/sec and 68.0 cub.m/sec, while ordinary design water flow is 67.0 cub.m/sec and flood waters discharge – 61 cub.m/sec.

The content of organic substances by COD increased, the exceeding on nitrites preserved (2 MAC) and phenols (2 MAC). Average mineralization was in range of 1.1-1.06 MAC. Lindan and hexachloran were constantly identified and observed (α- and γ- HCCH). Concentration of sulfate exceeded MAC 5 times. High stiffness is typical (11 mg.eq./l) for water of river Syrdarya. The quality of water of Syrdarya river becomes worse due to collector-drainage waters discharge at the upstream of the river (Fergana valley, massifs of Tajikistan territory) and is characterized by 3rd type of moderately contaminated waters.

Superficial waterways in Akaltyn rayon comprise 14 branches of South Golodnaya Steppe Canal – SGSC: uts. Tairov (2 channels), Sardoba (3), Ferghana (2), Andijan (2), U.Nasyr (2), Bobur (2), M.Mukhamedov (1).

The mineralization values of collector-drainage waters are presented in table 3.2.4.2.

Table 3.2.4.2.

Chemical composition of water at main collectors of Akaltyn rayon as of 1.01.2009

Name of collectors	Chemical indicators	2009
CC-7	Mineralization, g/l	4,06
	Amount of chlorine, g/l	0,313
CC-6	Mineralization, g/l	4,09
	Amount of chlorine, g/l	0,39
17-C-7	Mineralization, g/l	3,72
	Amount of chlorine, g/l	0,34

Ground waters

The territory of Akaltyn rayon due to small slopes and absence of drainage layer stipulates extremely difficult conditions of the general underground inflow and outflow waters.

Source of supply for underground waters of the massif before irrigation were ground waters from the side of submontane part of Turkestan mountain range forming the single stream of ground waters in direction to the Central part of Golodnaya Steppe. Moving away from foothills the conditions of outflow become worse as approaching to periphery part – north-west and towards Jettisay lowering and Sardoba cavity, which are practically the basin of final groundwater runoff. Due to irrigation these natural conditions of the rayon have worsened.

The level of ground waters is 2-3 m (85% of the territory) on the main part of the plain and Karoy lowering. The depth of ground waters of newly irrigated ground of Jettisay lowering and neighboring territory is 1-2 m. Before beginning of irrigation works the depth of groundwater occurrence at different sources was from 1.0 till 20 m in researched rayon. With the beginning of irrigated agricultural production groundwater level annually raised with the speed at 0.8-1.0 m per year.

At present time groundwater level considerably undergoes to season fluctuation, lifting to 1.5m below ground level to the end of irrigation season and falling to the depth till 3,0m. In low-lying places of Akaltyn rayon groundwater level can lift up to surface level flooding separate places for a long time.

For the researched area it is characteristic the absence of natural superficial water objects and deficit of superficial water resources.

Water supply of the rayon

Water supply of the rayon is based on the usage of own ground waters.

Provision with piped water of the Akaltyn rayon population was 75.6% in 2008; specific water consumption – 21.65 l/day per person.

Average water supply to the network on Akaltyn rayon was 343.0 thousand.cub.m/year, where loss was 78.3 thousand.cub.m/year. Water supplied in 2008 was 264.7 thousand cub.m/year, to population 241.8 thousand.cub.m/year, other bulk buyers - 22 thousand.cub.m/year. Population coverage with sewerage was 63%.

The length of water-supply network on Akaltyn rayon is 210.0 km including those broke down - 98.0km; quantity of wells is 28, in workless condition are 12; tank houses are 12, in workless condition are 4, set up pumps are 3.

The analyses of present condition of water supply system indicated that it is necessary to substitute pumping equipment at water intakes and water distribution centers (WDC) and to replace the significant part of pipelines of water supply network because of their uselessness or too small diameter in comparison with discharge they should let through. WDC and water intakes are rather old but their capacity is mainly sufficient.

The monitoring for qualitative condition of sources of water supply is absent.

Electricity interruption is observed as the result of accidents in electrical supply network which is the cause in water supply, as the sources of reserve electric power supply are absent.

The pipes are outdated. Sedimentation in pipes and a number of breakouts with unmatched diameters lead to sharp powering of pipe capacity and increase of water loss by length and in this connection to excess consumption of electricity. Water pumps worked out their exploitation terms, which cause excess consumption of electricity up to 20% while of water transportation. The presence of undisclosed mechanical fractions, sand, suspensions and rust in water leads to fast abrasive deterioration of pipes and their clogging.

The main problem revealed under the initial investigations is 100% absence of water disinfection. In warm climate there is a great probability of mass infection appearance from different pathogenic organisms. Population protection from diseases caused as the result of water consumption can be implemented only with clean drinking water consumption. Hygienically clean water should be supplied constantly and undoubtedly have the quality appropriate to Drinking Water Standard.

For protection of water quality and water production facilities (wells, constructions on surface water intake) the area of sanitary protection is usually defined: 1st zone to 30-50 meters, 2nd zone up to 1000 meters. Zone of absolute protection is 1st zone. No other constructions except necessary for water supply can be located on the territory of 2nd zone. These requirements to existing local intakes (wells) cannot be applied at present. All the wells do not have 2nd zone of protection and for 90% do not have 1st zone of sanitary protection.

Great problem is the hundreds of emergency water intake wells demanding liquidation, which are on balance or amortized but not tampered.

Figure 3.2.4.1. Pavilion above the well

Figures 3.2.4.1. and 3.2.4.2. «Water intake №2» on the territory of rayon center of Sardoba was built in 1961. Water intake constructions are in emergency condition.
There are two wells, where only one is operating with the pump of ECV 10-160. Pavilion above the well is brick based, 3x3m without windows and doors, the roof is leaking.
The non-operational well is clogged and has no pump installed in, so the plugging shall be provided. Plugging is necessary.
In the connection with high level of ground waters in autumn and winter time the pumps are flooded as no drainage pump available and also due to temporary electricity absence. The chlorination building is absent. Chlorination equipment is absent. Chlorination equipment is located on the reservoir and is not functioning.

Figure 3.2.4.2. Well

3.2.5. Soil resources

Total land area in Akaltyn rayon is 57381 ha, where 42057 ha are irrigated lands. Great part of the land goes under tillage (65.8% from total land area). Significant part of the lands is lands not used in agriculture (22.0%). Irrigated lands are mainly used for production of raw cotton and grain and also for farmlands.

Table 3.2.5.1.

Land (soils) of Akaltyn Rayon

	Land area (ha)	
	total	Including irrigated
Total irrigated area	57381	42057
Where: Tillage	37731	37731
Perennial plantings	767	767
Layland	1253	1253
Grassland and hay-fields	2508	
Farmland	2060	1849
Woods	457	457
Bushes		
Lands not used in agriculture	12605	

Prior to agricultural land development the ground considered to be amorphous and referred to light sierozem. In accordance with ground-climatic zonality and conditions of ground moistening on the territory of Akaltyn rayon there are the following types of lands present:

- semi-hydromorphic – meadow and sierozem;
- hydromorphic – meadow.

The bottom Jettisay lowering is occupied with and typical saline soils, which comprise 5% from the total area.

Meadow and sierozem grounds are formed under the impact of intermittent irrigational-ground-hydromorphic regime of moistening. The grounds preserve the residual signs of sierozem in certain extents. Blue-gray and rusty spots peculiar to hydromorphic grounds (the process of gleization) were observed in terms of ground differences. Meadow and sierozem grounds occupy 85% of the area of this rayon, but meadow – only 15%.

Content of humus in arable horizon is 0.55%. Humic horizon capacity is 40-50 cm.

Concentration of labile soil nutrients as phosphorus and potassium makes up appropriately 18-30 mg/kg and 160-300 mg/kg, carbonate - 7%. About 53% of the territory is occupied by low gypsum containing soils and 2% - by average and strongly gypsiferous ones.

Slight and average loamy prevail by texture of soil (84% of the territory).

Fixed amount of land subsidence in 10.0 layer in period of irrigation and environmental stress is 20-30 cm.

More than 60% of area has low fertility (41-50 points) sufficient for production up to 20 centners from 1 cotton ha, about 20% - low fertility (31-40 points). The potential of cotton productivity on such grounds does not exceed 16 centners from 1 ha. Further go lands with very low fertility (21-30 points) and exceedingly low fertility (< 20 points). These are the lands with average and strong degree of salinity, saline lands, mainly by texture of soil, heavy loam or average loam with interlayer of heavy loam.

Fertility yield class calculated on basis of field and laboratory investigations is indicated in table 3.2.5.2.

Table 3.2.5.2.

Fertility yield class of soils of Akaltyn rayon

Land type	Depth of GW occurrence, m	Texture component	Lands salinity	Lands yield class
Meadow-sierozem.	3-5	Average loam (interlayer of heavy one)	Nonsaline	41-50
			Light saline	31-40
			Average saline	21-30
			Strong saline	< 20
	3-5	Light loam (loamy sand	Nonsaline	41-50
			Light saline	31-40
			Average saline	21-30
			Strong saline	< 20
Meadow like sierozem	2-3	Average loam (interlayer of loamy sand)	Nonsaline	41-50
			Light saline	31-40
			Average saline	21-30
			Strong saline	< 20
	2-3	Light loam (interlayers of loamy sand)	Nonsaline	41-50
			Light saline	31-40
			Average saline e	21-30
			Strong saline	< 20
Meadow	1-2	Average loam (interlayer of heavy loamy sand)	Nonsaline	41-50
			Light saline	31-40
			Average saline	21-30
			Strong saline	< 20
	1-2	Light loam	Nonsaline	41-50
			Light saline	31-40
			Average saline	21-30
			Strong saline	< 20

Level of soils contamination with pesticides is low, except the territory of former agricultural aerodrome (mainly places of their storage).

Content of total DDT is 0.56 MAC. Sanitary norms excess is observed at 33.76% of all investigated areas by Glavgidromet. Maximum concentration is 1.32 MAC. The content of residual quantity of total HCCH is 0.01 MAC by all crops. The excess of MAC parameter was not observed. Phosalone, phosphamide, thiodan, dalapon and treflan are not identified. Average content of residual chlorate is also low – 10.96 mg/kg.

Land usage

Agricultural production in the rayon is concentrated mainly on cotton and on winter wheat growing (3.2.5.3.).

Table 3.2.5.3.

Main agricultural crops of Akaltyn

Culture	Unit of measure	
cotton	ha	19099
	c/ha	11,6
Winter wheat	ha	17159
	c/ha	22,9
Vegetables	ha	85
	c/ha	70,2
Watermelon	ha	588
	c/ha	243,2
Gardens	ha	618
	c/ha	18,7
Vine	ha	60
	c/ha	7,8

Lands in Akaltyn rayon are not used at full scale due to deficit of water resources and land salinity.

3.2.6. Socio-economical aspects and population healthcare

At the beginning of 2009 the population number comprised 45.663 thousand.capita, out of which men comprising 22.4 thousand.capita, women – 23.2 thousand.capita.

Population of Akaltyn rayon is young, the most part of it comprise people in able-bodied age, 30% - below age of 14, half of population (42.3%) – at the age of 14 to 55, and only 14% is over 55 years old.

As Akaltyn rayon was formed on the basis of former sovkhozs, aimed at stimulation of industrial approach to agricultural production, then the majority of population or 42% of households live in blocks of flats, which is unusual for rural rayons of Uzbekistan, 58% lives in privately owned houses. All that makes domestic gardening complicated as many citizens do not even possess own plots, which could be developed or such plots are located far from their houses as blocks of flats' area is not adapted for organization of gardening.

According to sociological researches ethnical composition of population of Akaltyn rayon is represented, as follows: Uzbeks – 77%, Kazakhs – 14%, Tajiks – 2.5%, Tatars – 1.8%, Russians – 1.3%; the remaining part includes 8 other nations.

Researched employment status of population in Akaltyn rayon by sectors of economy evidences that the majority of population is engaged in the sphere of agriculture and foresting as well as healthcare, physical culture, social security, public education, culture and arts.

For the end of 2008 total number of hospitals in Akaltyn rayon was 2, clinics – 9, preschool institutions – 10, out of which: 10 – kindergartens. Primary education schools - 18.

According to calculations, approximately 84-89% of population is supplied with drinking water in centralized manner, though irregularly.

According to water quality of artesian wells in farms at Andijan, Bobur, Siddikov water is not suitable for domestic purposes. Water from centralized water supply has mineralization more than 1.5 g/l, which exceeds sanitary norms. Due to non-satisfactory chlorination, 30% of water does not correspond to quality standards by bacteriological parameters.

Table 3.6.2.1.

Existing water supply in Akaltyn Rayon

District name	Existing water supply		
	Total released to population	Population covered	Nominal water consumption
Meas. Unit.	Thous. cub.m/year	%	**l/day/cap.**
Akaltyn	241,8	75,6	21,65

Level of coverage of population of Akaltyn rayon by drinking water as for 01.01.2009 comprises 76% (population of rayon center) and 89% of rural population (according to data of regional Suvokova). Sources of water supply – GW. Total quantity of wells is more than 20, which are located in settlements within Akaltyn rayon. More than 40% of wells are broken down (according to data of regional Suvokova). CWRs are located in the following settlements: r/c (4), «U. Nasyr» (3), «Galaba» (3), «M.Mukhamedov» (2), «Andijan» (1), «Ferghana» (1), «Tairov» (2). Chlorine-containing disinfectant is for drinking water disinfection. Analysis of results of the research of drinking water conducted by territorial CSSES shows tendency for improvement. Number of samples, not corresponding to hygienic norms of Uzbek State Standard - O'zDst 950:2000 «Drinking water» - rapidly decreased at the beginning of 2009, as per chemical and bacteriological parameters. According to chemical parameters drinking water does not correspond in majority of researched samples by mineral composition and common rigidity level as well as bacteriological parameter and Coli index.

International and national experts unanimously adopt that salinization, eutrophication of water of superficial waterways is environmental consequences of excessive tension of water resources, wrong practice of irrigation polluting wastewater to environment.

Results of laboratory researches of water of superficial water objects: inclination from hygienic norms was not revealed both in terms of chemical and bacteriological parameters.

Table 3.2.6.2.

Water quality parameters of the rayon

Indicators	2006	2007	2008
Parameters of pollution of superficial waterways (% of disparities): - by chemical parameters	0,0	0,0	0,0
- by bacteriological parameters	0,0	0,0	0,0
Drinking water quality (% of disparities): -by chemical parameters	12,4	9,3	9,9
-by bacteriological parameters	38.5	43,5	1,5

Birth rate by Akaltyn rayon in 2008 in comparison to 2003 increased from 1008 capita to 1183 capita, natality (per 1000 capita) increased from 19.2 to 23.3. At the same time mortality (per 1000 capita) increased from 3.4 to 3.6.

Health parameters of population of Akaltyn rayon according to medical aid appealability are stable. Leading noninfectious diseases among population are 5 classes of diseases. Most disease incidents in total structure are related to blood diseases and blood-forming organs: in 2006 – 17.9%, 2007 -18.6%, in 2008 -19.8%. Share of diseases of respiratory apparatus, urogenital organs, and endocrine system and of digestion organs is more than 10%. Diseases of digestion organs are on the 5th place (Table 3.2.6.2). Condition of children's health from age of 0-14 is characterized by wavy-like dynamics in the analyzed period.

Table 3.2.6.3.

Structure of general disease incidence of population, %

Rank	Diseases classes	2006	2007	2008
1	Blood diseases, blood-forming organs	17,9	18,6	19,8
2	Respiratory apparatus diseases	15,3	16,1	14,8
3	Urogenital organs diseases	13,0	12,8	13,6
4	Endocrine system diseases	12,3	11,9	11,5
5	Digestion organs diseases	10,3	9,4	10,5

Parameters of general disease incidence according to medical aid appealbility allow identifying approximate health condition. Condition of children's health from age of 0-14 is characterized by wavy-like dynamics.

Parameters of general and infant mortality in Akaltyn rayon are stable (table 3.2.6.3), not characterized by growth tendency and lower than regional parameters.

Table 3.2.6.4.

Parameters of general disease incidence, mortality of population

Parameters	2006	2007	2008
General disease incidence of population (parameter per 1000 capita)	594,8	595,4	592,7
General mortality incidence of population (parameter per 1000 capita)	3,6	3,7	3,6
General disease incidence of children below age of 14 (parameter per 1000 capita)	192.1	228,5	215,3
Infant mortality (up to 1 year) (parameter per 1000 of born alive)	11,2	11,3	11,4

Settlements in Akaltyn rayon are not covered with sewerage services. Removal of liquid wastes is conducted to cesspool toilets and absorbing type toilets. Sanitary epidemiological well being of population in certain manner depends on organization of collection, storage and transportation of solid domestic wastes (SDW). There is a special organization on managing all types of wastes – rayon communal economy. In spite of conducted work on sanitation treatment, development of settlements, there is a row of issues, requiring further improvement: increase of quantity of special motor vehicles for SDW and LW removal. There is a landfill in the rayon located in uts. «Sardoba». Agency subordination – «Uzkommunkhizmat». The landfill is constructed without the project. Date of putting into operation is 11.07.1995. Factual volume of collected SDW – 8.5 tons/cub.m. In winter time the landfill does not function.

3.3. Bayaut Rayon

3.3.1. Physical-geographical and climatic peculiarities

Bayaut rayon is situated on the left bank of Syrdarya river in its middle course. It occupies the end south-eastern part of Syrdarya region between Syrdarya river and railroad "Khavast-Syrdarya". From the north the rayon is bordered with Dustlik canal, from the south – Jettisay collector and South-Golodnosteppe canal (see Annex 1, figure 2).

There are 13 settlements in the rayon: Bayaut -1, Gallakor, Bayaut -3, U.Yusupov, Navbakhor, Sh.Rashidov, Navoiy, Latipov, Taraqqiyot, N.Makhmudov, Dehkhanabad, Galaba, Bayaut.

Rayon center – Bayaut town, situated at the distance of 35km from Gulistan town. 18,590 people live in Bayaut town, Total population of the rayon is consisting 106,000 people, including

17,390 people of urban people and 88,610 people (83.6%) living in the countryside; number of households – 21,400. Bayaut rayon includes 14 towns and 88 makhallas.

In physical-geographical aspect Syrdarya region is surrounded with Turkestan ridge in the south, Chatkal ridge - in the north and east. From the west it borders with Kyzylkum desert and Golodnaya steppe and open for intrusion of warm air masses, which reflects on climate.

Climate of Bayaut rayon is sharply continental, with relatively mild winter and long hot summer. As per surveys during the last 10 years the average annual temperature of air +15.8 ^{o}C, average maximal temperature of the hottest month of July is + 36.7 ^{o}C, the minimal – 1.6^{o}C. Sharp continentality of the climate is characterized by big range of temperatures: absolute maximum – within + 42.9- +44.0^{o}C, minimum - -15.5-16.9^{o}C.
Earth in summer time warms up to 67^{o}C, in winter the temperature falls down to -14,0^{o}C.

Prevalent directions of the wind are south-east and east-south-east, which recurrence makes up 16.5 & 13.0% accordingly. Average annual wind speed – 2.7m/sec. More often the weak winds (0-1 m/sec) and winds with 2-3m/sec speed are fixed, which recurrence reaches 38.2 and 36.8%. Big probability (10.2 and 6.2%) of winds at high speed equal to 4-5m/sec and 6-7m/sec.

First autumn light frosts fall, mainly, to the end of October and the beginning of November. Duration of frost-free period in average consists 260-270 days.

The main climatic factor, influencing the development and yield of agricultural crops in conditions of irrigated farming is warmth.

Precipitations are about 390mm, 80% of which come to winter-spring time. Apparently, the considered territory is characterized by insufficient moistening.

Relative humidity of the air in winter time reaches 74-78%, and in summer – 29-31%, at average annual value of 56%. Annual evaporation is equal to 1500mm.

Climatic conditions (high summer temperatures, low level of precipitations, in summertime, high wind speeds and high evaporation intensity) of Bayaut rayon are favorable for water evaporation from soil surface during irrigation and that leads to soil and ground water salinization causing increase of mineralization of subjacent GW horizons.

3.3.2. Existing sources of impact

Main sources of influence to environment in Bayaut rayon, typical for agricultural areas, are irrigated farming, livestock farming, agricultural enterprises and populated areas. Irrigated farming forms a big amount of return and collector-drainage waters, contamination with mineral salts, pesticides and fertilizers.

Centralized sewerage network in Bayaut rayon is lacking. Significant influence to natural environment is made up by public-domestic and livestock waste, which are discharged without treatment, as a rule, into open collectors and lay of land. Along with them compounds of nitrogen, fats, surfactant species, oil products and other substances infiltrate to natural waters.

Sources of influence to environment are also mechanical-repair shops, garages, greenhouses, domestic waste, stored at landfills, fertilizers and pesticides warehouses, contaminants of which are washed out by atmospheric precipitations.

There is Khavast-Syrdarya motorway in the west of the rayon from south to north, in the west – interregional motor road Andijan-Ferghana-Kokand-Jizzakh-Samarkand, as well as inside the

rayon – local roads. Oxides of nitrogen, carbon, sulphur dioxide, soot, aldehydes and benzpyrene ingress into atmospheric air from motor transport.

Natural sources of influence to environment are dust storms, worsening the condition of atmospheric air, as well as water and wind erosions, disturbing the integrity of soil-vegetation cover.

3.3.3. Geomorphologic and hydro geological conditions

Territory of the rayon is included into wide intermountain plain, having the name Golodnaya steppe. This zone of old irrigation is located on ancient alluvial-proluvial and alluvial sediments of 3rd floodplain terrace of Syrdarya river valley. Sediments from above are overlaid with loams, mainly light, and with pulverescent sandy loams with interlayers of clays and scarce lenses of sands. Capacity of cover sediments is from 1 to 40m.

Territory is characterized by slopes of land surface – around 0,001-0,002, that forms backup of ground stream, accumulation of ground waters and development of hydromorphic soil formation processes. Ground waters form single underground water-bearing basin, forming inside the valley of Syrdarya River. In recent irrigation development conditions the main source of ground waters feed is irrigation waters (filtration from canals and losses at irrigation fields).

Whole area of the rayon relates to area of complicated inflow and outflow of ground waters with both unsteady depth and mode. Mode of ground waters is regulated by transpiration, evaporation and work of permanent drainage.

Ground waters are mainly weakly mineralized (from 1 to 5 g/l), in places with extremely hard conditions of outflow, occupying about 20% of the territory, mineralization reaches 5-10g/l. Within the examined area in present conditions the level and mineralization of GW are shown in Table 3.3.3.1.

Table 3.3.3.1.

Current level and mineralization of ground waters

Examined area	GW level, m					GW Mineralization, g/l				
	0-1	1,0-1,5	1,5-2,0	2-3	3-5	0-1	1-3	3 - 5	5 - 10	>10
Hectare	205	1457	8972	22584	775		3,68	23,25	6,41	0,06
%	0,6	4,3	26,4	66,4	2,3		11	70	19	0

3.3.4. Water resources

Water supply of Bayaut rayon with drinking water is accomplished from local sources. Water is received from detached wells, located in villages. Present condition of wells, distribution network and waterways is not allowing for population using in full the water supply services and they have to purchase water in tanks, to deliver it from distant still operating wells or to use water from aryks (ditches) and canals. Water disinfection is lacking. Analysis of water from hydrant stands does not conform to requirements (Picture. 3.3.4.1).

Figure 3.3.4.1. Well №5. Navbakhor settlement (centre), Navbakhor makhalla, J.Usmonov RCC

For 30% of population comprising 1200 capita this well was drilled in 1972. Area has no sanitary control zone and is not fenced. Zone is in anti sanitary condition The well is self-emission. The tank tower is not available. Distribution network is absent. Population uses water from the well by hand-pump. As a result, pollution of ground water occurs.

Provision with piped water of Bayaut rayon population was in 2008 – 69.8%; specific water consumption – 3.99 l/day/capita.

Average water supply to the network of Bayaut rayon from 2006 to 2008 is increased from 142,000 cub.m/year to 195,000 cub.m/year, losses has made up 56,700 cub.m/year and 77,400 cub.m/year. Supplied water in 2008 – 117,600 cub.m/year, to the population – 108,900 cub.m/year; to other bulk consumers - 8,700 cub.m/year.

Fresh underground waters in Bayaut rayon center are located at 100-200m depth. Local water intake (Bayaut) is having the capacity of 5,300 cub.m/year, mineralization 1.46 g/l.

There are no fresh waters of drinking quality in central part of Bayaut rayon, mineralization everywhere comprises 1.5-20.0g/l, hardness 1.6-40 mg.eq./l. For the last 35 years the reduction of drinking waters resources is occurring on behalf of worsening of their quality due to contamination and salinity, which brought to acute intensification of the problem of drinking water supply to population.

Due to aging and failure of pipelines and their complete destruction (built 25-40 years ago), due to leakage and losses of pressure in main lines, water produced at water intakes does not reach the consumer at full capacity.

Total length of water-supply networks of waterways on Bayaut rayon is 261.1km, out of which 122.9 km requires replacement; 79,3km – within Bayaut town, out of which 37.4km requires replacement.

Total length of water-supply networks – 333.6km, including 104.9 of damaged network. Water intake on the rayon consists 15.5 cub.m/day, in Bayaut town – 3.1cub.m/day, coverage with drinking water - 73%.
Total number of observation wells within Bayaut rayon is 218 units.
Number of wells – 112 units, including 30 damaged.
Number of water towers – 84 units, including 61 units damaged.
14 pumps were installed in 2007: 1 – Grundfos, 8 – ECV, 5 – Aquarius.
Laid water-supply networks 7.5km (I-100.76).
3 wells were drilled and 6 repaired in 2007.

Water intake facilities, waterways and water-supply networks were build in 60-70s. As a result of long operation period they became worn out. By this reason leakages are consisting 38%. As a result of utilization of power-intensive, obsolete often failing pumps, interruptions in power supply and lack of funds for repair the reduction of rendered services quality and living standard of population is occurred. Water supply on village population areas is accomplished 4-6 hours a day.

Figure 3.3.4.2. U.Yusupov makhalla, Bayaut town

The area of the well has no zone of sanitary protection and is not fenced.
The well is with high level of water horizon, artesian, clogged with pebbles. Population collects water by pots. The condition of the well is anti-sanitary. Population suffers from water scarcity.
Non-rational use of drinking ground water is observed as well as their pollution, water logging of adjacent areas.

Main source for lands irrigation of the rayon is right branch of Southern Golodnaya steppe (YuGK) trunk canal, fed with water from Syrdarya river.
Water supply for irrigation varies depending on water content of the year from 300 to 400 mln.cub.m. Water arrives to the rayon border with mineralization 0.85 -1.05g/l. Actual picking of water, including irrigation and water supply of other consumers, is considerably below the limit, therefore water-provision of the rayon consists about 85%. Water deficit is wholly put to irrigate farming, in accordance with priority of consumers. At that, whole deficit is falling on vegetation period.

Table 3.3.4.3.

Chemical content of Syrdarya river water

Ingredients	Average concentrations		MAC for waters of Fishing-Economic Purpose
	YuGK (Syrdarya river upper Bekabad town)	Syrdarya r. after Bekabad t.	
Oxygene, mgO2/l	11,59	11,24	>6,0
BOD, mgO/l	2,85	3,08	3,0
COD, mgO/l	23,78	24,19	
Nitrogen ammonia g/l	0,00	0,01	0,39
Nitrate nitrogen, mg/l	0,039	0,046	0,02
Nitrite nitrogen, mg/l	2,91	2,2	9,1
Iron, mg/l	0,0	0	0,5
Copper, mkg/l	2,0	2,2	1,0
Zinc mkg/l	3,2	3,6	10,0
Phenol, mg/l	0,001	0,002	0,001
Oil products, mg/l	0,01	0,01	0,05
SSAS, mg/l	0,0	0,01	0,1
DDT, mkg/l	0,0	0	0,0
Alfa-HCCH, mkg/l	0,0	0	0,0
Gamma-HCCH, mkg/l	0,0	0	0,0
Chrome VI, mkg/l	0,3	0,4	1,0
Fluorine, mg/l	0,41	0,43	0,75
Mineralization, mg/l	1296,4	1308,0	1000,0

As per water quality, Syrdarya r. relates to 3rd class of moderate contaminated waters. Concentrations of phenol, copper, nitrogen nitrite and mineralization exceed maximum permissible norms for waters of fishing-economic purpose.

Irrigated farming is the main water consumer of SGSC canal irrigation system. Total length of main and inter-farm network is 803 km.

Table 3.3.4.4.

Present condition of irrigation network

Inter-farm network extent, km			Inter-farm network extent, km					
Total	**Earth riverbed**	**Concrete**	**Total**	**Earth riverbed**	**Concrete**	**Flumes**	**Pipelines**	**Efficiency coefficient**
58,4	30,6	27,8	744,6	553,2	56,4	111	24	0,66

Large extent of unlined canals stipulates low operation Coefficient of efficiency of rayon irrigation system (0.66).

Rayon irrigation zone is serviced by collector-drainage infrastructure of total extent 1,268.22 km, (incl. 447.7 km of main and inter-farm collectors and 820.62 km – intra-farm). Intra-farm network mainly consists of open collectors (767.0km) and partially (53.62km) of closed horizontal drains. For collector and drainage system of the rayon the typical problems are – deterioration of operation and maintenance and reduction of efficiency. Considerable portion of drainage system requires repairing and cleaning.

Collector-drainage waters from project area are led to main collectors, having the discharge to Syrdarya r.

Due to disabled part of irrigation and drainage system the water consumption for irrigation purposes is increased that results in water deficit and facilitates the ground waters rise.

3.3.5. Soil resources

As per data of Goscomzemgeodezcadastre the total area of the rayon is 49,400 ha, out of which 37,200 ha. are agricultural lands, including 33,100 ha. of irrigated.

Table 3.3.5.1.

Lands (soils) of Bayaut rayon

	Land area (thous. ha)		Specific weight (%)	
	Total	Including the irrigated	Total	Including the irrigated
Total land area	49,4	35,8	100	100
From which: Arable land	32,1	32,1	65,1	89,6
Perennial plants	0,94	0,94	1,2	2,6
Meadows	0,03	0,03	0,1	0,1
Pastures and Haymovings	4,1		8,4	
Adjoining land	3,3	2,5	6,6	7,0
Reclamation fields	0,09		0,2	
Forests	0,22	0,22	0,4	0,6
Other lands	8,5		17,3	
Agricultural lands	37,2	33,1	75,5	92,4

Quality indexes of rated irrigated agricultural lands are characterized by following indexes:

Table 3.3.5.2.

Quality of agricultural lands in Bayaut rayon

Indexes	Area, ha	Specific weight, %
Irrigated ag. lands	29730	100
Including: the worst lands		
Below the average	2934	9,9
Average	21270	71,5
Good	5526	18,6
Best		
Unrated		

Soil cover of Bayaut rayon is genetically related to light grey lands of ephemeral steppes zone. But hydromorphic conditions for soil-forming have formed to the present meadow-grey-land (GWL 2-3m) soils for more than 60% of area. On the rest area with GW closer than 2m meadow soils are distributed, which are somehow differ with their properties from grey lands that even lost their name, resembling their genetic property.

Due to hydrogeological conditions the reclamation state in the rayon is rather complicate, though, about 60% of lands are in satisfactory condition. In order of soil profile salinity areas are distributed as follows: (i) nonsaline and weakly-saline – 72%, (ii) moderate-saline – 23% & (iii) strongly-saline – 5%.

Soils are having different mechanical content – from light-loamy and sandy-loam-sandy up to heavy-loamy, depending on mother rock, on which they were formed. By their natural properties soils possess high potential fertility (80-100 points). However, in present conditions soils fertility dropped practically two times and in average by rayon consists 51 points, in 1991 that index was equal to 58. Reduction of soils productive capacity is stipulated by salinity and close GWL, for the reason of inadequate operation of drainage and low Efficiency coefficient of irrigation network.

In 2007 sowing area of agricultural crops on irrigated lands by all farm categories has made 32,600 ha. There are no non-irrigated (dry farming) lands in the rayon. Main areas are occupied with cereal crops, which account (by categories of farms) for the 38%, from which spiked (36%), cotton 53%, potato and vegetable and cucurbitaceous crops 2.6%, and fodder crops 5.4%, including 2.4% of Lucerne.

Farming entities are accounting for 91% of whole sowing area, 64% gardens and 52% vineyards. Farmer entities are producing the considerable part of agricultural products: 91% of grain, 99% of cotton.

Dekhkan entities occupy 7% of total sowing area, 29% gardens and 48% vineyards. Number of dekhkan entities in 2007 has made up 23,138. 0.11 ha of crops and perennial plantings are the share of one farm. Mainly dekhkan farms are producing potato and fruit and vegetable products. Share of dekhkan farms is: 9% of grain production, 79% of potato, 95% of vegetable crops and 76% of cucurbitaceous.

3.3.6. Socio-economical aspects and population healthcare

For the beginning of 2003 population number comprised 83.2 thousand.capita, out of which men comprising 41.0 thousand.capita, women – 42.2 thousand.capita. For the beginning of 2009 population number comprised 108.9 thousand.capita, out of which men comprising 54.2 thousand.capita, women – 54.7 thousand.capita.

Employment status of population in Bayaut rayon by sectors of economy evidences that the majority of population is engaged in the sphere of agriculture and foresting as well as healthcare, physical culture, social security, public education, culture and arts.

For the end of 2008 total number of hospitals in Bayaut rayon was 4, clinics – 33, preschool institutions – 33, out of which: 2 – kindergartens, 31 – day care school. Primary education schools - 58.

Birth rate by Bayaut rayon in comparison to 2003 increased from 1,818 capita to 2,426 capita, natality (per 1000 capita) increased from 21.6 to 23.4. At the same time mortality in 2008 (per 1000 capita) increased from 4.8 to 4.0 in 2006.

Parameters of general disease incidence of population according to medical aid appealability is characterized by insignificant growth rate of approximately 4%, and of children – about 9% (Table 3.3.6.1). However for reliable growth assessment or reducing population health parameters a prospective research will be required. Annual trends of population health are estimate. It is worth mentioning that parameters of general disease incidence and of mortality are within limits of regional parameters.

Table 3.3.6.1.

Parameters of general disease incidence, mortality of population

Parameters	2006	2007	2008
General disease incidence of population (parameter per 1000 capita)	546,4	565,4	570,0
General mortality incidence of population (parameter per 1000 capita)	4,8	4,4	4,0
General disease incidence of children below age of 14 (parameter per 1000 capita)	469,6	515,2	513,7
Infant mortality (up to 1 year) (parameter per 1000 of born alive)	11,8	12,3	13,5

Ranking of extensive parameters of general disease incidence showed that the first place in the structure of general disease incidence is occupied by respiratory apparatus diseases, blood diseases and blood forming organs diseases. Urogenital organs diseases occupy third place in ranking.

Table 3.3.6.2.

Structure of general disease incidence of population, %

Rank	Diseases classes	2006	2007	2008
1	Blood diseases, blood-forming organs	20,1	21,2	23,6
2	Respiratory apparatus diseases	20,1	19,7	20,3
3	Urogenital organs diseases	10,2	10,4	9,9
4	Endocrine system diseases	9,1	9,4	9,1
5	Digestion organs diseases	7,8	7,3	6,7

Coverage of population by tap water is different and comprises 73% in Bayaut settlement and 69% in other rural settlements.

Territory of the rayon is crossed by Dustlik channel with its 8 right bank branches. Indicated superficial waterways are attributed to 2nd category (being not sources of centralized drinking water supply). Lab tests assisted sanitary epidemiologic service to reveal deviations on bacteriological parameters – inconsistency by coli index. Agents of infection of water etiology (pathogenic microorganisms) were not revealed.

Data of lab tests of drinking water quality of agency-level water pipelines is worse than of communal water pipeline. Approximately 30% of wells of agency-level water pipelines are in broken condition. Deviation by bacteriological parameters due to coli index (more than 3), and by chemical parameters due to increased rigidity and mineralization.

Table 3.3.6.3.

Water quality parameters of the rayon

Indicators	2006	2007	2008
Parameters of pollution of superficial waterways (% of disparities): - by chemical parameters	5,8	0,0	0,0
- by bacteriological parameters	9,9	4,3	19,75
Drinking water quality (% of disparities): Communal water pipe -by chemical parameters	10,0	6,0	0,0
-by bacteriological parameters	9,8	15,4	20,45
Agency-level water pipe			
-by chemical parameters	5,7	5,7	1,9
-by bacteriological parameters	18,9	16,2	27,1

Rayon is not covered by sewerage system. Liquid wastes are removed by efforts of rayon communal economy and farms. For management of SDW removal landfill is organized, which is located on the territory of uts «Taraqqiyot». Total square – 3 ha. Design capacity of the dust - 32.100 tons per years. Factual volume of collected SDW – 88 tons/cub.m (2008). Date of putting into operation - 14.01.1987. № 8/1. Rayon has one transport vehicle for SDW removal «ISUZU». Also farms are attracted to remove SDW.

3.4. Mirzaabad Rayon

3.4.1. Physical resources and climatic peculiarities

Mirzaabad rayon is located in western part of Syrdarya region. It borders with Kazakhstan in the north, Akaltyn rayon in the west, Gulistan rayon in the east, and with Mekhnatobad rayon in the south (see Annex 1, figure 3).

Population of Mirzaabad rayon comprises 58630 capita, 9800 households, there are 9 RCC consisting of 41 makhallas and 11 settlements: Mirzachul, Mustakillik, Tashkent, M.Ulugbek, Yangiobod, Dustlik, Akaltyn, Dekhanobod, T.Akhmedov, Beruniy, Yangihayot.

Climate.

Climate of Mirzaabad rayon is sharp continental with relatively mild winter and long lasting hot summer. Climatic characteristic is given according to data of weather stations of Syrdarya and Yangier.

According to data of multiyear observations average annual temperature of air in Syrdarya is + 14.5 ^{o}C, in Yangier + 15.8 ^{o}C, average maximal temperature of hot summer month (July) in Syrdarya + 36.7 ^{o}C, minmal is – 3.2 ^{o}C; in Yangier accordingly + 37.3 ^{o}C and – 1.5 ^{o}C. Sharp continental climate is characterized by high temperature amplitude: absolute maximum within – 42.9-43.8 ^{o}C, and minimum - -16.5-20.1^{o}C.

Soil in summer time is warmed up to 70.0-71.0 ^{o}C, and in winter time temperature decreases till -15.0^{o}C.

Wind regime stipulated by the orography of the rayon which is rather complex. In average annual course the winds of north, east and west directions prevail. In winter time prevail the eastern and southeastern winds, and reach 5.2 m/sec, in summer – northwestern winds followed by separate strong rushes (till 28-30 m/sec) and rare dust storms.

Average annual wind speed is 1.3 m/sec; more frequent weak winds are recorded (0-1 m/sec), which is 62.9 % from total quantity.

The first winter frosts are mainly in late October- early November. The duration of frost-free period in average is 260-270 days.

Precipitations are about 340 mm, where 80% are in winter-spring time. As it is seen the studied territory is characterized by sufficient humidification.

The relative air humidity in winter time is 74-78%, but in winter is 29-31%, per annual average values is 56%. The annual evaporating capacity is equal to 1500 mm.

Climatic conditions (high summer temperatures, low level of precipitations, in summertime, high wind speeds) of Mirzaabad rayon are favorable for water evaporation from soil and ground water during irrigation causing soil and GW salinization, increase of mineralization of subjacent GW horizons.

3.4.2. Existing sources of impact

The main sources of environmental impact in Mirzaabad rayon, which are typical for agriculture territory is irrigated agriculture, livestock farming, agriculture farms and settlements, as well as motor roads with transport.

Nitric oxide, carbon oxide, sulfur dioxide, soot, aldehydes, benzpyrene ingress into atmospheric air from automobile transport.

Irrigated agriculture composes great quantity of return collector-drainage waters, polluted with mineral salts, pesticides and fertilization.

Rayon population is not covered with sewerage. Considerable impact is caused by communal-domestic livestock wastes, which most part is discharged as a rule without purification into open collectors and lay of land. Combinations of nitrogen, grease, surfactant species, oil products etc. come into natural waters with them.

The repair-mechanical workshops, garages, greenhouses, domestic wastes, stored at the landfills, storehouses of mineral fertilizers and pesticides, agricultural aerodromes from which ones the contaminants are washed away by atmospheric precipitation can be the sources of environment impact.

Ablation and wind erosion which disturb the integrity of soil-vegetable cover can be natural sources of environment impact.

In geomorphological relation the territory of Sardoba rayon (as Akaltyn rayon) represents graded slight wavy proluvial plain of Golodnaya Steppe (terrace of Syrdarya River) with erosion accumulative type of relief including flat proluvial plain of Golodnaya Steppe complex and great lowering- Karoy, Sardoba and Jettisay with general surface slope to the north and north- west with slopes no exceeding than 0,002. In low extremely graded part the plain is characterized with slight wavy surface with frequent closed lowerings and general slopes from 0.0005 and less.

Karoy lowering and neighboring low plains representing sloping bending with depth 5-10m with general slope about 0.0002 occupy the north part of the territory.

Lithologic formation is characterized by interleaving loams, sandy loams and sands, with inter-layers of clay.

Sardoba cavity located in the northeastern part of the territory is characterized by slight wavy surface with the slope 0.0002. It is formed with sandy loams, pulverescent clays with sand bands.

3.4.3. Geological and hydro geological conditions

In geomorphologic relation the area of Mirzaabad rayon represents sloping northwards light hilly Golodnosteppe prolluvial and alluvial plain of peripheries of slope washes and is characterized

by small inclinations of land surface (0.001-0.002). Rayon area is formed by thick masses of quaternary sediments of Golodnosteppe complex (Q_3gl). Ground water, which differs from common ground water by connection to deep water-bearing horizons of quaternary sediments, having pressure and high piezometric head exceeding free level of ground water, outcrop in sediments of Golodnaya steppe complex within the bounds of third terrace of Syrdarya river (Q_3gl)

Water-bearing horizons are represented here by pebbles, sands, gravel and loam soils. Water permeability of ground is characterized by coefficient of filtration for gravel - 0,214-0,317 m/day, and for sands – 16.0 m/day.

3.4.4. Water resources

Mirzaabad rayon does not have its own natural superficial water objects and is supplied with irrigation water from Dustlik channel fed from Syrdarya. Water quality in it changes at length due to discharges from enterprises of Gulistan city as well as drainage collector system. Dustlik canal is fed by water of Syrdarya river and the quality of water in it is not changing by length on account of flows of Gulistan town enterprises and collector-drainage waters. In 2008 content of organic substances (COD) was – 20.06 mg/l, mineralization – 869.5mg/l (100mg/l), nitric nitrogen – 0.016mg/l (MAC 0,02mg/l). Concentrations of α- and γ-HCH were not identified.

Collector-drainage waters, collected by drainage network are discharged to Central Golodonsteppe Collector

Level of mineralization of ground water is different and varies from 0.5 up to 10 g/liter, so the maximal mineralization level is characteristic for upper part of ground flow and it decreases depending on the depth. Waters are sulphate and sulphate-chloride type.

Ground waters
The map of depths of occurrence of ground water composed for the maximal period (vegetation period) shows that sites with depth from 2,0 to 3,0 m and from 3,0 m predominate. Total number of observation wells comprises 360.

Fresh ground water occurs at depth of 250-350. There are fresh water reserves of drinking quality with mineralization reaching 0.3-0.9 g/l, hardness 1.0-9.0 mg.eq./l. However central part of Mirzaabad rayon does not have fresh ground water of drinking quality, mineralization reaches 1.5-20.0 g/l and hardness – 1.6-40.0 mg.eq./l. For the last 35 years the reduction of drinking waters resources is occurring on behalf of worsening of their quality due to contamination and salinity, which brought to acute intensification of the problem of drinking water supply to population.

Water supply of rayon by drinking water is based upon use own ground water.

Main source of water for the population is Balykchi water intake which is aimed at providing drinking water fully to 3 RCCs (rural citizens' communities) with partial feeding of Mirzachul RCC and 3 large settlements of Akaltyn rayon.

In remaining RCCs people take water from standalone wells located near to settlements. Existing condition of wells, distribution network and water pipeline does not allow population using at full with services of water supply and they ought to buy water in cisterns and bring from distant still working wells or to use water from aryks and channels.

Coverage of population of Mirzaabad rayon by tap water comprised in 2008 84.1%; specific water consumption – 37.0 l/day per capita. Water intake capacity – 12.34 thous.cub.m, and water consumption – 2.19 thous.cub.m per day.

Average water supply to network by Mirzaabad rayon from 2006 to 2008 increased from 195 thous.cub.m per year up to 1126 thous.cub.m per year, thus losses comprised 56.9 thous.cub.m per year and 408.3 thous.cub.m per year. Water supplied in 2008 – 717.7 thous.cub.m per year, including to population – 686.1 thous.cub.m per year, and to other bulk consumers – 31.6 thous.cub.m per year.

Due to deterioration and break down of pipelines and their full decay (built 25-40 years ago) and due to losses in pressure at main pipelines, total water volume produced at water intakes does not reach consumers at full.

Total length of whole water distribution system by Mirzaabad rayon comprises 186.5 km, out of which 573 km requires replacement.

Water intake by rayon comprises 12.34 cub.m per day, coverage with drinking water is 89%.

Total number of observation wells by Mirzaabad rayon comprises – 58 units, including 9 deteriorated.

Quantity of tank towers – 45, including 5 out of order.

In 2007 7 pumps were installed: 6 – ECV-type, and 1 – Vodoley.
Total length of water distribution network installed comprises 11,4 km (D=110,76, 315,0).
In 2007 2 wells were drilled.

Water intake facilities, water conduits and water distribution networks were built in 60-70s. As a result of long term operation for over 40 years they came to decay. Therefore losses comprise 38%.

Frequent breakdowns of pumps, breaks in power supply and lack of money for O&M led to decrease of quality in services rendering as well as population well being. Water supply by rural settlements is provided 4-6 hours per day.

<u>Figure 3.4.4.1</u> Tashkent settlement, Tashkent makhalla, RCC Tashkent
Facilities were built in 70s. The area is not fenced. The tank tower is rusted and in non-operational condition. The well became useless due to infiltration of upper layers of salt water into it. The pump is dismantled.
Well tampering required.

Figure 3.4.4.2 Yangi-hayot settlement, Yangi-hayot makhalla, RCC Birlashgan
For the population comprising 3357 capita there are 2 working wells. The main problem of the population is the lack of irrigation water and irrigation channels.
Well №1. Facilities were rehabilitated by own efforts of the makhalla. Water is supplied two times a day, 2 hours in the morning and 2 hours in the evening. Fencing is unavailable. The area of sanitary protection zone is available. No complaints on water quality from the population were registered.
Due to lack of superficial waters, ground waters are used to irrigation of homestead.

3.4.5. Soil resources

Total ground area in Mirzaabad rayon is 44,426 ha, where 27,379 ha are irrigated lands. Great part of the land take tillage 23,397 ha (52.7% from total land area). Significant part of the lands are grounds not used in agriculture (26.1%).

Sierozems of high fertility are characteristic for the rayon and along channels and collectors – sierozem and meadow.

Irrigated lands are mainly used for production of raw cotton and grain and also for farmlands. In rayons areas of irrigated lands by holdings are introduced in table 3.4.5.1.

Table 3.4.5.1.

Lands (soils) of Mirzaabad rayon

	Land area (hectares) Total	including irrigated
Total land area	44426	27379
Include.: Arable land	23397	23397
Perennial plantings	244	244
Deposits	2497	2497
Pasture and hayfields	5202	
Homestead	1293	1037
Forests	204	204
shrubbery		
Land not used in agriculture	11589	

Irrigated lands of project contour of Mirzaabad rayon are saline: low-saline comprise 2.8 thous.ha (10.8%), average saline 9.0 thous.ha (34.7%), high saline 9.9 thous.ha (38.2%). Total area of saline lands out of irrigated and which are under control comprise 21.7 thous.ha (83.8%). (Table 4.5.4.2)

Table 3.4.5.2

Distribution of irrigated lands by level of salinity, in thous.hectares

Rayon	Total irrigated land area	including level of salinity							
		low-saline		average saline		high saline		Total saline land area	
	hectares	area	%	area	%	area	%	area	%
Mirzaabad rayon	25,9	2,8	10,8	9	34,7	9,9	38,2	21,7	83,8

Qualitative evaluation of soils of Mirzaabad rayon is represented in Table 3.4.5.3. Lands of high quality with yield class equal to 81-91% are absent in project rayon. Lands of average quality (yield class 41-50 and 51-60%) and of good quality (yield class 61-70%) comprise 10831 hectares (41.9%) and 1419 hectares (5.5%) accordingly. Lands of quality below average with soils yield class 21-40% - 11947 hectares (46.2); lands of low quality with yield class of 10-20% are absent. In comparison to 1991 average yield class by rayon decreased from 46 to 42%. Quality of irrigated lands of Sardoba rayon is below average by the Republic. If average yield class by the Republic is equal to 55% and by Sardoba rayon it comprises 42%.

Table 3.4.5.3.

Qualitative assessment of soils, by area (in hectares), by yield class

Rayon	Irrigated land area	Bad quality		Below average		Average		Good		Best quality		Not evaluated land area	Average class	Average class in 1991
		I class	II class	III class	IY class	Y class	YI class	YII class	YIII class	IX class	X class			
		YIELD CLASS												
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100			
Mirzaabad	25869			2308	9639	8366	2465	587	832			1672	42	46

3.4.6. Social aspects and population health

For the beginning of 2003 population number comprised 43.6 thousand.capita, out of which men comprising 21.7 thousand.capita, women – 21.9 thousand.capita. For the beginning of 2009 population number of Khavast-Mekhnatobad rayon comprised 58.6 thousand.capita, out of which men comprising 29.3 thousand.capita, women – 29.3 thousand.capita.

Employment status of population in Mirzaabad rayon by sectors of economy evidences that the majority of population is engaged in the sphere of agriculture and foresting as well as healthcare, physical culture, social security, public education, culture and arts.

For the end of 2008 total number of hospitals in Mirzaabad rayon was 2, clinics – 19, preschool institutions – 17, out of which: 12 – day care schools, 1 preschool. Primary education schools - 34.
Provision of population of rayon center of Navruz as well as remaining rural settlements with tap water is practically the same and comprises accordingly 80% and 89%. Water quality by bacteriological parameters is not stable. If in 2006 percentage of inappropriate samples of drinking water comprised 15.2%, then in 2007 – 0,0%, and in 2008 – 24,7%. More than 15% of water supply network is broken down as of 01.01 2009 (data of regional Suvokova) (Table 3.4.6.1). Thus frequent faults at water distribution network cause bad quality of drinking water, and that is approved by the results of bacteriological test results of territorial Centre for sanitary and epidemiologic control in 2008.

Quality of superficial waters by the results of bacteriological researches do not correspond to hygienic requirements, there is a tendency to deterioration: 15.2% (2006), 16.2% (2007), 24.7% (2008). As Dustlik channel, К-1, К-3 are not considered as water objects of recreation purpose, so the risk to health is minimal. Current fact evidences that discharge of untreated wastewater is conducted.

Table 3.4.6.1

Water quality parameters of the rayon

Indicators	2006	2007	2008
Parameters of pollution of superficial waterways (% of disparities):			
- by chemical parameters	15,1	2,0	0,0
- by bacteriological parameters	15,2	16,2	24.7
Drinking water quality (% of disparities):			
-by chemical parameters			

	16,0	5,6	1,9
-by bacteriological parameters	15,2	0,0	24,7

Rayon is not covered by sewerage system. Public buildings and private sector use cesspools.

For management of SDW removal a regional landfill (dump) is organized. Total square – 10 ha. Utilization of SDW from Gulistan is provided right to the mentioned landfill. Date of putting into operation - 13.02.1997. Volume of collected SDW – 151 tons per cub.m

Birth rate by Mirzaabad rayon in comparison to 2003 increased from 991 capita to 1480 capita, natality (per 1000 capita) increased from 22.4 to 25.3. At the same time mortality in 2008 (per 1000 capita) increased from 4.3 to 4.5.

Population health condition by appealability is characterized by growth trends by 1.3% (whole population) and for 13% (children contingent). Parameters of general and children mortality is characterized by relative stability, not exceeding average parameters by region (Table 3.4.6.2).

Table 3.4.6.2.

Parameters of general disease incidence, mortality of population

Parameters	2006	2007	2008
General disease incidence of population (parameter per 1000 capita)	999.9	1011,0	1013,1
General mortality incidence of population (parameter per 1000 capita)	4,3	4,6	4,5
General disease incidence of children below age of 14 (parameter per 1000 capita)	949,0	987,4	1073,3
Infant mortality (up to 1 year) (parameter per 1000 of born alive)	12,2	13,4	13,1

Mentioning priority problems with regard to population health, first place is occupied by respiratory apparatus diseases (more than 30% for the last 3 years). Diseases of urogenital organs among population of the rayon observed less than in Akaltyn or Bayaut rayons (7,1% and 7,3%). Ranking allowed establishing that mainly two diseases are of priority: respiratory apparatus diseases and blood diseases, blood-forming organs (Table.3.4.6.3).

Table 3.4.6.3.

Structure of general disease incidence of population, %

Rank	Diseases classes	2006	2007	2008
1	Blood diseases, blood-forming organs	33,1	34,1	31,8
2	Respiratory apparatus diseases	23,7	22,1	27,4
3	Urogenital organs diseases	7,1	7,3	7,1
4	Endocrine system diseases	6,3	6,3	6,5
5	Digestion organs diseases	5,9	5,8	6,3

3.5. Sardoba Rayon

3.5.1. Physical resources and climatic peculiarities

Sardoba rayon is located in south-eastern part of Syrdarya region. It borders with Djizzak region in the south and the west, with Mirzaabad and Khavast rayons in the east, and with Akaltyn rayon in the north (see Annex 1, figure 4).

Sardoba rayon is located in the central part of Golodnaya Steppe between left branch of SGSC and Central Golodnaya Steppe Collector (CGSC). Area relief is plain, absolute points of elevation are within 289,5 and 291,0 m above the sea-level with gradual decline from south-east to north-west (inclinations from 0,0008 to 0,0015).

Population of Sardoba rayon comprises 52.3 thous.capita, 9200 households living in 10 settlements (Kurgontepa, Chulkuvar, Gulistan, Yangiobad, Pakhtaobad, Gulzor, Yangikishloq, Kh.Olimjon, Bakhor, Bakhmal), 23 makhallas.

Climate.

Climate of Sardoba rayon is sharp continental with relatively mild winter and long lasting hot summer. Climatic characteristic is given according to data of weather stations of Syrdarya and Yangier.

According to data of multiyear observations average annual temperature of air in Syrdarya is + 14.5 ^{o}C, in Yangier + 15.8 ^{o}C, average maximal temperature of hot summer month (July) in Syrdarya + 36.7 ^{o}C, minmal is – 3.2 ^{o}C; in Yangier accordingly + 37.3 ^{o}C and - 1,5 ^{o}C. Sharp continental climate is characterized by high temperature amplitude: absolute maximum within – 42,9-43,8 ^{o}C, and minimum - -16,5-20,1^{o}C.

Soil in summer time is warmed up to 70,0-71,0 ^{o}C, and in winter time temperature decreases till -15,0^{o}C.

Wind regime stipulated by the orography of the rayon which is rather complex. In average annual course the winds of north, east and west directions prevail. In winter time prevail the eastern and southeastern winds, and reach 5,2 m/sec, in summer – northwestern winds followed by separate strong rushes (till 28-30 m/sec) and rare dust storms.

Average annual wind speed is 1,3 m/sec; more frequent weak winds are recorded (0-1 m/sec), which is 62,9 % from total quantity.

The first winter frosts are mainly in late October- early November. The duration of frost-free period in average is 260-270 days.

In conditions of irrigated agriculture the warmth is the main climatic factor, which affects the development and crop of agriculture.

Precipitations are about 340 mm, where 80% are in winter-spring time. As it is seen the studied territory is characterized by sufficient humidification.

The relative air humidity in winter time is 74-78%, but in winter is 29-31%, per annual average values is 56%. The annual evaporating capacity is equal to 1500 mm.

Climatic conditions (high summer temperatures, low level of precipitations, in summertime, high wind speeds) of Sardoba rayon are favorable for water evaporation from soil and ground water during irrigation causing soil and GW salinization, increase of mineralization of subjacent GW horizons.

3.5.2. Existing sources of impact.

The main sources of environmental impact of Sardoba rayon, which are typical for agriculture territory is irrigated agriculture, livestock farming, agriculture farms and settlements. Farms and 10 settlements with rayon center at Pakhtaabad are located on the territory of the rayon.

Irrigated agriculture composes great quantity of return collector-drainage waters, polluted with mineral salts, pesticides and fertilization.

Considerable impact is caused by communal- domestic livestock wastes, which most part is discharged as a rule without purification into open collectors and lay of land. Combinations of nitrogen, grease, surfactant species, oil products etc. come into natural waters with them.

Along western and eastern borders of the rayon main inter-regional roads as Tashkent-Termez M-39 and Dashtobad-Navbakhor-Dustlik R-31 are located, in the south interregional road - Yangier-Djizzak. Nitric oxide, carbon oxide, sulfur dioxide, soot, aldehydes, benzpyrene ingress into atmospheric air from automobile transport.

The repair-mechanical workshops, garages, greenhouses, domestic wastes, stored at the landfills, storehouses of mineral fertilizers and pesticides, agricultural aerodromes from which ones the contaminants are washed away by atmospheric precipitation can be the sources of environment impact.

Ablation and wind erosion which disturb the integrity of soil-vegetable cover can be natural sources of environment impact.

3.5.3. Geological and hydro geological conditions

In geomorphological relation the territory of Sardoba rayon (as Akaltyn rayon) represents graded slight wavy proluvial plain of Golodnaya Steppe (terrace of Syrdarya River) with erosion accumulative type of relief including flat proluvial plain of Golodnaya Steppe complex and great lowering- Karoy, Sardoba and Jettisay with general surface slope to the north and north- west with slopes no exceeding than 0,002. In low extremely graded part the plain is characterized with slight wavy surface with frequent closed lowerings and general slopes from 0,0005 and less.

Karoy lowering and neighboring low plains representing sloping bending with depth 5-10m with general slope about 0,0002 occupy the north part of the territory.

Lithologic formation is characterized by interleaving loams, sandy loams and sands, with inter-layers of clay.

Sardoba cavity located in the northeastern part of the territory is characterized by slight wavy surface with the slope 0,0002. It is formed with sandy loams, pulverescent clays with sand bands.

3.5.4. Water resources.

Sardoba rayon does not have its own natural superficial water objects and is supplied with irrigation water from the South Golodnaya Steppe Chanel originating from diversion canal at the Farhad hydroelectric power plant on river Syrdarya and having bandwidth approximately 540 cub.m/sec. Project bandwidth of the Central Branch of SGS appropriate Akaltyn rayon is 140 cub.m/sec. Both channels were built before construction of irrigation and drainage infrastructure in Sardoba rayon.

The quality of irrigation water is defined by chemical water composition of Syrdaya river (see Table 3.2.4.1).

As it is seen from the table oxygen regime of water was preserved during the whole period in satisfactory condition.

The content of organic substances grew evidently on COD, the exceeding on nitrites preserved (2 MAC) and phenols (2 MAC). Average mineralization was in range of 1,1-1,06 PMC. Lindan and hexachloran were fixed constantly (α- and γ- HCCH). Concentration of sulfate 5 times exceeded MAC. High stiffness is typical (11 mg.equivalent /l) for water of river Syrdarya. The quality of water of Syrdarya river becomes worse at the expense of collector-drainage waters

discharge in upstream of the river (Fergana valley, massifs of Tajikistan territory) and is characterized by III type of moderately contaminated waters.

Collector-drainage waters, collected by drainage network are discharged to Central Golodonsteppe Collector, which leads to Arnasay depression located to the north-west and west from Akaltyn rayon

Ground water

There are no fresh ground water occurrence of drinking quality on the territory of Sardoba rayon, mineralization exceeds 1,5-20,0 g/l, rigidity - 1,6-40 mg.eq/l.

Ground water with occurrence level of 2,0-3,0 m is spread all over the rayon area and approximately 1% of rayon area has occurrence level of ground water observed at more than 3,0 m.

Rayon water supply is based upon disposal of ground waters of Djizzak region and of Zaamin water pipeline as well as from «Turttom», «Sirgali» water intake facilities located on the territory of Djizzak region, but which are at the balance of Sardoba rayon Suvokova. Complex of Zaamin water conduit was constructed in 60s and due to long lasting operation as well as impact by environment equipment, pumps, pipes became deteriorated.

Designed capacity of water supply consists Q-40000cub.m/day, actual delivery consists Q=7000- 8000cub.m/day.

Power supply to Zaamin water conduit is conducted from the feeder station of Turttom-Zarbdor PSE of Djizzak region. Operation of pumps is became complicated due to frequent breaks in power supply, it is necessary to discuss the matter of non-stop power supply and to install reserve transmission line - 17 km from Dashtobabd feeder station to Turttom water intake.

Most critical situation occurred in Pakhtaabad, Chulkuvar, Kurgan-tepa, Gulzor and Yangi kishlok RCCs, where water supply via water distribution network stopped many years ago and now it is brought in cisterns. Situation in Yangiabad RCC is more favorable, where water is supplied to distribution network once in three days.

Main water sources of water supply in the rayon - Turttom / Sirgali Water intakes with 28 wells are located in Djizzak Region in an altitude of about 430m. The water is led by 3 pipelines by gravity to the WDC “Uzakov”, from where it is distributed in three directions: to the west till Pakhtaabad; to the north till Gulzor and to the east to Mekhnatobad zone located in Khavast rayon.

Coverage of population of Sardoba rayon by tap water comprised 43,6% in 2008; specific water consumption rate – 1,3 l/day per capita.

Average water supply rate to network by Sardoba rayon from 2006 to 2008 rapidly decreased from 242 thous.cub.m/year to 42 thous.cub.m/year. Thus losses comprised 86,1 thous.cub.m/year and 16 thous.cub.m/year. Such a rapid decrease in water supply at this stage is not justified, final indications will be presented in project FS. Water supplied in 2008 is 26 thous.cub.m/year, to population – 11 thous.cub.m/year, to other bulk consumers – 15 thous.cub.m/year.

Due to deterioration and subsequent breakdown of water pipelines as well as their full decay (as being installed 25-40 years ago) and also because of losses and pressure decrease in main water conduits, volume of water produced by water intake facilities do not reach consumers at full.

Total length of water supply network by Sardoba rayon comprises 209,0 km, out of which 170,1 km require replacement.

Turttom and Sirgali water intakes WDCs Uzakov, Yangiobod, Buston, Rashidov, T.Malik are built in 1958-1968. Water intakes function at 20-40% from their design capacity. Out of 10 wells present at Turttom in working condition – only 4, at Sirgali water intake – out of 18 wells 4 are in

working condition. The remaining wells do not function due to lack of working pumps. Depths of wells - 200-210 m, discharge – up to 30 l/sec. Chlorination plants are absent. Zone of sanitary protection corresponds to both water intakes.

Water sources for WDC are Turttom and Sirgali water intakes. Due to emergency conditions of water conduits, water supply of population is limited from 1 to 2 hours, and population which operates WDC Yangiabad, Rashidov, Malik is forced to use water from channels and aryks.

Water intake facilities, waterways and waterline networks are built in 60-70s. As a result of long operation of over 40 years they became worthlessness.

Figure 3.5.4.2 Reservoir

WDC «Rashidov» Water is not supplied to CWR from 2000 due to deterioration of water conduit, and has not been ever cleaned. Tank tower is not operated. Population uses water from aryk.

Figure 3.5.4.3 Water collection by population from aryk

3.5.5. Soil resources

Total ground area in Sardoba rayon is 56806 ha, where 43719 ha are irrigated lands. Great part of the land take tillage 39594 ha (69,7% from total land area). Significant part of the lands are grounds not used in agriculture (19,1%). Irrigated lands are mainly used for production of raw cotton and grain and also for farmlands. In rayons areas of irrigated lands by holdings are introduced in table 3.5.5.1.

Table 3.5.5.1

Lands (soils) of Sardoba rayon

	Land area (hectares) Total	including irrigated
Total land area	56806	43719
Include.: Arable land	39594	39594
Perennial plantings	543	543
Deposits	1212	1212
Pasture and hayfields	1958	
Homestead	2252	1972
Forests	398	398
shrubbery		
Land not used in agriculture	10849	

Sierozems of high fertility are characteristic for the rayon and along channels and collectors – sierozem and meadow.

Irrigated lands of project contour of Sardoba rayon are saline: low-saline comprise 15,4 thous.ha (37,2%), average saline 11,7 thous.ha (28,3%), high saline 9,8 thous.ha (23,7%). Total area of saline lands out of irrigated and which are under control comprise 36,9 thous.ha (89,1%). (Table 3.5.5.2)

Table 3.5.5.2

Distribution of irrigated lands, by level of salinity (in thous.hectares)

Rayon	Total irrigated land area	including level of salinity							
		low-saline		average saline		high saline		Total saline land area	
	hectares	area	%	area	%	area	%	area	%
Sardoba rayon	41,4	15,4	37,2	11,7	28,3	9,8	23,7	36,9	89,1

Qualitative evaluation of soils of Sardoba rayon is represented in Table 3.5.5.3. Lands of high quality with yield class equal to 71-91% are absent in project rayon. Lands of average quality (yield class 41-50 and 51-60%) and of good quality (yield class 61-70%) comprise 19308 hectares (46,6%) and 3354 hectares (8,1%) accordingly. Lands of quality below average with soils yield class 21-40% - 18222 hectares (44,1); lands of low quality with yield class of 11-20% are absent. Quality of irrigated lands of Sardoba rayon are below average by the Republic. If average yield class by the Republic is equal to 55% and by Sardoba rayon it comprises 45%.

Table 3.5.5.3

Qualitative assessment of soils, by area (in hectares), by yield class

Rayon	Irrigated land area	Bad quality		Below average		Average		Good		Best quality		Not evaluated land area	Average class	Average class in 1991
		I class	II class	III class	IY class	Y class	YI class	YII class	YIII class	IX class	X class			
		YIELD CLASS												
		0-10	**11-20**	**21-30**	**31-40**	**41-50**	**51-60**	**61-70**	**71-80**	**81-90**	**91-100**			
Sardoba	41349			2104	16118	8329	10979	3354				465	45	49

3.5.6. Socio-economical aspects and population healthcare

For the beginning of 2009 population number comprised 52,3 thousand.capita, out of which men comprising 26,2 thousand.capita, women – 26,1 thousand.capita.

Employment status of population in Sardoba rayon by sectors of economy evidences that the majority of population is engaged in the sphere of agriculture and foresting as well as healthcare, physical culture, social security, public education, culture and arts.

For the end of 2008 total number of hospitals in Sardoba rayon was 1, clinics – 11, preschool institutions – 11, out of which: 11 – day care school. Primary education schools - 21.

Coverage of population good drinking water in 2008 comprised 43,6%, and 1,3 l/day per capita. According to level of coverage of rayon population with drinking water is observed as inadequate. Population of rayon center «Pakhtaabad» is 100% supplied by tap water, rural population - 24%. Source of supply – Zaamin water conduit. Drinking water quality by chemical and also by bacteriological parameters is considerably better tan in above mentioned rayons.

Rayon territory is crossed by the following superficial water reservoirs: Sarkisov channel, 4 branches of which enter rayon territory (K-7-8, K-7-8-1, K-6, K-7-4). For the period of 2006-2008

deviations on bacteriological parameters were revealed within from 2,4% to 4,5% (Table 3.5.6.1).

Table 3.5.6.1.

Water quality parameters of the rayon

Indicators	2006	2007	2008
Parameters of pollution of superficial waterways (% of disparities): - by chemical parameters	0,0	0,0	0,0
- by bacteriological parameters	2,4	4.0	4,5
Drinking water quality (% of disparities): Communal water pipe -by chemical parameters	1,6	0,3	0,0
-by bacteriological parameters	0,0	1,2	2,3

For utilization and removal of SDW there is an non-official landfill in Pakhtaabad settlement with total square 1,5 ha. There are no decisions of khokimiyat on establishment of this landfill. SDW is removed according to the agreements with farms. Lack of specialized vehicles and technique is observed the same as for other rayons. Though removal of SDW is conducted constantly with attraction of farms.

Private and public toilets are not connected to sewer. All toilets are cesspool type. Wastewater is removed as a rule without treatment to open collectors and onto relief of the area, ground, superficial and GW.

Birth rate by Sardoba rayon in comparison to 2003 increased from 1108 capita to 1333 capita, natality (per 1000 capita) increased from 21,0 to 24,3. At the same time mortality in 2008 (per 1000 capita) increased from 3,9 to 4,1,0. Children's mortality – up to 14,6. Natural growth per 1000 capita increased from 17,1 to 20,2.

Parameters of general disease incidence according to medical aid appealability of population to medical and prophylactic institutions allow assessing approximate condition of health.

Parameters of general disease incidence of rayon population increased in 2008 (by 13,7%) in comparison to 2006, general and children's mortality insignificantly increased in 2008 in comparison to 2006.

Condition of children's health is characterized by wavy-like dynamics. Level of general disease incidence among children decreased in 2008 in comparison to previous years, accordingly by 9% and by 3% (Table 3.5.6.2.).

Table 3.5.6.2.

Parameters of general disease incidence, mortality of population

Parameters	2006	2007	2008
General disease incidence of population (parameter per 1000 capita)	645,0	694,6	733,4
General mortality incidence of population (parameter per 1000 capita)	3.5	4,2	4,1
General disease incidence of children below age of 14 (parameter per 1000 capita)	685,9	735,7	666,1
Infant mortality (up to 1 year) (parameter per 1000 of born alive)	11,9	10,6	14,6

In the structure of general disease incidence of main 5 classes blood diseases and blood forming diseases prevail. At second place there are diseases of respiratory apparatus diseases.

Chronic diseases of upper respiratory tracts (pharyngitis, tonsillitis, and rhinitis) prevail in the structure respiratory apparatus diseases as well as bronchitis (Table 3.5.6.3.).

Table 3.5.6.3.

Structure of general disease incidence of population, %

Rank	Diseases classes	2006	2007	2008
1	Blood diseases, blood-forming organs	38,9	41,7	33,2
2	Respiratory apparatus diseases	19,3	23,6	27,5
3	Urogenital organs diseases	7,1	5,2	6,2
4	Endocrine system diseases	6,9	5,9	6,4
5	Digestion organs diseases	6,5	5,7	6,2

3.6. Khavast Rayon

3.6.1. Physical, geographical and climatic peculiarities

Khavast rayon is located in the southern part of Syrdarya region. To the south it borders on the Republic of Tajikistan and Djizzak region of Uzbekistan, to the west – with Mekhnatobad rayon, to the east and the north – with Bayaut rayon of Syrdarya region (see Annex 1, figure 5).

Population of the rayon comprises more than 69,000 capita, 13,300 households living in 9 towns and 38 makhallas.

Khavast rayon is located on third left bank terrace of Syrdarya river. To the south the terrace adjoins to northern slopes of Turkestani ridge (Kokshent range) spread in latitudinal strike. To the north-east and east spurs of Kurama ridge are spread (Mountains of Altyntopkan and Mogoltau). Golodnaya Steppe plain lies to the west, and Syrdarya river valley, accordingly – to the north.

Climatic specificity is determined by geographical location of the rayon. The characteristics of climatic conditions are composed according to 10 year old data on results of investigations made by Glavgidromet of the RUz at weather stations of Bekabad and Yangier.

The most part of the area located to the west is occupied by desert area, which represents a seat of intensive transformation of western air masses. Aridity of active desert surface often leads to that radiation heat does not interact with processes of evaporation, but practically completely affects bottom layer and that defines the high level of temperature of this area. Maximum air temperatures are observed in July exceeding up to + 44°C.

By quantity of precipitations the rayon shall be attributed to sharp continental region. Average annual quantity of precipitations comprises 387.9 mm, which fall predominantly in Spring Autumn period. The summer is hot and average temperature July equals to +28.6ºC. Winter is warm and average temperature in January comprises +2.8ºC. Winter temperatures may drop until -16C.

Mountain ridges fringing plain areas from the south to eastwards provide for stagnation of air masses and their cooling, accordingly, causing occurrence of foehn phenomenon in foothills. Foehns represent air flows descending along mountain slopes with a high temperature and marked by significant dryness of air in conditions of clear sky. Most distinctly foehns are observed in cold half-year during the period of intensive cyclonic activity. During foehn process under appearance of depression at the west, air begins pulling out from mountain areas. Air flows stream down from mountains towards valleys and stick to the direction of plains location, accordingly, this influence direction of predominant winds. Wind rose is stretched from east to west and predominant winds are winds of east and west-south south-west direction.

According to data of Yangier weather stations frequency of winds by speed is observed in the following proportion: often winds are observed at speed of 0-1 m/sec. (38.2%) and 2-3 m/sec (36.83%). Gentle breezes and calms are possible both in summer and winter periods. In calm (not windy) weather bad detrimental are gathered in bottom layer of the atmosphere. Low night and morning temperatures provide occurrence of bottom inversions, monthly frequency of which comprise 45%. These conditions are unfavorable for dispersion of low and cold sources. Frequently winds at speed of 4-5 m/sec (10.2%) are observed. Strong winds (6- >15) comprise 14.8% out of total volume of events. The highest frequency is observed in May and June. Maximal wind speeds reach up to 30.0 m/sec (while average annual speed of 2.7 m/sec). Strong winds provide for massive dispersion of polluting substances into atmosphere from stationary and mobile sources, however they cause dust rise from unfixed covering surface and its further shift.

Climatic conditions (high summer temperatures, low level of precipitations, in summertime, high wind speeds and high evaporation intensity) of Khavast rayon are favorable for soil and ground water salinization causing increase of mineralization of subjacent GW horizons.

3.6.2 Existing sources of impact

Basic sources of impact to the environment of Khavast rayon, which are typical for agricultural areas are irrigated agriculture, cattle breeding, agricultural enterprises and settlements. Irrigated agriculture forms a big volume of reverse and collector drainage waters, polluted by mineral salts, pesticides and fertilizers.

Coverage of the population by sewerage comprised – 66%. Population that is non provided with sewerage services discharges domestic waste without treatment, as a rule, to open collectors and to area relief. They are accompanied by compounds of nitrogen, fats, surface active substances, petrochemicals and etc.

Sources of environmental impact are also repair and mechanical shops, garages, greenhouses, domestic waste stored at landfills, agricultural airfields, mineral fertilizers warehouses, polluting substances washed out by precipitations.

High hot sources of Syrdarya Thermal Power Plant and cattle breeding complex and automobile transport provide impact to rayon.

Operation of Syrdarya Thermal Power Plant (TPP) is accompanied by introduction of polluting substances to the environment. Chimney flues of TPP are the main sources of polluting substances discharge. Qualitative and quantitative intrusion of polluting chemical substances to the atmosphere with chimney gases depends on the type of fuel. In case of burning hydrogen sulfide containing gas nitric oxide and dioxide, sulfur dioxide infiltrate to the air. When burning black oil, sulfur dioxide, nitric oxide, vanadium pentaoxide, benzpyrene and black oil ash ingress to the atmosphere.

Dust collectors of Syrdarya TPP represent potential sources of pollution of ground and surface waters, soils.
The activity of cattle breeding complexes is related to discharging of wastes and sludge. In case of breeding livestock formation of 9 polluting substances: amine, ammonia, carbonyl compounds, carbon acids, mercaptans, hydrogen sulfide, sulfides, phenols, fur dust as well as microbal aerosol of cattle breeding facilities (microorganisms – aspergilli, Candida fungi, salmonella, colibacilus and hemolytic strain). During the process of work of cattle breeding farm production wastes in form of livestock dung, litter and forage residuals, which pollute soils and ground.

Along the southern border of the rayon A-379 Bekabad-Djizzak road is located. Nitric oxide, carbon oxide, sulfur dioxide, soot, aldehydes, benzpyrene ingress into atmospheric air from automobile transport.

Natural sources of environmental are dust storms worsening the condition of atmospheric air as well as water and wind erosions damaging integrity of soil and vegetation cover.

Thus the condition of environment of the rayon is defined by totality of energy objects, livestock breeding complex, irrigated agriculture, automobile transport.

3.6.3. Geological and hydro geological conditions

Research area is composed of thick layer of quaternary sediments at depth of 145 meters by upper Neocene sediments represented by alternation of siltstones and sandstones.

Lower quaternary sediments of Sokh complex (Q1sh) are the most ancient and occur only in area of Khavast cone at depth of 50,0 m. They are represented by grey yellowish loam soil with rare pebbles.

Sediments of Tashkent complex (Q_2ts) outcrop only within bounds of upland plain (Lomakin plateau), in the remaining places they outcrop under nappe of Golodnaya Steppe complex at different depths. They are represented by clay sands, chip and pebbles and sands.

Sediments of Golodnaya Steppe complex (Q_3gl) within the bounds of researched area are widely spread with outcropping. On foothill plain they compose cones of loss represented by pebbles mixed with chip gravel and large-grain sand.

By removal from tops of cones sediments of Golodnaya steppe complex are represented, mainly, by loam soils and rarely with gravel.

Within bounds of third above-flood-plain alluvial and prolluvial terrace sediments of Golodnaya steppe complex are represented by yellowish grey loam soil and gravel. To the west from Shirin town alongside the rupture of third terrace, grayish yellowish loess type loam soils outcrop from the top with thickness of 16-18 m containing sand and pebble lenses of various sizes. Further to north-west in rayon of Sultanhauz loam soils at different depth are covered by grayish yellowish small grain sand containing sub layers or lenses of gravel and pebbles.

According to data of survey works conducted along Dustlik channel, it was identified that below loess type loam soil layer pebbles occur (at depth of 15-16 m).

To the west from the rupture of above-flood-plain terrace the plain area (territories of former collective farms of «Drujba» and «Bayaut») at depth of 20-35 m is formed by grey loam soils containing sub layers of gravel and sand, below occur grey pebbles.

Syrdarya complex (Q_4sd) of sediments is traced as a thin stripe in valleys of temporary flows and rivers is represented by alluvial pebbles, sands, gravel and loam soils.

Natural relief of whole territory was subject to considerable anthropogenic changes. It stands for arable delluvial denudation widely spread at sites and occupied by crops and orchards, collector and drainage network, areas allocated for current cemeteries.

A significant role was played by radical change of natural relief forming processes related to intensive development of artificial irrigation.

Specific geodynamical processes are represented by erosion, which are attributed to slopes of terrace ledges. Most intensively these processes are formed at third above-food-plain terrace of Syrdarya River, near to slopes sharply rupturing towards first river terrace.

Within bounds of researched area in sediments of quaternary age pressure ground water, free surface ground water, and simply ground water occur.

3.6.4. Water resources

On the territory of Khavast rayon pressure water are formed within sand and gravel sediments od Sokh, Tashkent and Golodnaya Steppe complexes, and ground water – within sand and gravel and alternated by loess type rocks of Golodnaya steppe and Syrdarya complexes.

Pressure water in sediments of Sokh complex (Q_1sh) outcrop rarely. Outcropping depth comprises from 200 up to 300 m and attributed to gravel sand rocks. Solid residuals comprise from 0,6 up to 2,0 g/litre; type of water – sulphate chloride.

Pressure water with mineralization of 0,3-0,7 g/liter outcrop within sand and gravel sediments of Tashkent complex (Q_2ts) at depth of 60-80 m; type of water – hydro carbonate and sulphate as well as sulphate-hydro-carbonate.

Ground water, which differs from common ground water by connection to deep water-bearing horizons of quaternary sediments, having pressure and high piezometric head exceeding free level of ground water, outcrop in sediments of Golodnaya steppe complex within the bounds of third terrace of Syrdarya river (Q_3gl)

Water-bearing horizons are represented here by pebbles, sands, gravel and loam soils. Water permeability of ground is characterized by coefficient of filtration for gravel - 0,214-0,317 m/day, and for sands - 16,0 m/day.

Level of mineralization of ground water is different and varies from 0,5 up to 10 g/liter, so the maximal mineralization level is characteristic for upper part of ground flow and it decreases depending on the depth. Waters are sulphate and sulphate-chloride type.

Ground water in Syrdarya sediments (Q4sd) at first terrace of Syrdarya river occur at depth of 1,0-3,5 m from surface level. Partially tapering of ground water occurs. Water preserving rocks include loess type gravel, loam soils and also sands and pebbles. Water content is characterized by the level of specific discharge established at for sands as 0,4-2,9 l/sec, for pebbles - 0,5-3,8 l/sec. Filtration coefficient is accordingly defined by 2,5-3,6 m/day and 17,0-76,6 m/day.

Mineralization of ground water along Syrdarya river - 1 g/liter by Dustlik channel (named after Kirov) - 1-3 g/liter.

Feeding of ground water is provided at account of inflows from foothills, infiltration of river and irrigation waters and atmospheric precipitations.

The main source of feeding of ground water within bounds of researched area influencing on the process of its regime changing are superficial waters – infiltration river and irrigation.

Dominant factor of formation of ground water regime is the flow of Syrdarya River.

According to regime observations it was established that within bounds of first (lake) terrace of Syrdarya River from April till August a rise of ground water level is observed leading to a peak point in May. Water rise decreases depending on distance from the river. Ground water level

rise is explained by river dam: from August to October, sometimes till the end of the year a gradual decrease is observed, thus the maximal decrease level occurs near Syrdarya River in the period of low water.

Ground water regime within bounds of third terrace of Syrdarya River is complicated by pressure level of deep horizons of quaternary sediments.

For irrigated rayons it additionally complicated by human activity in expansion of zones of areas requiring irrigation. As a result irrigation regime is overlapping natural ground water regime causing rapid level increase.

General direction of ground flow is from the south to the north with inclinations within terrace III at 0,003-0,004. Close to Syrdarya river a ground flow is directed at the side of river and inclined at 0,00135.

The map of depths of occurrence of ground water composed for the maximal period (vegetation period) shows that sites with depth from 1,5 to 2,0 m and from 2,0 to 3,0 m predominate. Spread of the latter sites is mainly identified in the western part of the area. Total number of observation wells comprises 330.

Along eastern and north-western border of the rayon, where ravine network is developed, ground water occurs at depth of more than 4,0 m.

Results of chemical analyses showed that dry residual varies from 1375,0 to 9230,0 mg/l. Content of $S0_4$ ions comprises 631,5-4434,9 mg/l by content of Cl ions' - 125,1-1302,7 mg/l. According to KMK 2.03.11-96 ground water by content of sulphates are attributed to low-aggressive and high-aggressive towards concrete based on Portland cement by GOST 10178-85* and non-aggressive to concrete based on sulphate resistant cements by GOST 22266-94. According to content of chlorine water is assessed as non-aggressive and average aggressive to ferroconcrete constructions.

Superficial water resources

Khavast rayon as well as Akaltyn rayon are supplied by irrigation water from South Golodnaya Steppe Channel (SGSC) originating from derivation canal at Farkhad hydro electric station on Syrdarya river and channel networks TM-1, TM-2, M-1, M-2 and etc. Small waterways end on the area of rayon such as Sharbulaksay, Uyazsay, Kattasay.

Collector and drainage waters gathered by drainage network via the system of economical and inter-economical collectors are discharged to Jettisay collector, which flows into Central Golodnaya Steppe Collector (CGSC). The length of Jettisay collector – 32,4 kms, water discharge at river delta – 6,6 cub.m/sec

Water supply of rayon by drinking water is based upon use own ground water. The system of water supply was built in 60-70's of last century.

Basic source of drinking water is represented by standalone wells located within each settlement. Existing condition of wells and of distribution network do not allow to population using it at full capacity with provided water supply services, so they are forced to buy water in cisterns and bring it from distant working wells or using water from aryks and channels.

Source of water for population of makhallas Kakhramon, Khusniobod and Chimanzor are represented by water intake of «Turttom» and «Sirgali», water from which is pumped by pumps of 2nd lifting at WDC Uzakov via water conduit at length of 27 kms and diameter of pipe equal to 500-300 mm to WDC Buston, WDC Kakharov, WDC Khamza, WDC Kakhramon and WDC Narchaev.

Water intake facilities of «Turttom» and «Sirgali» are located on the territory of Djizzak region but at the balance of Suvokova.

Figures 3.6.4.1 and 3.6.4.2 Kushkand settlement, Farkhod RCC, 496 capita, one artesian well was drilled in 70s, distribution network is absent. Population uses water from the pool near to the well.

Figure 3.6.4.3 Islom settlement, Farkhod RCC with population of 110 capita uses water from the channel.

There are only 13 wells at the balance of Khavast Suvokova, the remaining ones are abandoned. Population by its own efforts and means provide repair works of well pumps and network and also pays for power energy supply. Population does not pay for use of ground water resources.

Water intake and network of makhallas Istiqlol, Dustlik and Tinchlik of Khovosobod RCC are at the balance of railroad and the present project does not provide for its reconstruction.

Average water supply to network by Khavast rayon in 2008 comprised 399,0 thous. cub.m/year, losses comprised 144,9 thous. cub.m/year. Water supplied in 2008 - 253,8 thous. cub.m/year, population – 232,0 thous. cub.m/year, other bulk consumers – 21,8 thous. cub.m/year.
The total length of water supply network by Khavast rayon comprise 212,3 kms, including pipes broken down 55,7 kms; quantity of wells – 59, in non-working condition – 17, tank towers – 18, including in non-working – 3; installed pumps – 9.*3.4.5.*

3.6.5. Soil resources

Total land area in Khavast rayon (Khavast-Mekhnatobad zone) comprises 78751 hectares, out of which irrigated land area – 52203 hectares. The majority of irrigated lands are occupied by arable lands – 45240 hectares (57,4% out of whole land area). Considerable part of lands are those not involve in agricultural activity (23,5%). Irrigated lands are mainly used for cotton production and wheat growing, as well as gardening. Areas of irrigated lands in rayons by purpose of their use are presented in table 3.6.5.1 below:

Table 3.6.5.1.

Lands (soils) of Khavast rayon

	Land area (hectares) Total	including irrigated
Total land area	78751	52203
Include.: Arable land	45240	45240
Perennial plantings	996	996
Deposits	5073	5073
Pasture and hayfields	5566	
Homestead	2662	2351
Forests	674	674
shrubbery		
Land not used in agriculture	18540	

Irrigated land in Khavast rayon, which is under control comprises 45240 hectares. In area of 1034 hectares ground water occurrence level comprises 1,0-1,5 m; within area of 14852 hectares – GWL-1,5-2,0 m; within area of 28547 hectares – GWL-2,0-3,0 m; within area of 807 hectares – GWL is more than 3,0 m.

Irrigated lands of project contour in Kahavst rayon are saline at different level: low-saline soils comprise 19,63 thous. hectares (43,4%), average saline - 11,08 thous. hectares (24,5%), high saline - 9,82 thous. hectares (21,7%). Total area of saline soils out of area of all irrigated lands comprises 40,53 thous. hectares (89,6%) (Table.3.6.5.2.).

Table 3.6.5.2.

Distribution of irrigated lands by level of salinity (in thous.hectares)

Rayon	Total irrigated land area	including level of salinity							
		low-saline		average saline		high saline		Total saline land area	
	hectares	area	%	area	%	area	%	area	%
Khavast rayon	45,24	19,63	43,4	11,08	24,5	9,82	21,7	40,53	89,6

Soil cover is represented by various types of irrigated pale sierozems and old irrigated alluvial meadow soils. They differ by its capacity in terms of pit-run fines layer, structure, lithological composition and salinity level as well as level of land development and agricultural and land improvement transformation.

Alluvial layering is clearly expressed in turf horizon located within 50-60 sm. Typical profile of sierozems is damaged, masses of soil and ground predominate as a result of intensive construction and use of territory in agriculture. Along with engineering constructions soils suffer impact from agritechnical activity of small gardens, plantings along roads, green lands inside dwelling constructions. Gumus content in soils under plantings - 2,5 – 4,7%, in open areas - 1,8 %.

In soil horizons as approaching to daily surface a rise of absorbed potassium and calcium is observed. Total content of potassium and phosphorus changes slightly, content of potassium is constant. Phosphorus predominates in soils of homestead area. As a whole, lack of magnesium and potassium is observed. Total content of nitrogen in sierozems is also small. Concentration of nitrite, nitrate and ammonium nitrogen in average comprises 0,004, 0,006 and 0,043 g/kg accordingly. Average content of sulphates is 0,332 g/kg. Concentration of microelements does

not exceed local background parameters. There are local sites polluted by petrochemicals due to spilt fuel by moving vehicles.

According to data of monitoring service on atmospheric pollution of Uzglavgidromet, superficial water and soils for 2008, content of residual quantities of DDT (dichlordiphenyltrichlorethan) on the territory of Syrdarya region and average content of residual quantity of DDT in soil probes comprised 0,8 MAC, increase at up to 1 MAC is observed for 30% of the researched area. Maximal concentration comprised 3,3 MAC.

Qualitative evaluation of soils of Khavast rayon (Khavast-Mekhnatobad zone) is represented in Table 3.4.5.3. Lands of high quality with yield class equal to 71-91% are absent in project rayon. Lands of average quality (yield class 41-50 and 51-60%) and of good quality (yield class 61-70%) comprise 25648 hectares (49,1%) and 2704 hectares (5,2%) accordingly. Lands of quality below average with soils yield class 21-40% - 22733 hectares (43,5); lands of low quality with yield class of 11-20% - 0,28%. Quality of irrigated lands of Khavast rayon are below average by the Republic. If average yield class by the Republic is equal to 55% and by Khavast rayon it comprises 43%.

Table 3.6.5.3.

Qualitative assessment of soils, by area (in hectares), by yield class

Rayon	Irrigated land area	Bad quality		Below average		Average		Good		Best quality		Not evaluated land area	Average class	Average class in 1991
		I class	II class	III class	IY class	Y class	YI class	YII class	YIII class	IX class	X class			
		YIELD CLASS												
		0-10	**11-20**	**21-30**	**31-40**	**41-50**	**51-60**	**61-70**	**71-80**	**81-90**	**91-100**			
Khavast	52203	0	144	2501	20232	22814	2834	2704	0	0	0	974	43	40

3.6.6. Socio-economical aspects and population healthcare

For the beginning of 2003 population number comprised 45,0 thousand.capita, out of which men comprising 22,6 thousand.capita, women – 22,4 thousand.capita. For the beginning of 2009 population number of Khavast-Mekhnatobad rayon comprised 80,475 thousand.capita, out of which men comprising 40,8 thousand.capita, women – 39,7 thousand.capita.

Employment status of population in Khavast rayon by sectors of economy evidences that the majority of population is engaged in the sphere of agriculture and foresting as well as healthcare, physical culture, social security, public education, culture and arts.

Percentage of coverage of population by tap water is higher in rayon center (92%), than in rural settlement (47,0%). In Khavast rayon, except number of settlements of Mekhnatobad zone sources of drinking water supply are ground waters. Population of Kakhramon, Chamanzor, Binokor and Khusnobod is supplied by drinking water from Zaamin water conduit, and population of Zafarobodand Turkiston - 2 wells. There are 15 CWR in Khavast rayon located in settlements in quantity of 1 to 2.

Drinking water quality by chemical composition is improving, and by bacteriological parameters – worsening and that is due to year season. 35,9% of water distribution network is in damaged condition, requires repair. Results of researches of drinking water in Mekhnatobad zone shows

that deviations from standards by bacteriological parameter are registered more frequent than by chemical parameters.

Obviously, drinking water quality depends on technical condition of water supply network, timely water disinfection in CWRs, as well as supply schedule to consumers.

Table 3.6.6.1.

Water quality parameters of the Khavast rayon

Indicators	2006	2007	2008
Parameters of pollution of superficial waterways (% of disparities): - by chemical parameters	1,69	0,0	0,0
- by bacteriological parameters	10,85	21,9	20,7
Drinking water quality (% of disparities): Communal water pipe -by chemical parameters	24,5	11,4	10,7
-by bacteriological parameters	12.7	19,8	20,0
Agency-level water pipe			
-by chemical parameters	22,9	10,7	3,8
-by bacteriological parameters	11,6	14,5	16,1

Water quality parameters in Mekhnatobad zone

Indicators	2006	2007	2008
Parameters of pollution of superficial waterways (% of disparities): - by chemical parameters	3,1	0,0	0,0
- by bacteriological parameters	8.2	16,8	16,3
Drinking water quality (% of disparities): Communal water pipe -by chemical parameters	7,8	5,0	3,1
-by bacteriological parameters	6.5	16,6	10,5

As rayons practice hour-by-hour tap water supply, public organizations and private sector maintains own reserves of water in tanks. Very often drinking water due to its storage time changes its quality and that is evidenced by results of bacteriological survey.

Taking into account situation arisen it is recommended to use boiled water in such institutions as schools, kindergartens, and medical health-improving institutions. The result of timely anti-epidemic and sanitary hygienic measures shows no occurrence of infectious diseases outbreaks among population and organized groups..

There are two channels in the rayon – Farkhad and Sakisova. There are irrigation trenches in Mekhnatobad zone. Water quality of superficial water does not correspond to standards by bacteriological parameters. Water discharge from irrigated fields to channels and irrigation trenches worsens water quality in channels.

Rayon has a landfill with design capacity of 100 thous.tons/cub.m, which is located at site of Karavan-saray. Total area – 10 hectares. Rayon communal service is not enough supplied with machinery. Therefore farms are attracted for SDW and LW removal. Rayon is not covered with sewerage. Part of LW from cesspool toilets is removed by cesspool cleaning vehicles of rayon communal service enterprises.

Birth rate by Khavast rayon in comparison to 2003 increased from 1069 capita to 2056 capita, natality (per 1000 capita) increased from 23,7 to 26,0. At the same time mortality (per 1000 capita) in 2008 in comparison to 2006 increased from 5,1 to 4,0.

For the end of 2008 total number of hospitals in Khavast rayon was 2, clinics – 17, preschool institutions – 15, out of which: 14 – kindergartens, 1-preschool. Primary education schools - 28.

General disease incidence rates of whole population, general and children mortality rate is lower than in 2006 accordingly by 11,2%, 21,2% and 47,8%. Only by 0,8% growth of general disease incidence is observed among children (Table 3.6.6.2.).

Table 3.6.6.2.

Parameters of general disease incidence, mortality of population

Parameters	2006	2007	2008
General disease incidence of population (parameter per 1000 capita)	345,7	352,3	307,0
General mortality incidence of population (parameter per 1000 capita)	5,1	5,0	4,0
General disease incidence of children below age of 14 (parameter per 1000 capita)	238,3	280,1	240,2
Infant mortality (up to 1 year) (parameter per 1000 of born alive)	13,8	11,5	7,2

The structure of general disease incidence includes 5 most priority class diseases similar to those in other 4 rayons of Syrdarya region (Table 3.6.6.3.).

Table 3.6.6.3.

Structure of general disease incidence of population, %

Rank	Diseases classes	2006	2007	2008
1	Blood diseases, blood-forming organs	26,8	22,4	22,8
2	Respiratory apparatus diseases	22,5	22,4	18,7
3	Urogenital organs diseases	9,5	8,3	9,2
4	Endocrine system diseases	5,8	9,4	8,1
5	Digestion organs diseases	5,8	5,7	5,9

4. ASSESSMENT OF PRESENT ENVIRONMENT CONDITION

Analyses of present environment condition, social aspects and population health in 5 rayon of Syrdarya region could reveal basic environment and social problems:

- deficit and water resources pollution;
- superficial groundwater occurrence and its high mineralization;
- salinity of irrigated lands;
- low soil yield class;
- absence of sewerage in settlements and also of treatment facilities of agricultural production, which leads to contamination of environmental waters, grounds and soil;
- domestic waste waters, discharged into absorbing holes, are the sources of environment contamination with pathogenic bacteria;
- insanitary condition of settlements due to accumulation of domestic and other garbage;
- lack of quality drinking water;
- low level of medical service and social- economic conditions of habitation

Due to outwear part of irrigational and drainage water supply is increasing which leads to water deficit and encourages ground waters lifting. Saline soils and non-irrigational consumers (housing and communal services, live stock-farms), which discharge their flows into absorbing holes (without casing) and to adjacent area in form of dung, impact on ground waters contamination.

With ground waters lifting the mineralization increased from 1-3 g/l to 3-5 g/l. Worsening of irrigation system condition and excess water consumption causes lands degradation and progressive soils salinity. Prevention of lands degradation requires radical rehabilitation of irrigational systems along with change of attitude to water as the resource, introduction of reliable systems of management and implementation of complex of measures on struggle with erosion and improvement of agricultural practice. Productive capacity of soils is defined by yield class. Calculations of soil assessment in the studied rayon were implemented by the institute «Uzgipromeliovozhoz». They indicate that weight-average factor of fertility loss at the expense of salinity, gypsiferity and contention of humus is from 42 to 45 in Mirzaabad, Sardoba, Khavast, Mekhnatobad rayons, 51 and 53 in Akaltyn and Bayaut rayons which is low than point of yield class in the Republic of Uzbekistan (55%). In Syrdarya region it is 49%.

Salinity of soils and ground waters cause increase of mineralization of underlying horizons of ground waters which in turn is reflected on drinking water quality. Provision with drinking water and regulation of management of SDW impacts population health condition in 5 rayons. Insanitary condition of settlements is caused by lack of specialized garbage trucks, inadequacy brought to polygons for SDW utilization as well as to present landfills which causes accumulation of domestic and other garbage in the most settlements, environment contamination and worsening of sanitary-epidemiological condition.

For purposes of population health improvement in 1998 was accepted the program of public health reformation for 1998-2005 years. For expired period in frame of State program of public health reformation were put into operation 2801 rural medical stations (RMS) which allowed rendering adequate medical assistance to patients in rural areas in the republic. Another no less important purpose program reformation is establishment of single system of all kinds of emergency medical aid in the republic which is provided to population at the expense of the

state. In all regions of the republic were established and are functioning the centers of emergency medical aid (EMA), and section EMA (170) under central rayon and municipal hospitals. The important aspect of doctrine implementation on provision with sanitary-epidemiological wellbeing of population the reveal of preventable risk factors of distribution highly dangerous infections as plague, cholera, anthrax etc. Analyses of assumed measures from side of Government, bodies of sanitary-epidemiological service indicated the significance of preventive against epidemiological measures in relation to factors risk of delivery of highly dangerous and quarantine diseases on the territory of the republic. In spite of registration of highly dangerous infections in neighboring states there was no registered delivery of highly dangerous and quarantine infections in Uzbekistan.

In Accordance with Regulation of the President of the Republic of Uzbekistan as of 02.10.2007 under №PP-700 ”On measures on improvement of organization of activity of medical establishments of the republic” was prepared the draft of Program on step-by-step capital repair, new construction and equipment with medical associations and medical-epidemiological services. Implementation of this program is planned since 2010.

To provide environmental safety, sanitary-epidemiological wellbeing of settlements the measures are assumed for inter-sector integration in field of environment protection and protection of population health by means of:

1. Organization of complex of laboratories in administration «Suvokova» for constant control of drinking water quality supplied to population in accordance with demands O’zDst 950: 2000 drinking water;

2. Minimization of contamination of superficial reservoirs with untreated wastewaters;

3. Improvement of material and technical basis of rayon communal services;

4. Improvement of mechanisms of exchange of information between sectors on results of environment contamination monitoring;

5. Improvement of landfills for utilization of SDW;

6. Broad distribution of health risk factors, changes of its behavior and increase of hygienic knowledge to public

7. Creation of adequate sanitary conditions: construction of centralized sewerage networks;

8. Uninterrupted provision with safety drinking water in epidemiological relation in enough quantity to population;

9. Removal of inequality in provision with safety drinking water and in enough quantity to population of rural areas.

For population health characteristics are usually used indicators of morbidity and mortality of population.

Indicators of general morbidity on appealability of population to therapeutic-preventive establishments for medical treatment allow to assess approximate condition of health.

Retrospective analyses of indicators of general morbidity of population of 5 project rayons is implemented on basis of official statistic annual reports for 2006-2008. The results indicate that populations appealability of Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast rayons varies in definite intervals. Priority problems of health identical for all population and including 5 main types of diseases is typical for all 5 rayons. Diseases of urogenital system take 3rd place in all 5 rayons. Analyses of morbidity of population of Syrdarya region on this type of diseases revealed that specific weight of urolithiasis varies in range of 2.3% (2006) and 2.23% (2007). The most specific weigh is attributed for other diseases of kidneys and ureter – 26.96% (2007) and 23.78% (2008). The level of mineralization of drinking water in definite degree is health risk on data of WHO and scientific investigations. In last decade timely anti-epidemic measures on

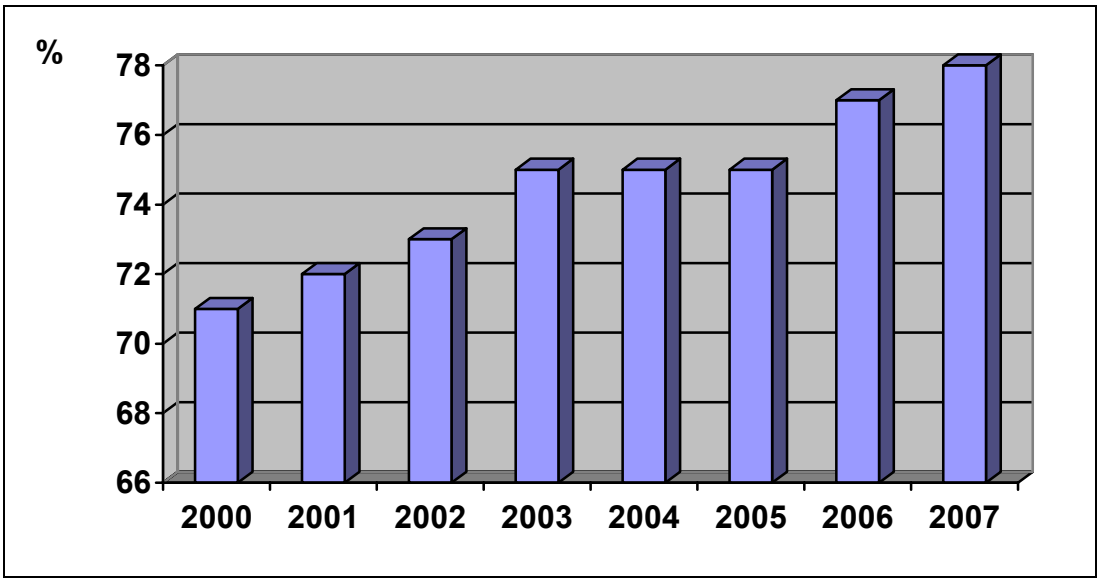
infections prevention of water etiology executed by bodies of sanitary-epidemiological service allow the prevention of infective episode, to shorten significantly (from 1,5 an more) indicators of acute intestinal infections, including dysentery, typhoid fever and also virus A hepatitis, but cases of cholera were not registered.

Bodies of sanitary-epidemiological service implement drinking water quality control before its supply in water pipe network from reservoirs of clean water and also from consumers. So far is practiced as by the hour water supply social organizations and private sector make water storage in reservoirs. The results of bacteriological investigations indicate that the drinking water while of storage often changes its quality.

Obviously that drinking water quality to a large extent depends on technical condition of water pipe networks, timely disinfection in reservoirs of clean water and also on schedule of its supply to consumer while RPE «Suvokova» does not implement constant drinking water quality monitoring before its supply to water pipe network and sources of water supply.

Coverage of population of area with water supply in 2000 was 71%, in 2007 - 78%.

Figure 4.1.1. Dynamics of provision of population with good quality drinking water



Water conduits constructed 35 years ago are in emergency condition and do not provide reliable water supply.

General coverage of population with systems of water supply varies in different rayons, so far as there are partially not covered rayons where systems of water supply run off due to absence of technical maintenance and investments. Level of coverage with systems of water supple varies in range of one rayon in different communities and settlements on above mentioned reasons. Indicators of coverage of population with systems of water supply vary from 40 till 70%.

Sources of water for all studied rayons are ground waters. The depth of drillings vary from short hole with the depth 30-40m as in Bayaut rayon to deep ones with the depth 200-50 m. on well fields such as Turttom and Sergali which provide with water the south rayons of the region. There are approximately 227 wells used in 5 rayons where some of them run off due to collapse, not functioning pumps or corroded pipelines.

There are 41 pumping station in the studied rayons. Pumping stations are in worn-out condition and are functioning in half of its capacity due to inefficient maintenance and/or absents of repair

works and equipment replacement for the last decades. Reservoirs are exploited partially; there are 25 pools with average capacity 500 cub.m. Besides there are 207 tank towers majority does not operate due to defective work or pipes absence.

There are electricity interruptions observed due to accidents which caused water supply interruptions as reserve sources of electricity are absent. Reservoirs are exploited partially; there are 25 pools with average capacity 500 cub.m. Besides there are 207 tank towers majority does not operate due to defective work or pipes absence.

Total length of water mains and distributive networks is 1027.1km. Diameter of pipes in water mains is 300-1200 m. and length of this water pipes is about 70 km. Left 957.1 km represent distributive networks with pipes with diameter 100-225m. The majority of distributive networks supplies water with interruptions but in some settlements water supply in distributive water pipes terminated many years ago.

On water intake facilities and pipes taking water in reservoirs water-measuring meters are not set. Water is supplied on schedule to urban type settlements (uts) and settlements (kishlak) in all the rayons. Situation exists in all the rayons when water is supplied with interruptions and time of water supply termination varies from several hours to several days. In some settlements water is not supplied at all and local population has to use water from the nearest irrigational systems.

Water supply to settlement is implemented on schedule mainly 4 hours a day (2 hours in the morning and two hours in the evening). Specific water consumption approved by khokimiyat in quantity 77l/day for person at present is overestimated for basic population.

There is irrigational network which water is used for washing, cleaning and other domestic needs on the territory of almost all studied settlements. When irrigational network is not functioning the population has difficulties with water supply as well pumps often break down and there is no other sources beside imported water. For example there is great problem with lack of irrigated water in Yangikhayot makhalla, RCC Birlashgan, Mirzaabad rayon.

Absence of water meters on water intakes also does not allow defining factual water supply to consumers. Water supply of population from standpipes caused total absence of water calculation, significant leakage (there is often no stop valve on standpipes) and difficulties in charges collection from consumers.

Water intake facilities, water conduit and water pipe networks were constructed in 60-70s. As the result of continuous term of exploitation more than 40 years are worn out. Pipes exhausted normative terms of exploitation. Large depositions in pipes and number of breakout with inappropriate diameters leads to sharp lowering of carrying capacity and increase of loss on length and in this connection to excessive consumption of electricity. Distributional network of water supply to population is breaks down on 80%. On this occasion leakage is 38%.

Absence or insufficiency of irrigational systems or their low efficiency in rural area causes sharp increase of specific water consumption mainly at the expense of farmlands from water pipe network. Excessive consumption of water in rural area under absence of drain system causes land flooding in settlements.

Under provision with centralized water supply of rural area of project rayons of Syrdarya region is supposed that the problem of waste waters utilization and necessity to construct drain systems will appear otherwise the process of underflooding, salinization and water logging is inevitable. In this case waste waters under high specific water consumption reach the relief of location, drainage system and irrigational network, which will worsen environment and sanitary - hygienic situation of the region.

The main problem revealed under initial investigations is 100% absence of water disinfection. In warm climate there is great possibility of mass infection appearance from different pathogenic organisms. Population protection from diseases caused by water consumption can be implemented only clean water consumption.

As the result of analyses of condition of environment situation and present situation with centralized water supply of rural population is revealed:

- Standard and electromechanical wear of facilities and objects such as pipelines, pumps, tank towers.
- Absence of water disinfection
- Unsatisfactory quality of drinking water in some wells.
- Extremely high consumption of electricity under drinking water transportation
- Vary of voltage of electricity and planned cutoff lead to pumps stopping or their breakdown
- Absence of metering devices for calculation of drinking water consumption, reveal of illegal water consumption and calculation of numerous points of leakage in distributional network.
- Absence of sanitary protection zones of wells.
- Insanitary condition of sanitary zones, tank towers, wells, water column
- Absence of automation and pre-emergency condition of electric equipment
- Poor technical condition of present vehicle fleet and mechanisms or their total absence
- Poor condition of buildings, laboratories of RPE «Suvokova»
- Absence of appropriate equipment on water quality control
- Insufficient level of personnel training in RPE «Suvokova» and insufficient organization of enterprise management
- Absents of computer software and computers for accounting and billings for Accounting department and customer department
- Insufficient revenue and loss from water realization
- Absence of prophylactic maintenance and instruments on leakage reveal.

5. ENVIRONMENTAL ANALYSIS OF PROJECT INVESTMENTS

5.1. Measures and work structure

It is planned by Syrdarya Water Supply Project to increase the coverage with centralized water supply systems of population by cities up to 100%, by rural populated areas 94.4% (399.200 people), nominal water consumption per one inhabitant shall consist: urban – 150l/day, rural - 115 l/day. Total capacity of rural waterlines of project districts after completion of reconstruction shall increase from 5.85 thous. cub.m/day to 71.6 thous. cub.m/day.

This Project provides for:

- Technical re-equipment, implementation of automation and reconstruction of existing facilities: replacement of obsolete equipment, drilling of new wells, cleaning of existing ones, construction of new distribution networks, replacement of waterways and stop valves;
- Increase of general water production due to increase of water supply coverage and nominal water consumption;
- Construction of facilities, equipment for disinfection of drinking water by automatic dosing with sodium hypochlorite (where necessary);
- Installation of water-metering units at water intakes and WDC, house meters;
- Construction and fitting the laboratories with equipment;
- Plugging of old unused wells;
- Purchase of operation equipment, machines and mechanisms, not requiring mounting;
- Conduction of information-educational measures on water economic use issues;
- Institutional consolidation of water supply system management and operation.

Water supply in 5 project rayons is organized in a way to broaden coverage structure of big water intake facilities in order to reduce the quantity of standalone wells.

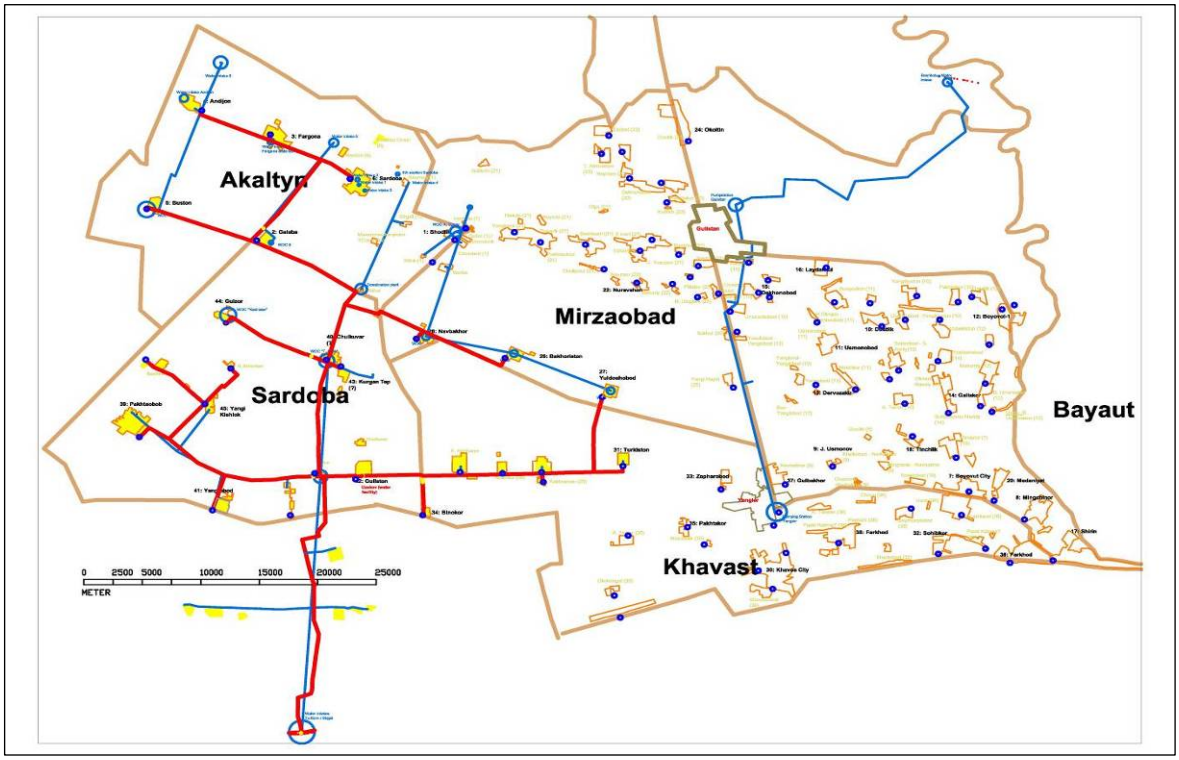
Water supply for project rayons is designed by 3 areas:

Area 1: Sardoba / Akaltyn

The given area covers the following (Fig. 5.1.1.):

- Sardoba rayon (fully)
- Akaltyn rayon (except Shodlik)
- Southern part (Yuldoshobod, Bakhoriston, Navbakhor) of Mirzaabad rayon
- Mekhnatobad zone of Khavast rayon

Figure 5.1.1 Proposed scheme of water supply Turrtom/Sirgali (Option 1.1)



Water from water intake facility of Turttom/Sirgali will be supplied across the whole area by gravity. All 12 wells at Turttom/Sirgali water intake facility will be rehabilitated and equipped by new well pumps.

Water supply will cover population equal to 145.167 thousand capita, maintain supply capacity – 17.74 thousand cub.m/day, total number of wells - 12, WDC/tank tower - 26, total length of pipeline (main transmission line with diameter of 600-90 mm) – 207 km, town water supply network including service network – 405 km (OD 20/25 to DN 250).

Area 2. Bayaut / Khavast

The given area covers the following (Fig. 5.1.2.):

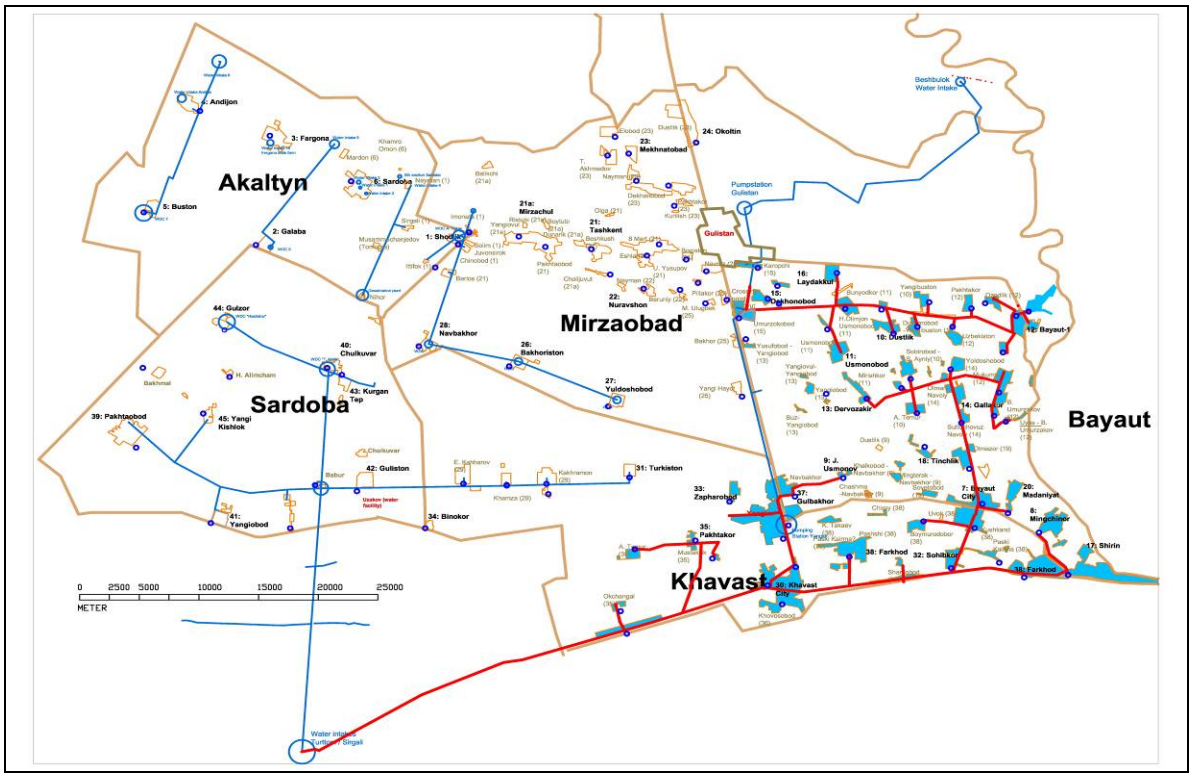
- Bayaut rayon (fully)
- Khavast rayon except Mekhnatobad zone
- Birlashgan of Mekhnatobad zone
- Yangier town
- Gulistan city

Towns of Gulistan and Yangier are not directly covered by the Feasibility Study under the proposed project. Water supply of Gulistan is covered by independent project financed by ADB. Though, ADB project does not rehabilitate Beshbulok water intake facility. Therefore it is necessary to take into account demand in water for Gulistan approximately 30.000 cub.m/day from Beshbulok after its rehabilitation. However, existing pumps in PS Beshbulok covering water volume for Gulistan will not be rehabilitated.

Water supply of Area 2 will be adopted according to Option 2.2, namely, water supply to majority of population of both Bayaut and Khavast including Yangier by gravity from Turttom/Sirgali water intake facility. The northern part of Bayaut will be supplied via existing

pipeline of Beshbulok-Gulistan (DN 1200) and existing pipeline from Gulistan to Yangier (DN 800).
The southern area of Khavast and Bayaut rayons up to Galakor town will be covered by newly built pipeline, which starts from Turttom/Sirgali water intake facility, which will be operated in gravity regime.

Figure 5.1.2 Proposed scheme of water supply Beshbulok and Turrtom (Option 2.2)



Beshbulok water intake facility
Existing wells will be rehabilitated and equipped with 5 new pumps. Wells assigned for supplying Gulistan will remain. (Fig. 5.1.2.)
New water supply pumps will be installed at PS Beshbulok via existing pipeline of D=1200 mm connecting with PS Gulistan. From there water is supplied via pipeline of Gulistan-Yangier and other small branches to northern part of Bayaut rayon. Pumps at PS Gulistan require replacement and electrical facilities need to be rehabilitated, as it is described in option 2.1.

It is provided to pump out water directly from PS Gulistan to tank towers in supplied towns from isolated steel plates with height of 25 m. From tank towers water will be supplied to distribution network under constant pressure. City networks will be built up to households with full coverage with water meters.

Turttom/Sirgali water intake facility
New pipeline will be laid down from Turttom/Sirgali water intake facility for supplying Khavast rayon, Yangier town and southern settlements of Bayaut rayon.

16 wells will be rehabilitated in Turttom/Sirgali and new ones will be equipped with pumps (96 cub.m/hour with hydraulic pressure of 60 m). Electrical installation will be conducted in accordance to the description by option 1.1. Additionally 6 transformer substations will be needed, each comprising 160kV. Additional CWR (v=1000 cub.m) will be constructed in Turttom for achieving sufficient capacity for supplying pipeline in gravity regime.

Due to high elevation of Turttom water will be supplied to Khavast and Bayaut rayons up to Gallakor town via gravity pipeline of DN-700mm and length of 26km. Water can be supplied by gravity to tank towers within towns except Khavast and Sokhibkor. In these two towns it is necessary to install a small ground reservoir including a booster pump to the tank tower.

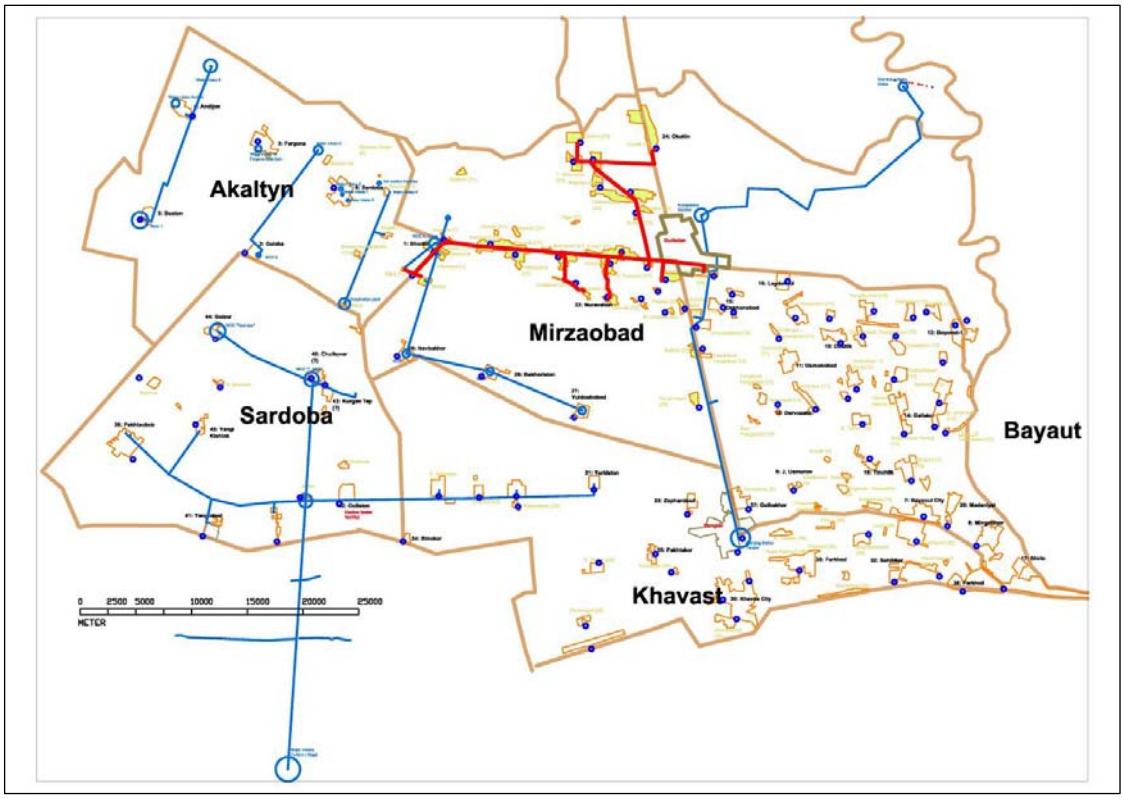
Water supply will cover population equal to 227.900 capita, maintain supply capacity – 29.525 cub.m/day, total number of wells - 21, WDC/tank tower - 57, total length of pipeline (main transmission line with diameter of DN 1200/800/700 to DN 150 mm) – 237 km, town water supply network including service network – 549 km.

Area 3: Mirzaobad

The area includes the most part of Mirzaobad rayon, without three southern towns, which are covered by Turrtom/Sirgali water intake facility and Birlashgan, which will be provided by Beshbulok water intake facility. In addition town of Shodlik (Akaltyn rayon) is included to the present area.

Northern towns of Mirzaobad rayon are connected to the central system of water supply. Instead of supplying from Balikchi it is also possible to connect to Gulistan PS and supply from Beshbulok water intake facility. To supply Mirzaabad rayon it is necessary to refurbish pumps at PS Gulistan and to design one branch from the existing Gulistan PS pipeline to Yangier.

Figure 5.1.3 Proposed scheme of water supply of Balikchi (via Gulistan), Option 3.2



Water supply will cover population equal to 62.157 capita, maintain supply capacity – 7.389 cub.m/day, total number of wells - 5, WDC/tank tower - 23, total length of pipeline (main transmission line with diameter of DN 500/150) – 64 km, town water supply network including service network – 323 km.

For technical details in respect to water intakes, distribution centers, reservoirs/towers, piplines and installation, monitoring & operation refer to the Technical Report of the Feasibility Study.

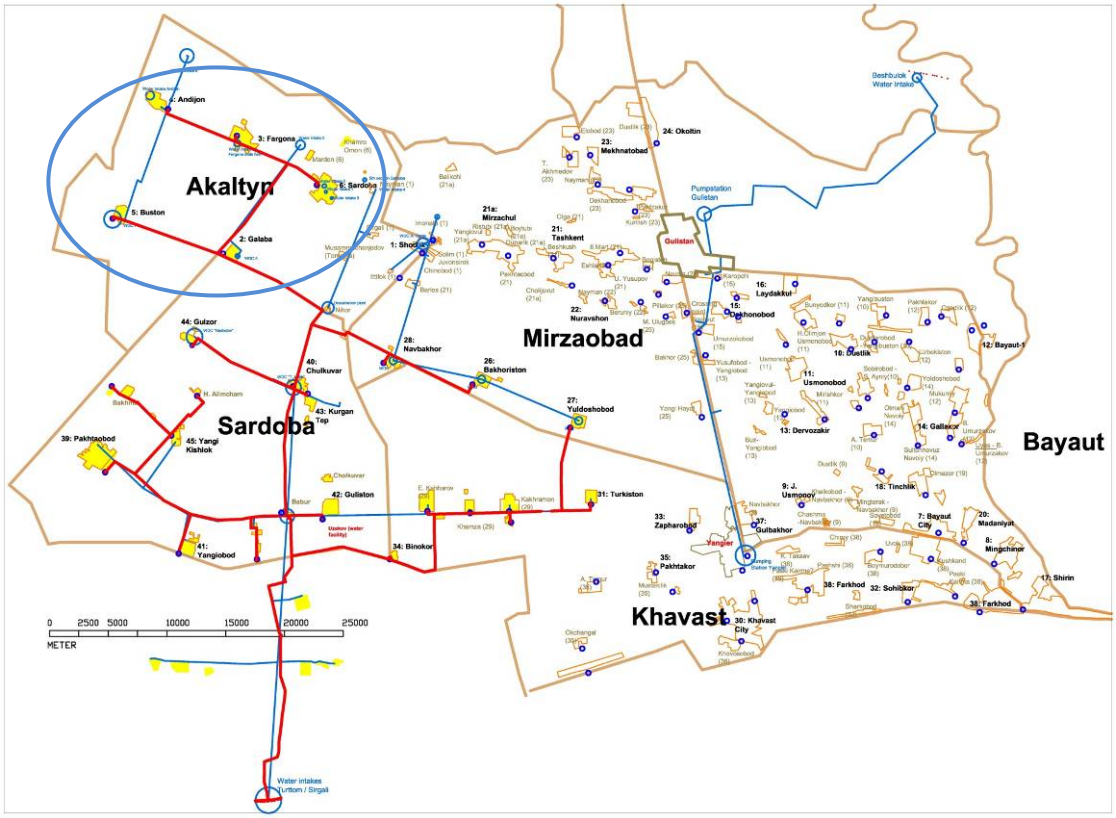
5.1.1. Akaltyn rayon water supply

The scheme of water supply of Akaltyn rayon is adopted as follows: from existing water intake facilities of Turttom and Sirgali (Jizzak region) water will be transferred via transmission mains to Galaba, Buston, Andijan, Ferghana and Sardoba. Shodlik will be included to Mirzaabad supply scheme.

At all towns it is planned to build tank towers with height of 26 m and volumes between 300 and 1000 cub.m., establishing even in hours of maximum water demand sustainable supply of water to the population.

Designed (project) capacity of waterways shall consist 6.053 cub.m/day (at present 0.95 thous. cub.m/day), nominal water consumption – 95 l/day/cap. (at present – 21.65 l/day/cap.). Provision of population with drinking water of centralized water supply shall reach 100% (present – 75.6%).

Figure 5.1.1.1 Villages Supplied in Akaltyn Rayon



5.1.2. Bayaut rayon water supply

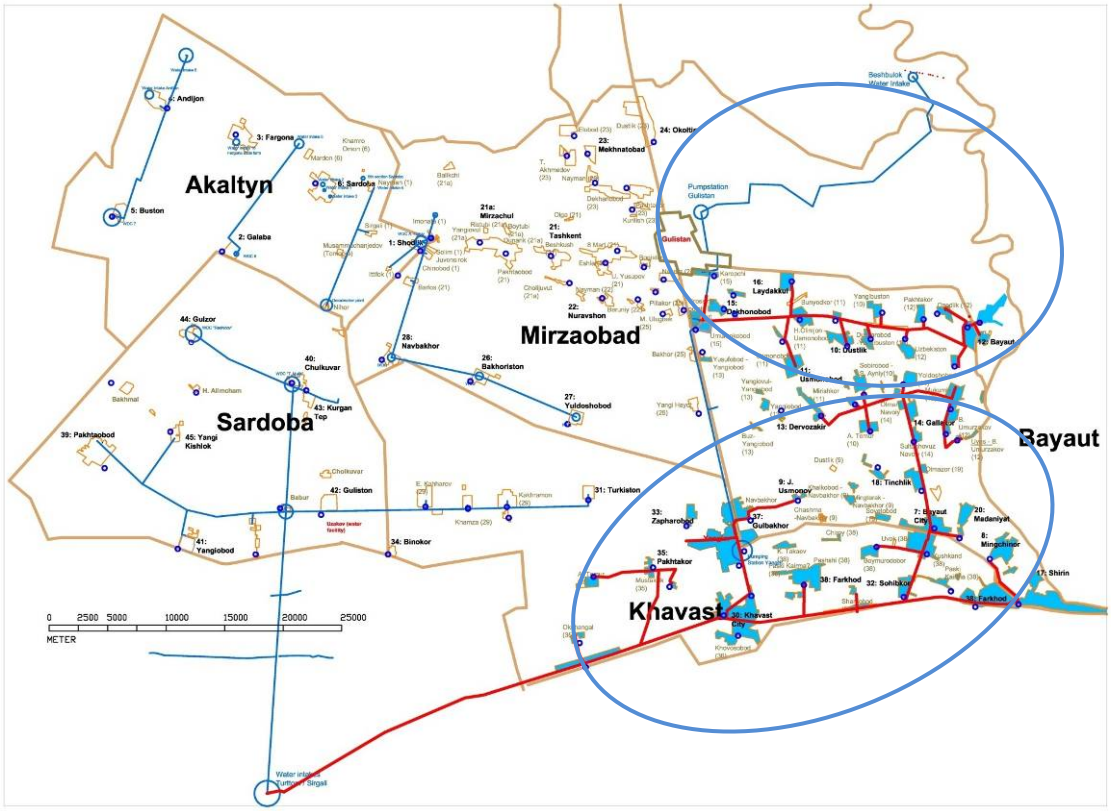
For Bayaut rayon water supply two options have been technically evaluated.

Option 1

Gravity water supply from Turttom/Sirgali wellfield up to Gallakor, Usmanobod, A.Temur villages as most northern settlements and,

Pumping water supply from Beshbulok wellfield via existing DN 1200/800 transmission main to Gulistan and DN 800 to supply the followling villages and incorporated settlements: Dustlik, Laylakul, Usmanobod, Bayaut-1, Dehkanobod, Umurzokobod.

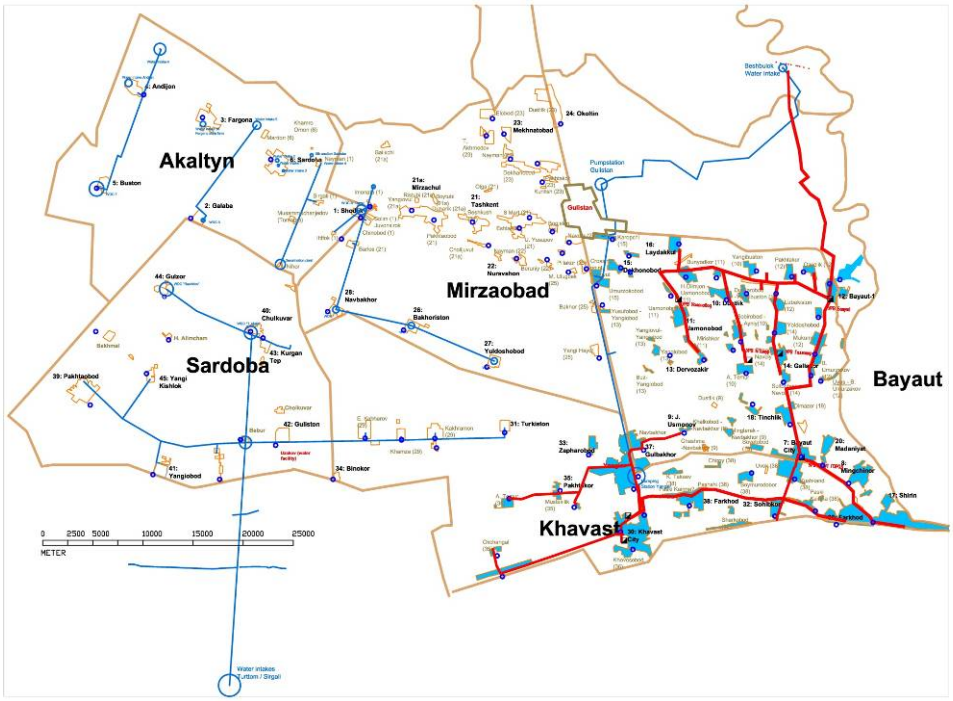
Figure 5.1.2.1 Villages Supplied in Bayaut Rayon (Option 1)



Option 2

Pumping water supply from Beshbulok wellfield via a new DN 600 transmission main to Bayaut-1, a new transmission main to supply Dustlik, Laylakul, Usmanobod, Bayaut-1, Dehkanobod, Umurzokobod and continuing from Bayaut-1 further to Bayaut town, Khavast town including branch lines to all villages aside. At Bayaut town water distribution center will have to be installed to supply Yangier town, Khavast town as well as Madaniyat, Mingchinor and Shirin.

Figure 5.1.2.2 Villages Supplied in Bayaut Rayon (Option 2)



Option 1 has been proposed as least cost solution in terms of investment costs, operation and maintenance.

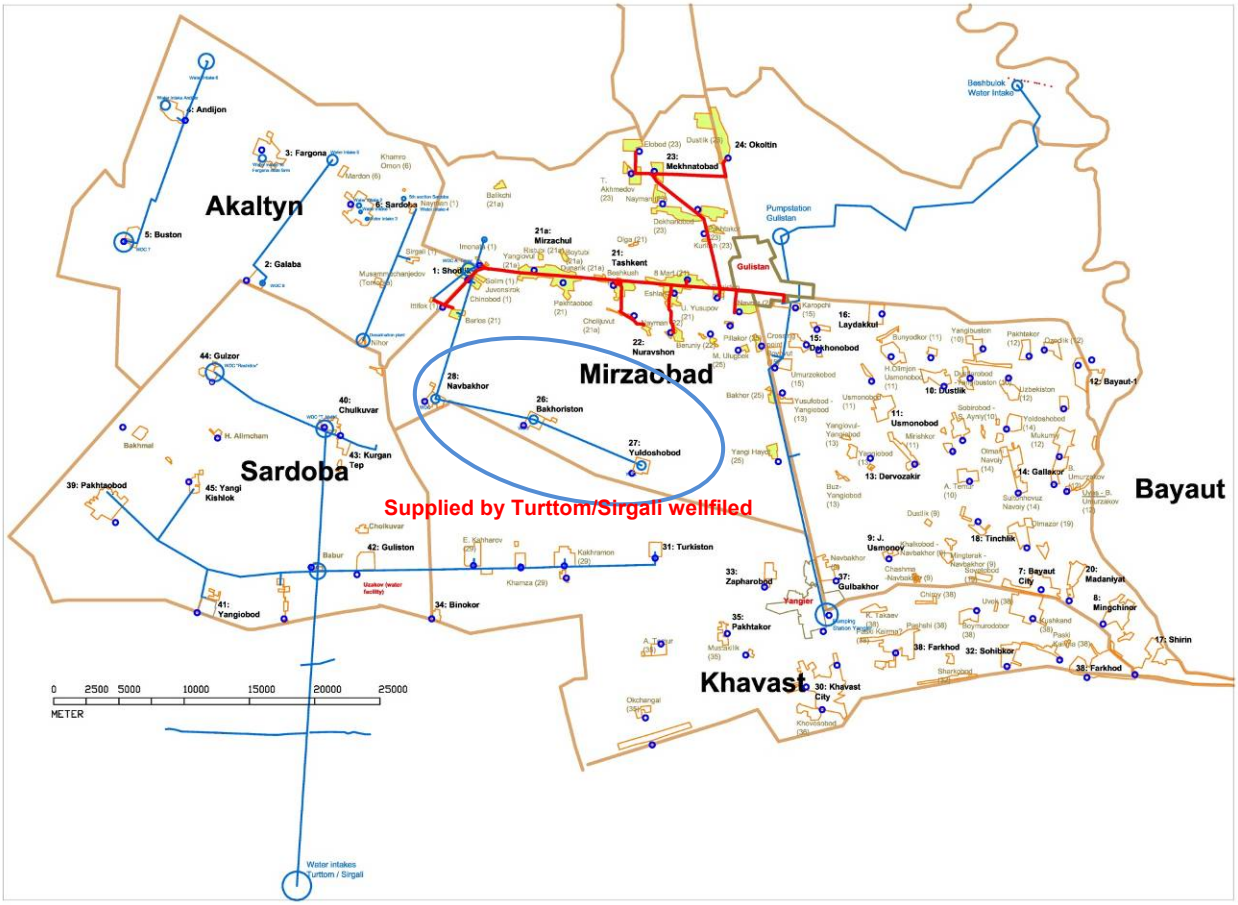
5.1.3. Mirzaabad rayon water supply

The Project provides for water supply of Mirzaobad rayon from 2 water conduits:

- From Turttom/Sirgali water intake facility (Djizzak region) water by gravity is supplied via design water conduit via Khavast rayon up to three southern towns of Mirzaobad rayon;
- Most part of Mirzaobad rayon will be covered by Beshbulok water intake facility. Northern towns of Mirzaobad rayon will be connected to the central system of water supply.

Designed (project) capacity of waterways shall consist 7.398 cub.m/day (at present – 0.32 thous. cub.m/day), nominal water consumption – 95 l/day/cap. (at present – 38.13l/day/cap.). Provision of population with drinking water of centralized water supply shall reach 100% (present – 86.6%).

Figure 5.1.3.1 Villages Supplied in Mirzaabad Rayon



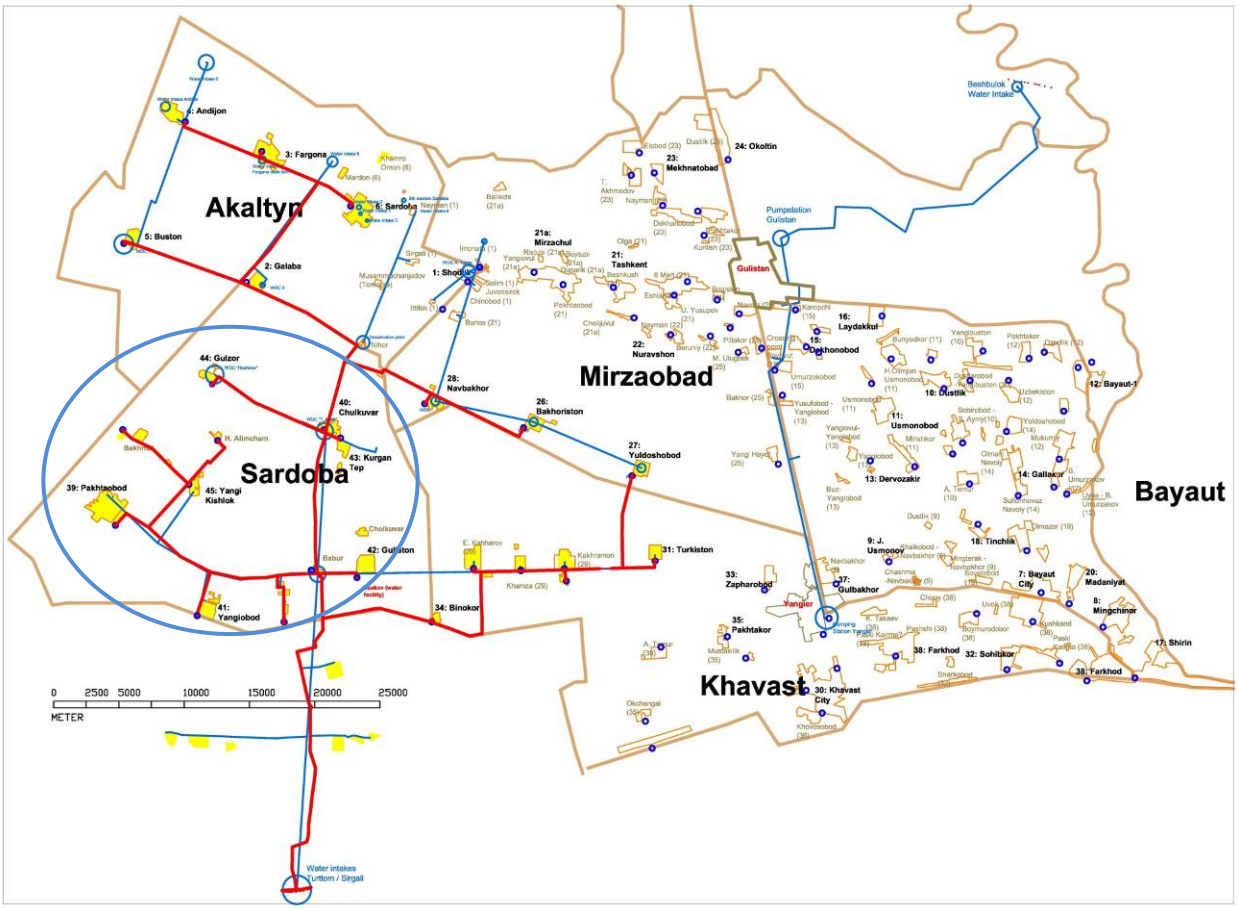
5.1.4. Sardoba rayon water supply

Project shall provide for arrangement of waterway, operating in pressure-gravity mode, supplying water from reservoirs of Turttom water intake waterway to Yangiobod, Yangi Kishlok, Pakhtaabad, Chulkuvar, Gulzor, Guliston as well as adjacent settlements. Additionally, the main transmission pipline from Turttom/Sirgali wellfield to the junction Bobur village will be responsible to provide water supply to towns of Akaltyn rayon and Khavast rayon.

It is planned that the project waterway, passing on the territory of Djizzak region and on territory of Sardoba district of Syrdarya region, shall be, after the construction, taken to the balance of Sardoba district Suvokova.

Designed (project) capacity of waterways shall consist 7.935 cub.m/day (at present – 0.12 thous. cub.m/day), nominal water consumption – 95 l/day/cap. (at present – 1.32 l/day/cap.). Provision of population with drinking water of centralized water supply shall reach 100% (present – 43.6%). Furthermore, included in the designed daily demand are villages along the main transmission pipeline passing Jizzak oblast.

Figure 5.1.4.1 Villages Supplied in Sardoba Rayon



5.1.5. Khavast rayon water supply

Water supply to the Khavast rayon and Yangier town will be established by a new gravity water supply transmission main from Turttom/Sirgali water intake facility (Djizzak region) to Khavast town and Yangier as well as all adjacent villages of the area.

The villages E. Kakharov, Narchaev, Turkistion, Binokor, Kakhramon and Khamza are covered by the Sardoba-Akaltyn gravity water supply scheme.

Designed (project) capacity of waterways shall consist of totally 14.840 cub.m/day including Yangier town (at present - 1,1 thous. cub.m/day; excluding Yangier town), nominal water consumption – 95 l/day/cap. for rural settlements and 125 l/day/cap. for urban population (at present – 13.38l/day/cap.). Provision of population with drinking water of centralized water supply shall reach 100% (present – 61.0%).

5.2. Types and nature of impact to environment by reconstruction of waterline systems

Almost all project measures shall be accomplished at the territory of 5 districts, villages and in towns, around the existing waterline infrastructure.

Nature of environmental impact during the rehabilitation works and after their completion shall change.

Project implementation period.

Repair and construction of waterline networks, rehabilitation of water-intake wells and pumps on them, their cleaning shall cause changes to operation mode of waterline system that will probably worsen sanitary-hygienic condition of adjacent territories and shall disturb the regime of water supply to population. Impact shall be short in terms of time with reversible consequences.

At construction or rehabilitation of water-intake wells and CWR, water resources can be polluted by cleaning and construction of waterline pipes, as well as with construction objects' wastes. To avoid pollution of surface and ground waters measures shall be undertaken to protect from possible pollution sources:

- Observance of repair and restoration works rules and use of modern technologies at works performance;
- Withdrawal of surface and drainage sewers out of construction objects area;
- Elaboration and application of the plan of water supply regime to population during reconstruction;
- Timely cleaning of construction objects from building refuses and their utilization.

Measures on protection of all type water resources from probable pollution sources shall be taken during rehabilitation and construction works. Unintended leakage of fuel and oils from reservoirs at construction sites, as well as incorrect handling of lubricant materials during technical maintenance, are the most possible pollutant sources of surface and ground waters at project objects. Pollution shall be temporary and shall minor impact to soil and ground waters.

During the conduction of construction works inorganic dust and combustion products from construction and mobile machinery shall be introduced into atmospheric air. Below is estimate calculation of quantitative and qualitative characteristics on pollutant emissions to atmospheric air while constructing the water intake sites.

Table 5.2.1. Fuel consumption rate by machines and mechanisms/rated fuel consumption for the period of construction

Name of machines and mechanisms	Meas. Unit	Total, mach.-h.	Fuel consumption rate, l/Mach.-h.	Total, fuel consumption, l
1	2	3	4	5
Average type motor graders 99(135) kWt(hp)	Mach.-h	2,65	9,9	26,24
5t Truck-loaders	Mach.-h	0,61	6	3,66
59(80) kWt (hp) Bulldozers	Mach.-h	122,05	7,3	890,97
79(108) kWt (hp) Bulldozers	Mach.-h	14,19	10	141,90

8t Flat automotive road rollers	Mach.-h	19,79	3,1	61,35
13t Flat automotive road rollers	Mach.-h	28,62	3,1	88,72
16t Flat automotive road rollers	Mach.-h	0,7	18,3	12,81
6,3t Autocranes	Mach.-h	20,21	5,3	107,11
10t Autocranes	Mach.-h	198,81	5,5	1093,46
16t Autocranes	Mach.-h	77,28	5,5	425,04
Crawler cranes up to 16t	Mach.-h	22,69	4,2	95,30
Crawler cranes up to 25t	Mach.-h	9,27	7,2	66,74
3cub.m/h capacity Mortar pumps	Mach.-h	1,84	9,3	17,11
1cub.m/h capacity Mortar pumps	Mach.-h	7,38	9,3	68,63
Compressor operation pneumatic rammers	Mach.-h	61,53	10,5	646,07
Pneumatic-tyred one-bucket diesel excavator :0,25cub.m	Mach.-h	45,13	4,5	203,09
Pneumatic-tyred one-bucket diesel excavator :0,5cub.m	Mach.-h	55,69	5	278,45
Pneumatic-tyred tractors 59(80) kWt (hp)	Mach.-h	2,52	6,2	15,62
Kit equipments for bailing with compressor and internal combustion engine	Mach.-h	192	10,5	2016,00
Truck-based drilling rigs and aggregates	Mach.-h	345,1	21,6	7454,16
15 cub.m/h Cementing automated units	Mach.-h	46,76	9,3	434,87
TOTAL fuel consumption for the period of site construction	L			14147,29

Table 5.2.2. Estimated emission of harmful substances to atmosphere during the construction period

Substance name	Amount of emission, kg/t of consumed fuel	Nominal density of diesel fuel	Amount of consumed fuel, t	Amount of emissions for the construction period (0,5 year), tn
Carbon oxide, CO	30,0	0,84	0,84*14147,29=11883,72	356,51
Nitrogen oxide, NOx	43,0			511,00
Hydrocarbons, CH	15,0			178,26
Soot, S	3,0			35,65

Sulfur dioxide, SO_2	4,5			53,48
Aldehydes, CH_2O	0,6			7,13
Benzpyrene, BP	$5,5*10^{-5}$			0,00065

Pollutant emissions from vehicles and machinery of project districts during accomplishment of construction works shall consist 1142,03 tons for 6 months or 6,35kg a day. Machinery and motor-transport shall work intermittently and are distributed by big territory of districts, and then their impact to atmospheric air shall be insignificant.

To reduce influence to atmospheric air by motor-transport, measures on strict observance of safety rules shall be observed at main crossroads, main roads and streets in makhallas and nearby the work objects. Contractors, under PIU control, shall establish either temporary or permanent traffic-lights at most loaded crossroads. During rehabilitation/construction period traffic police in makhallas shall be increased, as well as appropriate preventive and safety measures among schoolchildren shall be taken.

Suppression of dust formation during the works and transportation shall be undertaken by watering of work objects territories and roads. All construction objects and passages shall be cleaned after completion of works.
Main environmental impact to land resources during the rehabilitation and construction works can be pollution of soils with building refuses and fuel-and-lubricant material, as well as flooding of adjacent lands at facilities' possible destruction. Relevant sites shall be prepared for collection and stocking of building refuses and debris, in order to reduce negative environmental impact.

Soils can be subject to pollution by those pollutant sources that mentioned with regard to water resources, and exactly: by incorrect handling of solid and liquid wastes and incorrect handling of machinery, particularly, at oil change and refuel of machinery.

Use of fuel and lubricant materials is planned limited in volume and timing and therefore their impact to environment shall be insignificant. However, construction practice of works conduction requires provision of measures to avoid soils and waters pollution.

Soil protection measures shall be activated in accordance with norms and rules of the Republic of Uzbekistan. During the construction of new waterline networks organic upper layer of soil, suitable for further use, shall be removed and temporarily stocked separately from remained land materials. After completion of networks construction/rehabilitation, organic soil layer at backfilling shall be placed on the top, duly compacted and restored to initial condition.

In the process of repair works at distribution junctions and waterline networks building refuses shall be generated, which require strict system of collection, removal and their minimization.

Following refuses shall be formed during repair-rehabilitation works of waterline network:

- Refuses of pipes mechanical cleaning from sediments, consisting of rubbish, mineral salts and organic substances; shall be stocked at temporary sites with further use for fertilizing of irrigated lands;
- Land refuses from preparation of objects for waterline pipes construction, which shall be used for trenches backfilling;
- Materials refuses after repair of damaged concrete and cast-iron pipelines are provided to be taken to Vtorchermet (Ferrous metal recycle) or to recycle to metallurgical works.
- Use and stocking of these refuses shall be provided in working design.

Different type solid refuses, including wood, plastic and cardboard boxes from equipment packing shall emerge at work objects. Mitigation measures shall include provision with containers for sorting the solid refuses out. Cardboard boxes from equipment packing shall be

taken to reception centers of “Vtorutilsiryo” (Utility Refuses Company), waste plastic – to nearest plastic recycling enterprise.

Servicing of machinery shall be performed exclusively at refuel stations, used oils and other liquid pollutant substances shall be stocked in specially equipped locations and disposed to regeneration to nearest tank farm. No servicing of machines and mechanisms at worksites shall be permitted.

Construction sites after completion of construction and mounting works shall be cleared of debris and re-developed close to the initial stage. In case of destruction of streets’ asphalt coat, it is necessary to perform its restoration.

As necessary to dispose and stocking of excessive ground, getting of permission from district or regional architect department is required with indication of stocking location.

As necessary to deliver crushed stone, gravel, sand for construction works, getting of permission for use of sites and borrows is also required.

While conducting the construction works transportation services shall also be accomplished strictly by allocated roads, to eliminate a possibility to destroy the fertile soil layers.

Creation of sanitary conditions for constructors and their medical examination is necessary. Site controllers are obliged conduct to daily rounds of construction sites and adjacent areas with the purpose of visual inspection of performance of nature-protective measures (no trespassing of animals and plants, collection of wastes and oils into special capacities etc.) by builders.

Damage to trees and vegetation cover shall be minor. Rehabilitation/construction works at waterline networks are normally mean that the part of vegetation shall be removed and stocked along the work object. They can be mitigated by taken appropriate measures, and particularly, by restoration of destroyed vegetable cover.

Mode of operation at rehabilitated and constructed objects may generate dangerous situation for employees and population of adjacent populated areas. Necessary to establish healthy work conditions with observance of labor safety provisions. Fencing of work objects and trenches overpasses must be provided. Traffic control, emergency signals and lighting shall be performed in accordance with local rules. When necessary, safe bypass roads and crossings for pedestrians and cattle shall be established.

It is necessary to provide water disinfection by way of its chlorination with sodium hypochlorite, as well as additional chlorination depending on quantity of residual chlorine in water received.

Chlorination must be provided only at water intake with dose of chlorine equal to 1 mg/l. Optimal working dose of chlorine shall be established empirically. Solution preparation must be conducted in electrolysis plant installed in each rayon at one central WDC. Soultion is poured into the pipline directly at its entrance to CWR.

Replacement of old waterline networks shall result in interruptions in water supply, damage to other communications (telephone, electric networks) is possible. Taking of necessary actions shall be required while designing of rehabilitation works and mandatory coordination with relevant services and enterprises.

Thus, temporary environmental impact of rehabilitation and construction works at waterline systems and their infrastructures is related to use of machinery for repair and restoration, and shall include: dust formation, when digging ditches – generation of noise and vibration in nearest old buildings, access limit to buildings, closing of certain road sections and violation of auto traffic on them, these influences during rehabilitation works at waterline network and distribution junctions shall be short-term and adjacent population shall be affected in different time. Impact shall also be moderate for working personnel and environment. Relevant mitigation and control measures of practices for repair-rehabilitation works conduction shall be taken.

After implementation of the project.
When operating waterline networks, pumping stations after reconstruction, improvement of drinking waters supply, leakages elimination is expected, that shall favorably affect the environment and population health, since shall eliminate infiltration of drinking water from waterline pipes into the ground / ground waters and infiltration of ground waters that penetrate into waterline networks, having polluted and worsened the drinking waters quality in waterline pipes.

Expansion of waterline system shall allow increasing the number of connections of population to waterline network that, in its turn, can increase unorganized discharge of wastes to environment, as well as shall negatively impact the soils and ground waters without solution to the issue of collection and treatment of waste waters from population.

Impact of additional selection for underground waters reserves in the region shall be insignificant, as the index of use of underground waters approved operational reserves shall consist only 0.17 (forecast operational resources of underground waters with mineralization of up to 1.0 g/l in whole by region shall make 697.35 thous. cub.cub.m/day, and selection for household and industrial needs – 115.91 thous. cub.cub.m/day).

Along the whole territory of the Project the positive environmental impact shall be mainly the improvement of technical condition of water-intake facilities and waterline networks, termination of leakages that shall reduce problems of pollution and flooding of soils, ground and surface waters. In the majority part the negative environmental impact has temporary and local nature, and is connected with construction works. It is anticipated that negative environmental impact can considerably be mitigated by relevant construction safety measures.

Physical infrastructures, such as pipes laying, repair of pumping stations and waterline networks, wells drilling, construction and repair works on buildings of district vodokanals and laboratory buildings shall be accomplished and rehabilitated in accordance with construction norms and rules of the Republic of Uzbekistan.

There are no historical sites or cultural objects at the project area.

Archeological and cultural finds are hardly probable, as the construction works by expansion and construction of waterline network shall affect the territory of populated areas and irrigated lands. In case of archeological finds, the requirement to publish special notices, cessation of works and observance of order for their taking out shall be provided.

Thus, implementation of this project, consisting of rehabilitation of facilities, reconstruction and construction of waterline collectors, improvement of vodokanal services management and operation, shall result in improvement of water supply to population at the project area that shall have positive affect to whole range of natural conditions, objects of cultural heritage and health of population.

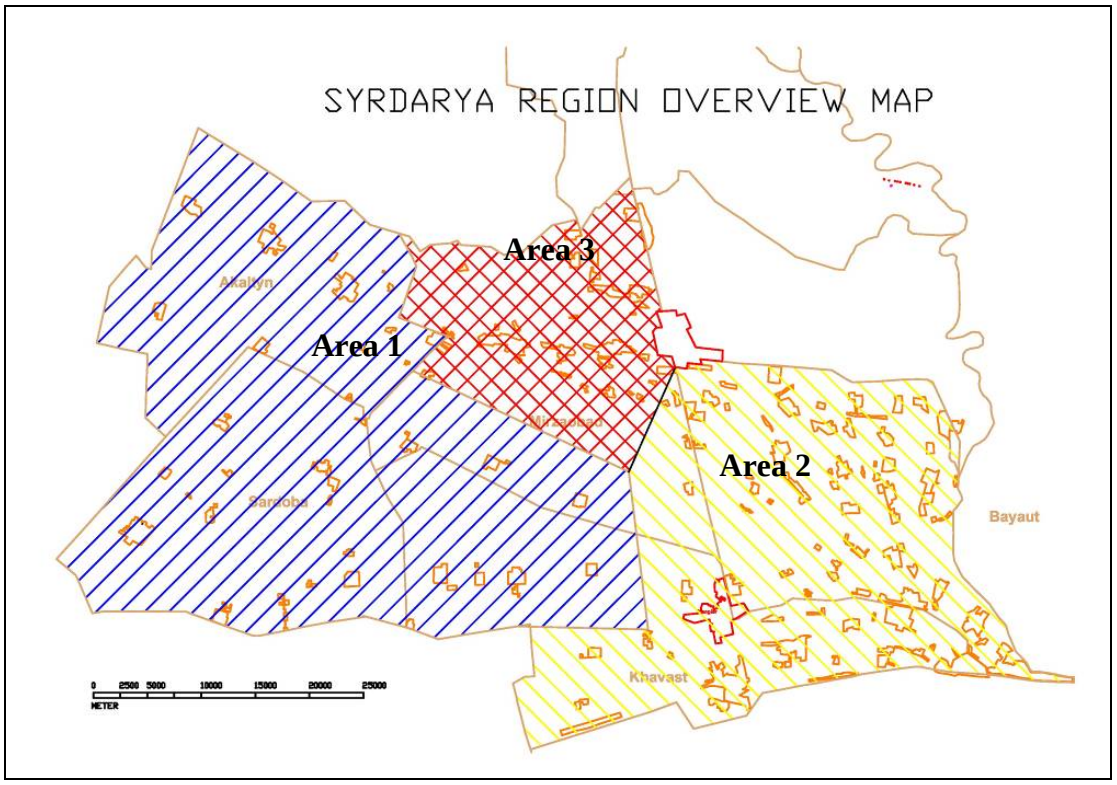
6. ALTERNATIVES TO PROPOSED PROJECT INVESTMENTS

Studied options of water supply for project area are compared based on the following principles:

- Selecting the technical best solution according to international and Uzbek standards;
- Minimising investment costs;
- Preference for long lasting and reliable materials, equipment, goods;
- Minimising the effort for operation and maintenance.

For comparison of various options the project area has been divided into three areas, where feasible variants could be developed. Three areas are presented in the figure below:

Figure 6.1. Areas of water supply (options comparison)



Area 1: Sardoba/Akaltyn

Option 1.1 is supplying the whole area by the water system Turttom/Sirgali.
Option 1.2 covers the area with exception of the northern part of Akaltyn rayon, namely the towns of Andijon, Sardoba and Ferghana. Those towns will be supplied by stand alone systems each (see Fig. 6.2)

Option 1.1
The whole described area will be supplied by Turttom/Sirgali Water intake.

Water intake Turttom/Sirgali

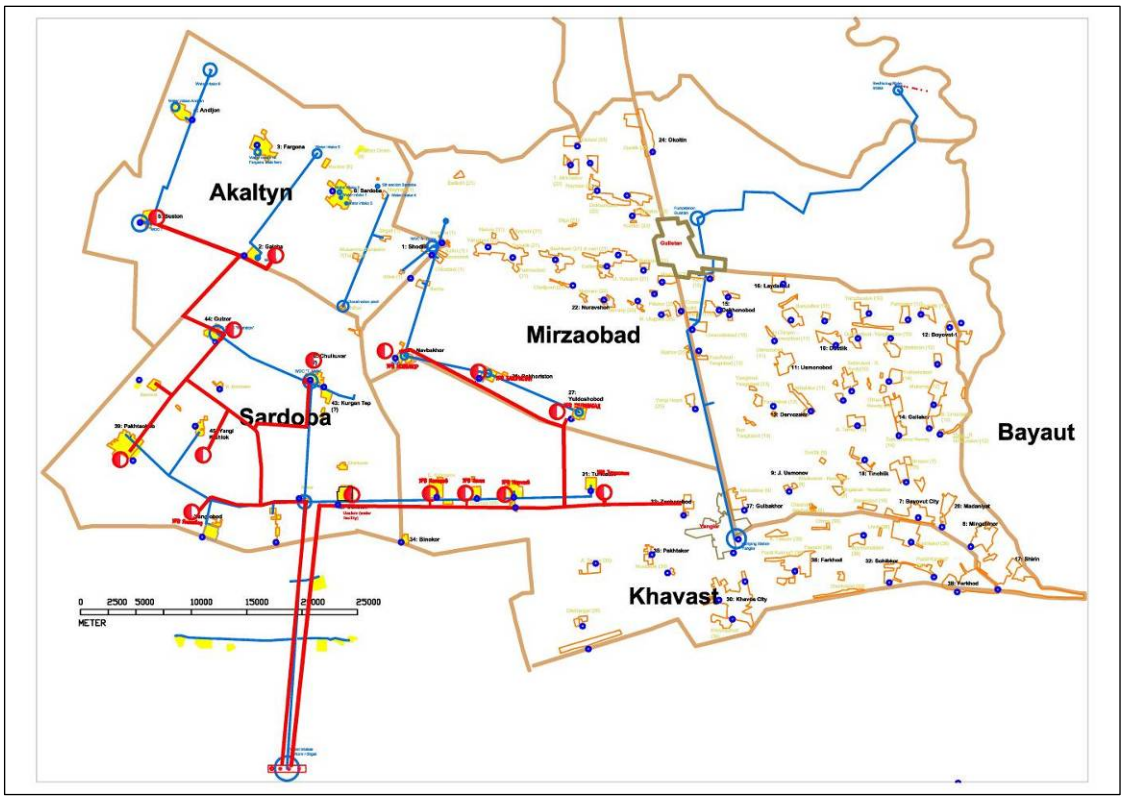
12 wells in the Turttom /Sirgali water intake have to be rehabilitated, equipped with new well pumps with a capacity of 96 m³/h and 60m hydraulic head each.

From the water intake Turttom/Sirgali the whole area will be supplied by gravity flow. Therefore no pumping station is necessary in the area. For the main pipeline from Turttom to the former pumping station “Uzakov” one pipeline with diameter of 600 mm, L = 26 km, is necessary.

The gravity system will feed water towers, which are foreseen as steel towers with prefabricated insulated steel plates with a height of approximately 25m and a volume of 30 and 1050 m³, depending on the size of the connected towns. The water towers are designed to store the average supply of 12 hours. The towers are placed at the highest part of the respective town to ensure the pressure in the network. The networks are designed as loop networks that no dead ends occur and the pressure distribution in the network is constant. All house connections will be equipped with water meters.

Option 1.2. As an option the supply of Turttom/Sirgali (Djizzak Region) by gravity can be limited to whole Sardoba rayon, the southern part of Akaltyn rayon and the Mekhnatobad zone of Khavast Rayon. In addition stand alone systems will supply three northern towns in Akaltyn rayon.

Figure 6.2.: Option 1.2: Water supply system (Turttom/Sirgali)



Water Intake Turttom/Sirgali

12 wells are foreseen to supply the projected area. Those will be rehabilitated and equipped with the pumps of 96 m³/h, 60m hydraulic head, bulk water meters as well as new well housing. The electrical equipment will correspond with option 1.1. Chlorination may be foreseen in the future.

Two main water conduits are planned. One pipeline (DN600, L = 31 km) for the area Sardoba / Akaltyn, and one Pipeline (DN500, L= 27 km) for supplying the area of Khavast Mekhnatobad zone and south of Mirzaobad. It is necessary to provide pipes for the length from water intake up to WDC T.Malik with operational pressure of 10 bar (DN500-600 mm and total length of 39 km). Further to WDC Buston pipes with operational pressure of 6 bar (DN500-300 mm and total length of 18.5 km).

The water is supplied by gravity via water conduits from the water intakes Turttom and Sirgali across Sardoba rayon till Akaltyn rayon as well as to WDC Buston and WDC Ahelik (Gallaba). On these WDC reservoir towers are stipulated with the height up to 25m and a capacity of up to 1,000 m³.

The networks in the towns are constructed up to household level.

In addition to the water supply from Turttom/Sirgali, the towns of Sardoba, Andijan and Ferghana will be supplied by stand alone systems. In the towns a distribution network will be established and water meter for connected customers.

This option is most expensive in terms of investments and operation; therefore it will not be considered and discussed further.

Area 2: Bayaut / Khavast

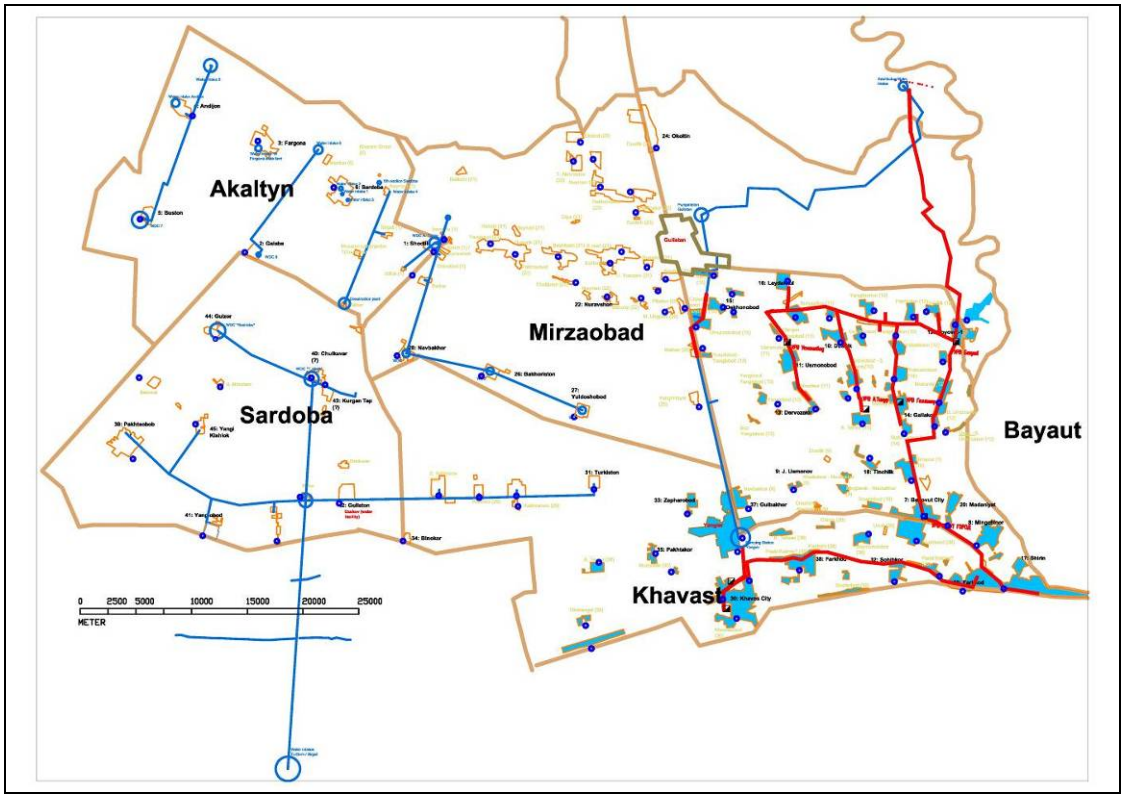
In total 2 options have been assessed for this area:

Option 2.1 will cover the whole Bayaut and Khavast rayons supplied by a new pipeline running directly southwards from Beshbulok up to Bayaut town. From where branches will supply the cities of Khavast and Yangier and other villages in the rayons.

Option 2.2 will supply large parts of Bayaut and Khavast inclusive Yangier via gravity flow from the water intake Turttom / Sirgali. The northern part of Bayaut will be supplied via the existing pipeline Beshbulok-Gulistan and the northern part of the pipeline from Gulistan to Yangier.

According to Option 2.1, at Beshbulok wellfield 11 wells will be rehabilitated and equipped with new submersible pumps (160 m³/h, 60 m hydraulic head). If necessary, new wells will be drilled in adequate distance between each other.

Figure 6.3. Option 2.1: Beshbulok water intake facility



For new pumps the overhead line has to be extended.

The water is supplied from supply pumps (4 x 450 m³/h + reserves, hydraulic head 60 m) via a new planned water conduit of DN600 mm, L=20 km to a water reservoir at the new constructed WDC "Bayaut-Town". In addition branches will supply directly water towers in the northern towns of Bayaut rayon. At the WDC "Bayaut-Town" water is finally supplied by 3 sets of additional pumps to

- water tower Bayaut town;
- villages of Madanijat, Minchinor, Shirin;
- cities of Khavast and Yangier as well as villages of Sohibkor-Farkhod and Pahtkor-Okchangal.

From WDC Bayaut altogether on average 20,350 m³ will be supplied daily. From the water distribution centre, the water is pumped directly into water towers, which supply the distribution networks. The networks are completed up to household-level, including water meters.

Option 2.2 provides for supply of the northern part of Bayaut rayon via the existing pipeline Beshbulok – Gulistan (DN1200) and the existing pipeline Gulistan – Yangier. The southern area of Khavast and Bayaut rayons up to the town of Galakor will be covered by a new constructed pipeline from the water intake Turttom/Sirgali, which will be operated in gravity flow.

Water intake Beshbulok

For Option 2.2 five existing wells at Beshbulok will be rehabilitated and equipped with new pumps. The wells allocated for the water demand of Gulistan will remain (see Figure 5.1.2). In the pumping station Beshbulok new pumps will be installed for transmitting the water via the existing pipeline DN1200 to Gulistan pumping station. From there the water is transmitted through the existing pipeline Gulistan – Yangier and new branches to the northern part of Bayaut rayon.

Water Intake Turttom/Sirgali

From the water intake Turttom/Sirgali a new transmission main will be constructed to supply Khavast rayon, Yangier City and the southern villages of Bayaut rayon.

In Turttom/Sirgali, 16 wells will be rehabilitated and new equipped with pumps (96 m³/h, hydraulic head 60 m). The electrical installation will be adopted according to description under option 1.1. Additional 6 transformer stations each 160 kVA will be needed. An additional water reservoir V=1000 m³ will be installed in Turttom to reach a sufficient capacity for feeding the gravity flow pipeline.

According to the elevated location of Turttom, the water will be transmitted to Khavast and Bayaut rayon up to the town of Galakor via a gravity flow pipeline DN700 mm, L= 26km. In towns of Khavast, Sohibkor small ground chamber have to be installed, from which the water is pumped into the water tower or booster pumps will be used.

Option 2.1 covers the whole area under usage of the existing water conduits and construction of a new pipeline with the shortest distance between water intake and consumers. Option 2.2 achieves to supply Khavast and large parts of Bayaut rayon with gravity flow system from Turttom/Sirgali. This solution is more costly for the investment than the total supply of the area from Beshbulok, but the future costs for operation and maintenance will be much less than in option 2.1 and the likelihood of break downs is decreased through minimizing the machinery in small towns. In addition, option 2.2 envisages installing water towers for the storage instead of ground reservoirs and connected pumping stations. This results in higher construction costs for the water towers. The effort for operation of water towers, which enable to distribute the water in the networks with a constant pressure, is less than for a number of WDCs.

Area 3: Mirzaobad

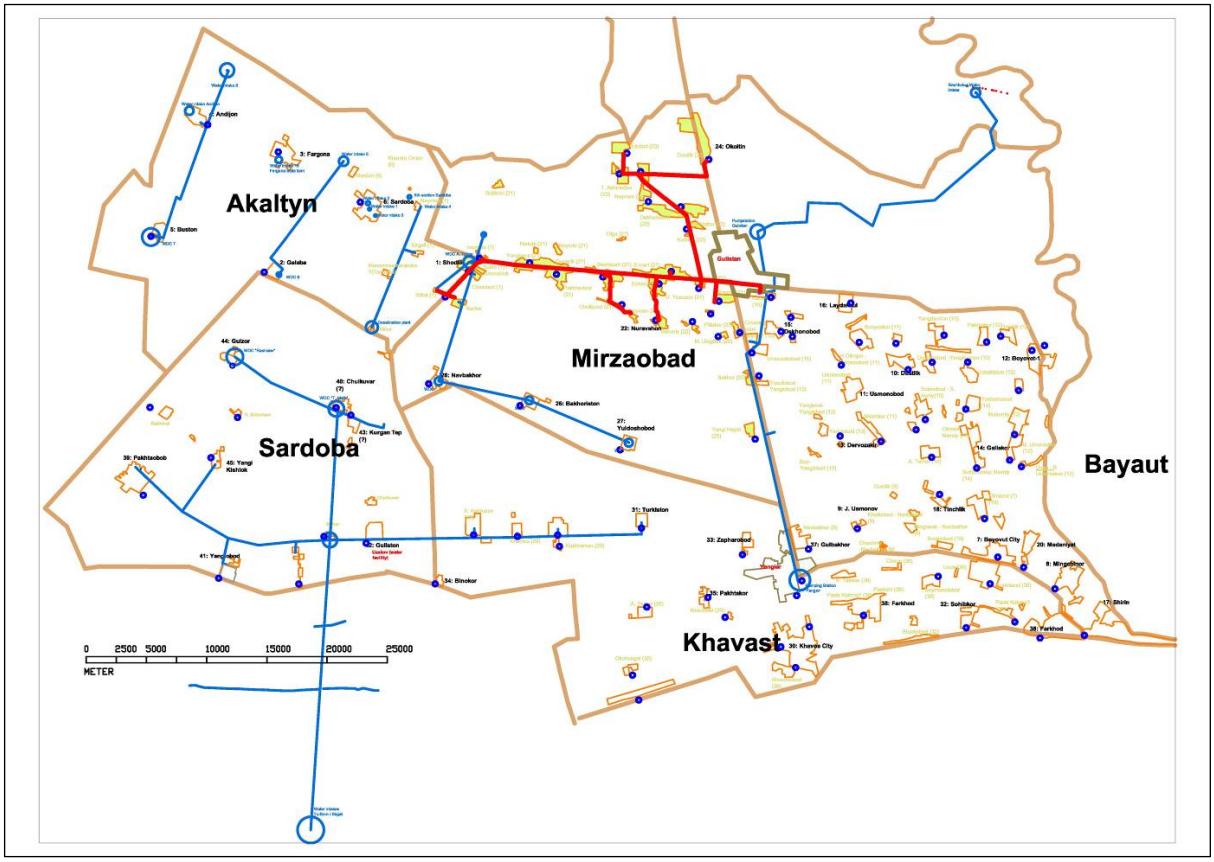
The area comprises the largest part of Mirzaobad rayon, without the three southern towns, which are covered by water intake Turttom/Sirgali as well as Birlashgan which will be supplied by Beshbulok water intake. In addition, the town of Shodlik (Akaltyn rayon) is included in this area.

The area along the R 29 up to the Navruz River and up to Tashkent RCC will be supplied from a central water scheme either from the water intake Balikchi or from the central pumping station in Gulistan. For the northern towns of Mirzaobad two options will be displayed. Option 3.1 does not include those towns into the water supply system, while in option 3.2 those towns connected to the central system.

Option 3.2

Alternatively the area can be supplied through the water intake Balikchi. In the water intake Balikchi 4 wells have to be rehabilitated and equipped with new pumps (66 m³/h, hydraulic head 40 m) and 3 new wells with the same specifications have to be drilled. The pumping station will be equipped with new pumps to transport the water through the pipeline directly to the networks and WDC Tashkent.

Figure 6.4. Option 3.2: Water supply system of Balykchi or / via Gulistan



The existing transformer stations (1 x 400 kVA, 1 x 250 kVA) have to be checked and maintained. The latter has to be equipped with new High Voltage fuses. An oil change has to be conducted and an oil tray has to be installed. A new low-voltage main distribution board has to be constructed to supply the well pumps and supply pumps. Therein the control of the pumps has to be integrated. Heating and lighting has to be installed.

The investment and operation costs for this option are higher. Therefore this option will not be discussed further.

It is planned to use CC-GRP (centrifugally cast reinforced glass fibre pipes) and PE pipes, both produced in Uzbekistan, for the construction of new water pipelines, whereas CC-GRP is recommended for diameters above DN 100 (transmission mains and main city network pipelines) and PE to be used for service pipelines to customers. For sections of waterways, to be made of steel pipes, internal and external anticorrosive coating shall be provided.

Metal pipes can easily be subject to corrosion, instable to aggressive ground waters impact, uncomfortable for transportation and assembly. Plastic and PE ones are light, produced of various diameters and length, fitted with coupling and fittings; convenient for transportation and assembly and do not expose to corrosion, durable – their service life is 50 years.

Great advantage and comfort in operation is given by use of glass-fiber pipes for rehabilitation of main waterways and water pipelines by way of pulling through the old pipeline. After the pulling through, space between old and new pipes shall be filled with quick-hardening mortar. Rehabilitation of water pipelines can be accomplished without stopping their operation during minimum flow at the site between two wells. Pipes outdoor warehousing is possible due to high stability to UV radiation. Scratches on external surface of pipes are admitted.

Use of these pipes shall allow considerably reducing terms and labor-costs for repair-rehabilitation works, as well as eliminating annual capital repair, improving environmental situation in the course of reconstruction.

7. ANALYSIS OF POSSIBLE EMERGENCY SITUATIONS

Possible emergency situations of waterline facilities can be related to integrity violation of irrigation canals, collector-drainage system at crossing routes that shall cause pipes corrosion and possible disturbances of the network, at this, one can not exclude the ingress of contaminants in waterline network. Simultaneously, at pipe break points the area flooding shall occur. To provide reliable operation of waterline network it is necessary to lay pipes of appropriate anticorrosive material. In case of such emergencies occurrence, necessary to notify population and to provide them with imported water.

Project shall provide the process control from dispatching points, which shall be equipped with self-operated controls and mobile communication. Central Dispatching Point (CDP) shall control measuring parameters of operation of waterways, pumping equipment and valves, as well as dispatcher management and control of facilities operation. It will allow detecting possible sites of break down and timely eliminate them.

8. FORECAST OF BENEFITS AND STATE OF ENVIRONMENT AFTER PROJECT IMPLEMENTATION

Benefits shall occur due to rehabilitation of waterline network. In the present, carrying capacity of waterline is considerably lowered because of sediments, clogging and leakages. Construction of new waterline networks, washing-out and repair of the existing network, pumping stations at water-intake wells, shall allow timely and regularly accomplishing the supply of clear water to population.

It is provided to reduce water consumption by development stages on account of:

- Implementation of technical water-saving measures, including improvement of water flow account system;
- Optimization of operating modes for water supply and distribution system;
- Regular coverage in mass media of issues of rational water consumption;
- Increase of social living standard of population and toughening of tariff policy.

Five district departments of RPE "Suvokova" – "Ichimlik suvi" shall guarantee the supply of improved quality drinking water, free of causative agents, suitable for consumption and meeting the standards of O'z DSt 950:2000 "Drinking water. Hygienic requirements and quality control".

Table 8.1. Coverage of population with centralized water supply

District name	Existing water supply			Designed capacities of water supply for 2025			
	Total released to population	Population covered	Nominal water consumption			Population covered	Population covered
Meas. Unit.	Thous. cub.m/year	%	**l/day/cap.**	Thous.cub.m/day	Thous. cub.m/year	%	**l/day/cap.**
Akaltyn	241,8	75,6	21,65	12,4	4464	92,78	134
Bayaut	108,9	69,8	3,99	22,2	7992	100	123
Mirzaabad	686,1	86,6	38,13	12,1	4356	94,48	129
Sardoba	11	43,6	1,32	14,4	5184	100	124
Khavast	232	61,0	13,38	13,3	4788	79,20	123,6
Dekhkanabad waterway				22,8	8208		
Yangier town				9,9	3564	100	150
Total:	1279,8			107,1	38556	94,42	128

Total capacity of rural waterlines of project districts after completion of reconstruction shall make 107.1 thous. cub.m/day (in 2008 – 5.85 thous. cub.m/day).

After the project is implemented it is assumed, that distribution waterline network of villages shall be brought to every household of project villages, domestic meter shall be installed, required pressure and acceptable water quality provided, water amenities improved and water quality shall sharply increase at initial stages. Physiological need in water, i.e. amount of water consumed with food makes 3.5-5l/day/cap., and considering domestic needs for non-sewerage population the norm shall be 150l/day/cap. for district centers and 115-123l/day/cap. – for rural villages.

It is expected that the considered project impact to environment shall be mostly positive, and negative effects shall be temporary and shall be observed during the period of construction and rehabilitation works accomplishment.

Nature of environmental impact during conduction of rehabilitation works and after their completion shall change.

Atmospheric air.
After conduction of planned works the quality of atmospheric air shall improve due to elimination of temporary influence sources – construction equipment and motor-transport.

Surface and ground waters.
Condition of surface waters shall not practically change. Rehabilitation of water-intake facilities and construction of new, shall influence to ground and underground waters, hydraulically connected with surface flow.

Table 8.2. Approved operational reserves and utilization of fresh and saline underground waters by deposits as of 01.01.2007 (thous.cub.m/day)

Underground waters deposits (UWD)	Reserves, approved by "Uzbekgidrogeologiya"		Actual summary average annual recovery from approved	Including by purpose of use (recovery / number of wells)						Index of use of SW operational reserves	Index of operational reserves use for 2025
	Total	Incl. by categories $A+B+C_1$	number of active wells by approved	Econ./ drinking purpose	Prod &Tech	Land Irrigation	VD	Pasture water.	Mine wash.		
Djizzak region											
Zaamin	157,28	82,92	15,85/22	15,85/22	-	-	-	-	-	0,1	
Syrdarya region											
Khavast	3,49	3,49	1,45/8	1,45/8	-	-	-	-	-	0,42	
Syrdarya	550,41	550,41	87,73/133	87,73/133	-	-	-	-	-	0,16	
Central Gulistan	109,09	109,09	24,01/97	24,01/97	-	-	-	-	-	0,22	
Upper-Pliocene	34,36	34,36	2,72/7	2,42/6	0,30/1	-	-	-	-	0,08	
Total:	**697,35**	**697,35**	**115,91/245**	**115,61/244**	**0,3/1**	**-**	**-**	**-**	**-**	**0,17**	**0,44**

As seen from table 8.2.,index of operational reserves use of fresh and saline waters varies from 0.08 by Upper-Pliocene UWD of Syrdarya region and 0,1 by Zaamin UWD of Djizzak region and up to 0.42 by Khavast UWD. Recovery of underground waters by project districts after the project implementation shall make 107.1 thous. cub.m/day, (before the project – 5.85 thous. cub.m/day.), increase of water consumption is planned for 101.25 thous. cub.m/day (18.3 times).

Total recovery of underground waters of Syrdarya region (as of 01.01.2008) for domestic-drinking and industrial water supply was making 209.07. Increase of underground water intakes due to project implementation shall make 101.25 thous.cub.m/day, and as a whole in the region water recovery shall increase to 310.32 thous. cub.m/day. Index of fresh and saline waters operational reserves utilization shall increase up to 0.44. Exhaust of fresh underground waters

reserve, as per data by hydrogeologists and by above estimates, is not expected, providing their use for drinking needs only. However, uneven distribution of deposits with limited amount of fresh waters within the region, including the project districts, as well as the tendency to worsen the quality of surface and underground waters in some deposits, have stipulated the creation of regional water supply system for supply of fresh and saline waters for non-drinking needs to population, not having the water resources.

As a result of rehabilitation/construction of waterline network, facilities, coverage of population connected to waterline network shall increase and shall make 100% for cities and from 79 to 94% for rural population, network efficiency shall increase, losses by transportation shall decrease, which shall result in economy and rational use of underground waters.

Ground and soils
Owing to increase of carrying capacity of rehabilitated network, flooding and contamination possibility shall decrease and the process of lands salinity along the waterline routes shall be halted.

Vegetation
Repair of waterline network, reduction of soils flooding and ground waters rise shall result in improvement of trees and bushes root system condition and accordingly the vegetation shall change to the best.
Temporarily destroyed vegetative covers shall be restored.

Fauna
During conduction of operations birds shall move to more distant areas, and then they shall return to former locations.

Social-economic aspects and population health
Social-economic conditions of people habitation shall improve.
Rehabilitation and expansion of centralized water supply, improvement of waterline infrastructure management shall bring to reduction of drinking water losses, regular supply of quality drinking water to population and, consequently, shall decrease population morbidity, shall improve sanitary-epidemiologic situation in project districts.

Thus, implementation of this project, consisting of rehabilitation and expansion of water-intake facilities, reconstruction and construction of waterline networks, improvement of management and operation of vodokanal services, shall result in improved supply of clear drinking water to population, shall decrease water losses at transportation, which shall influence favorably the environment and population health.

9. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The goal of Environmental Management Plan is implementation of measures to avoid or reduce any negative consequences to acceptable levels and by risks elimination at stages of construction and Operation and Maintenance (O&M), as well as control and monitoring of significant problems during the rehabilitation/construction and operation.

To guarantee its effectiveness and usability, EMP shall consider the requirements of: World Bank, "Uzkommunkhizmat" Agency, Syrdarya RPE "Suvokova", Contractor, and representatives of hydrogeologists, territorial nature protection committee and sanitary-epidemiological service.

Plan shall provide for solution of issues related to impacts from construction and operation of water supply structure itself, including description of possible negative consequences of impact, and measures on their effective reduction to environment. Summary EMP is prepared considering the acquired experience while performing the project "Bukhara and Samarkand Water Supply" (IBRD/IDA 2004-2009). Annex 3.

9.1. Impact mitigation measures

Temporary use of lands
It is assumed that the Project implementation shall not require for people's resettlement. To minimize the impact all Project objects shall be designed along the line facilities, such as roads.

Measures on mitigation of environmental impact negative consequences in the period of Project implementation relate to temporary and localized damage due to the construction and reconstruction works. It is assumed, that the majority part of reveled measures on mitigation of negative consequences of environmental impacts shall become the part of normal working practice of Builders during the Project implementation.
As expected, majority part of costs for mitigation of environmental impact negative consequences of the Project shall be included to tender documents.

Impact, caused by operation of project infrastructure
As a whole, operation of centralized water supply system does not imply significant risks. Project shall provide for anti-corrosive measures to mitigate negative impact to ground waters. Project shall provide for antiseismic measures, directed to reduction of seismic stress and increase of resistance to seismic load.

To prevent unfavorable consequences of environmental impacts, arising in the process of reconstruction and construction of water intakes and waterline networks, the following shall be provided:

To reduce atmospheric air contamination in the area of conduction of repair-restoration, earth works and by land transportation the measures shall be provided on:

- Dust suppression during the construction period;
- Non-admittance of excessive quantity of vehicles at the territory, in order to reduce gassing and dusting;
- Trash and other materials burning.

To protect grounds, underground and surface waters, it is planned to:

- Provide construction sites with trenches for withdrawal of surface flow and drainage waters, their surface after works completion is subject to restoration;
- Take appropriate measures to avoid leakages of fuel-lubricant materials, all ground capacities for fuel-lubricant materials shall be established on ground surface and their walls' integrity shall be under permanent control. Collection and utilization of processed oil-products is to be accomplished in accordance with environmental standards;

- Elaboration and application of waste waters withdrawal plan during the reconstruction, their transmission or bypass thru gravity flume;
- Timely clearing of construction sites from building refuses and their stocking only to places, designated by control authorities;
- Grounds after excavation and other works at the site shall be stacked in the way not hindering the water flows and not to be contamination sources;
- Creation and development of sanitary protection zones of water-intake wells.

To mitigate impact of repair-restoration works to the soil, it is supposed:

- After completion of works and removal of temporary passages, canals, trenches, facilities and building refuses to conduct lands reclamation;
- To avoid leakages at refueling and transportation of fuel-lubricant materials, to provide collection of fuel-lubricant materials and utilization of their residues;
- To organize collection of construction and other refuses (cut off trees, paper, glasses, plastic, sediments from cleaning of network, reservoirs, well wash-out etc) on water-proof (cemented) site into separate capacities (special containers) before their utilization and disposal to specialized processing and stocking companies.

After completion of rehabilitation and construction works all work sites shall be cleared and greened.

To protect flora and fauna it is provided to use the agreed roads and temporary sites only. To restore the lost vegetation the works on their restoration shall be carried out. Significant impact to terrestrial fauna in the process of the project implementation is not expected.

Preventive measures, related to health protection of the personnel, operating the Project facilities, shall provide strict observance of safety rules and regulatory documents on operation of treatment facilities and waterline infrastructure. Personnel, involved in the operation, shall be specially trained.

Methods of works on rehabilitated and constructed objects can create dangerous situations for employees and population of adjacent populated areas. Provision of work objects fencing and trench overpasses shall be established. Traffic control, emergency signals and lighting shall be equipped in accordance with local rules. When necessary, safe bypasses and crossings for pedestrian, cattle and vehicles shall be established.

9.2. Monitoring of actions

Monitoring of actions shall be held with the purpose to check, whether the project activity conforms to established national environmental standards and procedures, what impact the project shall have to environment. Monitoring shall pay attention to construction and reconstruction works, pipelines cleaning, observance of schedule and works fulfillment plan. In order to provide uninterrupted fulfillment of repair-restoration works, it is necessary to stipulate the following provisions in the contract with contractor:

- To introduce in building technology new efficient materials and constructions, technologies of works conduction.
- To provide for creation of safe and healthy conditions, facilitating the labor and eliminating emergencies and accidents.
- Commissioning of rehabilitated objects, not meeting the environmental standards, is prohibited.
- To identify the sequence of rehabilitation works on pipelines considering reduction of local inconveniences to minimum.
- To define the methods of construction with applying the work sites fencing and to provide catwalks over certain trenches. Maximally to provide relevant access to work sites and habitation areas.

- To demand for contractor organization to guarantee safe movement and installation of mechanisms.
- To demand for contractor organization to use re-distribution of road traffic in work zone. Road traffic control, emergency signals and lighting shall be established in accordance with local rules. When necessary, to establish safe bypasses and crossings for pedestrian, cattle and vehicles.

Responsibility for accomplishment of mitigation measures is assigned to Contractors. Measures on the first and second sections of EMP shall be performed by services of Vodokanal (RPE Syrdarya "Suvokova") in the period of repair-restoration works and facilities operation. PIU at "Uzkommunkhizmat" Agency and RPE of Syrdarya "Suvokova" shall coordinate and manage the Contractors' operation, to conduct monitoring and assessment of Project impact.

Accomplishment of works Chapter 9.3 of EMP, including establishment of water-protective and sanitary zones, recovery from water-protection zones of environmentally potential hazardous contaminating objects; Conduction of monitoring of underground waters conditions, water supply sources and quality of drinking water delivered to population (for that the laboratories equipment is planned); shall be assigned to local authorities and special authorized state bodies (Goskompriroda, Minselvodkhoz, Mingeologiya, Uzkommunkhizmat etc).

In order to improve the situation with preservation and rational use of drinking water and adjustment of Syrdarya region water supply system, including the project districts, the following should be done:
- to set in motion all legislative, political, administrative and social opportunities to reduce the level of contamination of surface and underground sources, as well as for limitation of using of drinking quality underground waters for industrial purposes;
- Maximally to use environmentally protected explored reserves of underground drinking waters, to continue exploration works in order to detect new drinking water deposits nearby the cities and populated areas, supplied with water from open water facilities.

Due to the fact that project does not provide for drinking water chlorination prior to its supply to the population and with the purpose of population health protection as well as taking into account hot climate of the Republic of Uzbekistan, local requirements to drinking water, it is recommended to consider 100% disinfection of drinking water by way of automatic dosing by sodium hypochlorite.

In order to prevent worsening of environmental conditions within project area from possible increase of unorganized wastewater discharge from the population, Suvokova and makhalla committees are recommended in the nearest future organizing concrete based cesspools for collection of housing and faecal discharges from population. It is proposed to consider the possibility to develop new project on arrangement of a centralized sewerage to the settlements with subsequent wastewater treatment activities.

9.3. Environmental Monitoring Plan

Monitoring for environment condition will be organized taking into account requirements of nature protection.

EMP's specific objectives are the following: (i) samples and collection of data on project area; (ii) collection and processing of additional data necessary for creation of analysis system and for transparent, effective information reporting which allows identifying impacts of the Project.

Environmental monitoring during Project implementation will provide for observation over:
- Quality of GW and superficial waters in sites of upper and lower parts of project area;
- Quality of air (dust, exhaust gases) close to work sites;

- Impacts on flora and fauna.

Key organizations implementing state monitoring in the Republic of Uzbekistan are the following:
- SE UzGIDROINGEO and its territorial subdivisions (monitoring over the level of GW, mineralization of GW);
- Uzgidromet under the Cabinet of Ministers (monitoring of the quality of the superficial waters of main rivers, atmospheric air, soils and meteorological monitoring);
- Goskompriroda (environmental monitoring over: fauna, flora, control over polluting substances monitoring).

Monitoring of the level of GW is conducted by OJSC Mirzachul Gidrogeologiya, regional department of SE UzGIDROINGEO, laboratory of which fulfills measurements from wells located on the territory of the region every month. Besides GW depth measurements, sampling from these wells also conducted for identifying GW mineralization rate. Hydro geological station (HGS) conducts regular monitoring of salinization by basic ions (chlorides, sulfates, calcium, magnesium and etc.).

Environmental monitoring is conducted by the State specialized inspection of analytical control (GosSIAK) of Goskompriroda of the Republic of Uzbekistan and its branch offices. Monitoring is carried out by: fauna, flora, air quality at pollution sources, superficial waters and sources of their pollution, soils.

For assessment of Project's potential impact on environment condition it is necessary to track the level of GW occurrence and salinization.

Monitoring plan consists of:
Monitoring of the level of occurrence and mineralization of GW is conducted within rayons boundaries regularly and monthly. Determined ingredients: PH, suspensions, electrical conduction, salt ions (sulfates, chlorides), mineralization, hardness)

Monitoring of water quality in Syrdarya River and (monthly sampling) will be continued by Uzgidromet. Information on water quality will be used for assessment of impacts of project works on river water quality.

Monitoring of sources of water supply and water quality supplied to the population will be provided by labs of vodokanal constructed and equipped in project rayons, comprising 7 sets in total, where basic tests could be held. Labs are proposed to install at the following sites:

1. Turrtom water intake facility
2. Beshbulok water intake facility
3. Mirzaobad Suvokova (Balikchi water intake facility)
4. Bayaut Suvokova
5. Khavast Suvokova
6. Sardoba Suvokova
7. Akaltyn Suvokova

Periodical analyses will be conducted at water intake facility prior to distribution to networks. Quality control over drinking water quality in distribution network is conducted according to parameters of "reduced control", which will be included to identification of basic bacteriological parameters (total content of germ, Coli index), orhanoleptic parameters (smell, odor, color, transparency). Physical and chemical parameters are detected more easily (pH and others).

Central lab in Gulistan will be equipped for conducting analyses, which must be conducted with smaller frequency (arsenic, nitrates, nitrites, plumbum, fluorine, dry residual, ferrum, rigidity, manganese, copper, polyphosphates, sulphates, chlorides, SSAM, biogenic elements

(ammonium nitrogen, nitrate, nitrite, general phosphates), petrochemicals approximately once in a month). Special analysis (virological and parasitologic, toxicologic, radioactive analysis- approximately once in two months), conducting of which require use of complex equipment, special preparation and special measures for protection of personnel could be contracted to labs of research and test centres as well as scientific organizations accredited according to their competence as it is indicated in the State Standard.

Final decision on necessary analyses and frequency shall be agreed with State sanitary and epidemiological inspection.

Table 9.3.1. Laboratory equipment (approximate composition)

№	Title	Number of units within a set
1	AVU-6s equipment	2
2	Redistiller (glass)	1
3	Bathometer GR-18	3
4	Automatic tirating unit BAT-15	1
5	Lab scales (equal-arm balance) VLR-200 g, 2nd class	2
6	Torsion VT-500	1
7	Aqua distiller DE-4	2
8	Photoelectric Calorimeter KFK-2 concentration-type	2
9	Magnetic stirrer MM-5	2
10	Amperemeter E-526 preciseness class - 0,5 for 2,5 and 5A	1
11	Vacuum pump 3NVR-1D	1
12	Universal polarograph PU-1	1
13	Universal ion meter	2
14	Spectrophotometer	1
15	Stopwatch	2
16	Titrating apparatus	1
17	Thermostat	1
18	Flame photometric analyzer of liquid	1
19	Electric furnace	1
20	Lab centrifuge	1
21	Freezer (cabinet)	1
22	Exhaust hood (chemical)	2
23	Reagent storage cabinet	2

9.4. Capacity Building and Training

During implementation of Sewerage Project in Syrdarya region, it is provided to improve capacity of VK in matters of O&M of water supply systems.

Measures on strengthening institutional potential are as follows:

- Review of existing tariffs and financial policy sector in order to give an opportunity to the VK to achieve financial independence, i.e. rely on combination of incomes from operational activity and allocations from the state budget sufficient to cover all O&M costs as well as costs for debt pay-off on proposed Project on water supply system rehabilitation;
- Raising the capacity of VK on conducting coordinated tariff policy in effective and sustainable manner. Essentially, such an increase of the capacity will include: full inventory of the property within bounds of service of VK for revealing incidents of unregistered connections and evaluation of demand for installation of counting devices (meters); counters installation itself; permanent improvement of VK's capacity on

introduction of bills and collection of payments for water supply services; personnel trainings in each of the sphere of activity;

- Creation of database on technical data of users, physical assets operational data including breakdown and emergency situations, supply&demand parameters;
- Acquiring of appropriate radio communication system for operational control;
- Purchase of computer equipment and software, including installation, testing as well as follow-up training of personnel.
- Additional training to various aspects of operation of water supply systems, including study.

Implementation of the above-mentioned measures will allow improvement of O&M of water supply infrastructure, increase reliability of constant water provision to population, industrial enterprises and organizations. Supply of water of better drinking quality free of pathogenic agent, drinking and corresponding to requirements of O'z DSt 950:2000 “Drinking water” standard. Hygienic requirements and control over quality will further positively assist improvement of ground waters quality. In general, project area will observe improvement of environmental condition as a result of SVK capacity improvement, prevention of operation problems as well as increase of life cycle of central drinking water supply system.

10. COSTS FOR MONITORING AND ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Environmental and social importance of project area assures specific protection of environment and mitigation measures which are included into the total project cost budget. This budget will cover preventive activity or necessary mitigation measures aimed at overcoming of impacts related to construction as well as development of capacity on environmental management/monitoring in PIU. Further these types of activity should be determined at development of feasibility study and detail designing of engineering works.

Monitoring of the sources of water supply and quality of water supplied to the population will be provided via built and equipped laboratories of vodokanal in project rayons, totally comprising 7 sets of labs.

Quality control of potable water in distribution network is carried out according to indicators of "reduced control," of the State Standard of Uzbekistan O'z DSt 950-2000 which include determination of the basic bacteriological indicators (the general microbe number, coli - index), organoleptic parameters (smell, flavor, color, turbidity), most simply determined physical and chemical indicators (pH and others).

Estimated expenses for activities envisaging environmental monitoring will include the following:

- Building facilities for 7 laboratory complexes with estimated cost comprising 75,000 USD each (totally – 525,000 USD),
- Purchasing of equipment and chemical regents for each laboratory amounts 22,500 USD (totally comprising 157,500 USD).

All expenses on environmental monitoring will be included to budjetary costs of the Project, i.e. 682,500 USD.

After completing all project activities improved centralized water supply of 5 project rayons of Syrdarya region and further basic measures for the support of project outputs will be O&M of water supply infrastructure by vodokanal. Thus by that period all project funds will be utilized and O&M financing will be covered by regional authorities and Uzkommunkhizmat agency. Responsibility for monitoring of follow-up activities will be burden of Syrdarya Regional RPE «Suvokova». Estimated cost for monitoring over water quality at sources of water supply and water distribution centers comprises 25,000 USD per year.

11. CONCLUSION

Draft Report on EIA related to rehabilitation and construction of water intake facilities and water pipeline systems in Akaltyn, Bayaut, Khavast-Mekhnatobad Zone, Mirzaabad and Sardoba rayons of Syrdarya region was prepared on the basis of analysis of current condition of environment, water pipeline network and water intake facilities, design solutions and expected impact consequences due to implementation of conducted activities.

The complex assessment conducted according to nature components showed number of problems related to condition of water supply facilities on the project area:

- Infiltration of drinking water from pipelines into the ground/GW and GW infiltration into water supply pipelines polluting and worsening drinking water quality in water supply conduits.
- Underflooding caused by leakage from water supply network and pump stations leading to soil moisturizing.
- Increase of GW level as a result of leakage from water supply systems in emergency situations.

Analysis of current condition of water intake facilities and pipeline system showed their high depreciation. Buildings and facilities, electromechanical equipment at water intakes, water pumps are in a very poor condition and have very low efficiency. Electric power supply of pumps is inconstant and the existing electricity is not enough for proper drinking water supply to population.

At present the indicators of population coverage by systems of centralized water supply vary from 40 to 90%. Distributional network of water supply to population is 80% depreciated, leakages are 38%.

Water intake facilities and pipes collecting water has no meters installed at. Water in urban type settlements (uts.) and kishlaks in all rayons is supplied according to schedule. Drinking water supplied to population is 100% non-disinfected.

Upon provision with centralized water supply of rural area of project rayons of Syrdarya region it is supposed that there will be a problem of waste waters utilization and necessity to construct systems of water disposal, otherwise the processes of flooding, salinity and waterlogging are inevitable. In this case waste waters as a result of high specific water consumption rate will burst onto relief of area, drainage system and irrigational network, which will worsen environment sanitary-hygienic situation of the region.

To cover centralized water supply systems of population in cities - 100%, rural settlements - 90% and refine specific water consumption per capita for urban population - 150l/day, rural - 115-124l/day, it is planned by the project to implement repair and renewal operations at the water pump station, construction of new water pipeline networks,drilling and rehabilitation of drinking water wells, rehabilitation of CWR, rehabilitation and construction of laboratory buildings etc.

Implementation of these activities will lead to drinking water quality improvement, reduction of leakages, eliminate drinking water infiltration out of pipelines into ground/ground waters and ground waters infiltration into pipeline networks, increase the quantity connections to water pipeline network of population, which will reduce negative impact consequences on soils, grounds and ground waters.

Implementation of activities which are stipulated by the present Project, enables to provide uninterrupted, reliable exploitation of water supply system, increase coverage of population with

centralized water supply networks in 5 project rayons and ensure the prevention of environment from underflooding and pollution.

To increase the capacity of Syrdarya vodokanal the projects plans to include procurement of equipment for washing and treatment of water pipes, excavator for quick repair, upgraded workshop and equipment for management, which will improve the further maintenance of rehabilitated water pipe system.

Assessment of emergency situations showed the violation of integrity of water pipe line networks and facilities, which cross canal route, due to pipes corrosion, and also disasters will lead to contamination of grounds, ground waters, soil, underflooding of territories at the sites of pipeline breaking. To reduce such factors as emergency situations it is necessary to lay down pipes of appropriate anticorrosion material.

To reduce possible negative environmental impact the plan of mitigation measures to execute works, plans of environment monitoring and management over environment condition are provided within the project EIA.

Thus, executed complex assessment of identified consequences of environmental impact from project implementation including rehabilitation of facilities, reconstruction and construction of pipe line networks and facilities, improvement of management and exploitation of vodokanal services will not lead to groundwater exhaustion, contamination of water and land resources and will improve population health.

Annex 1 Project Rayon Maps (5 rayons)

Figure 1

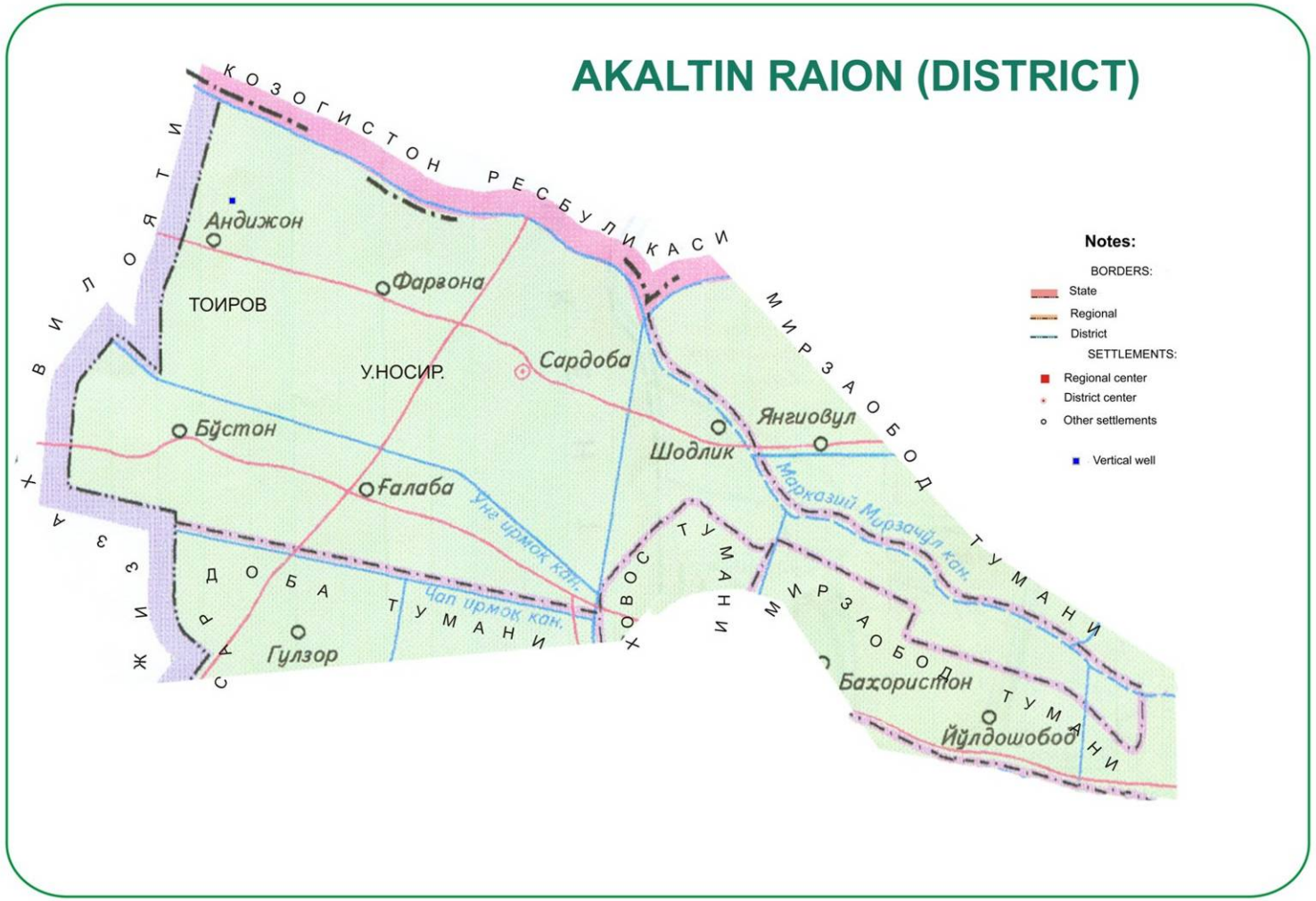
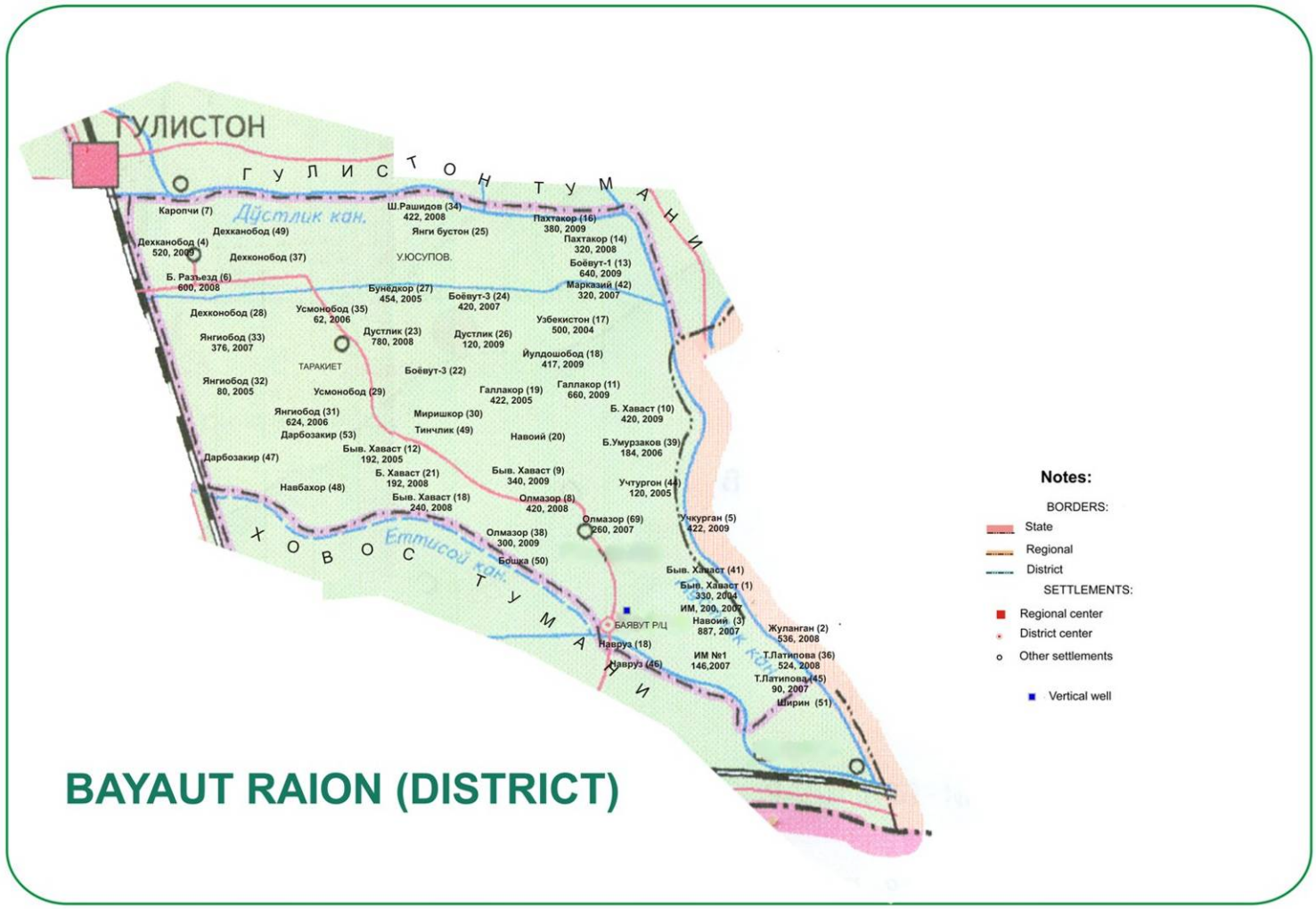


Figure 2


ГУЛИСТОН
Г У Л И С Т О Н Т У М А Н И
Х О В О С Т У М А Н И
Дўстлик кан.
Ёттисой кан.
Каропчи (7)
Дехканобод (49)
Дехканобод (4) 520, 2009
Дехконобод (37)
Б. Разъезд (6) 600, 2008
Дехконобод (28)
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Янгиобод (31) 624, 2006
Дарбозакир (53)
Дарбозакир (47)
Навбахор (48)
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Бунёдкор (27) 454, 2005
Боёвут-3 (24) 420, 2007
Усмонобод (35) 62, 2006
Дустлик (23) 780, 2008
Дустлик (26) 120, 2009
Боёвут-3 (22)
Усмонобод (29)
Миришкор (30)
Тинчлик (49)
Бывх. Хаваст (12) 192, 2005
Б. Хаваст (21) 192, 2008
Бывх. Хаваст (18) 240, 2008
Пахтакор (16) 380, 2009
Пахтакор (14) 320, 2008
Боёвут-1 (13) 640, 2009
Марказий (42) 320, 2007
Узбекистон (17) 500, 2004
Йулдошобод (18) 417, 2009
Галлакор (19) 422, 2005
Галлакор (11) 660, 2009
Навоий (20)
Бывх. Хаваст (9) 340, 2009
Олмазор (8) 420, 2008
Олмазор (38) 300, 2009
Бошка (50)
Олмазор (69) 260, 2007
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Учтургон (44) 120, 2005
Учкурган (5) 422, 2009
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ИМ, 200, 2007
Навоий (3) 887, 2007
ИМ №1 146,2007
БАЯВУТ Р/Ц
Навруз (18)
Навруз (46)
Жуланган (2) 536, 2008
Т.Латипова (36) 524, 2008
Т.Латипова (45) 90, 2007
Ширин (51)
BAYAUT RAION (DISTRICT)
Notes:
BORDERS:
State
Regional
District
SETTLEMENTS:
Regional center
District center
Other settlements
Vertical well

Figure 3

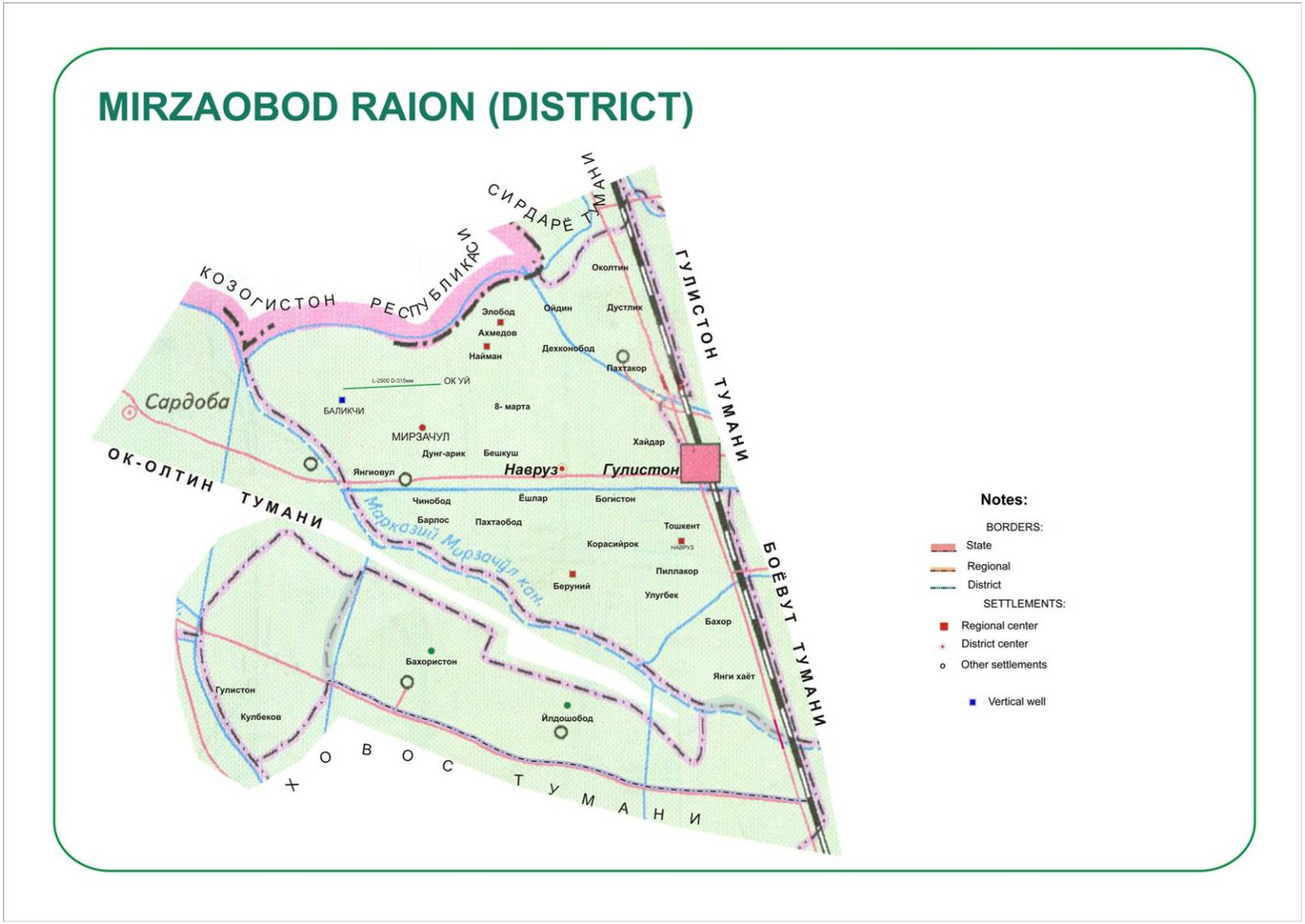

MIRZAOBOD RAION (DISTRICT)
СИРДАРЁ ТУМАНИ
ГУЛИСТОН ТУМАНИ
БОЁВУТ ТУМАНИ
ОК-ОЛТИН ТУМАНИ
ХОВОС ТУМАНИ
КОЗОГИСТОН РЕСПУБЛИКАСИ
Марказий Мирзачўл канали
Околтин
Элобод
Ойдин
Дустлик
Ахмедов
Найман
Дехконобод
Пахтакор
L-2500 D-315мм
ОК УЙ
Сардоба
БАЛИКЧИ
8- марта
МИРЗАЧУЛ
Дунг-арик
Бешкуш
Хайдар
Янгиовул
Навруз
Гулистон
Чинобод
Ёшлар
Богистон
Барлос
Пахтаобод
Тошкент
Корасийрок
НАВРУЗ
Пиллакор
Беруний
Улугбек
Бахор
Бахористон
Янги хаёт
Гулистон
Кулбеков
Йлдошобод
Notes:
BORDERS:
State
Regional
District
SETTLEMENTS:
Regional center
District center
Other settlements
Vertical well

Figure 4

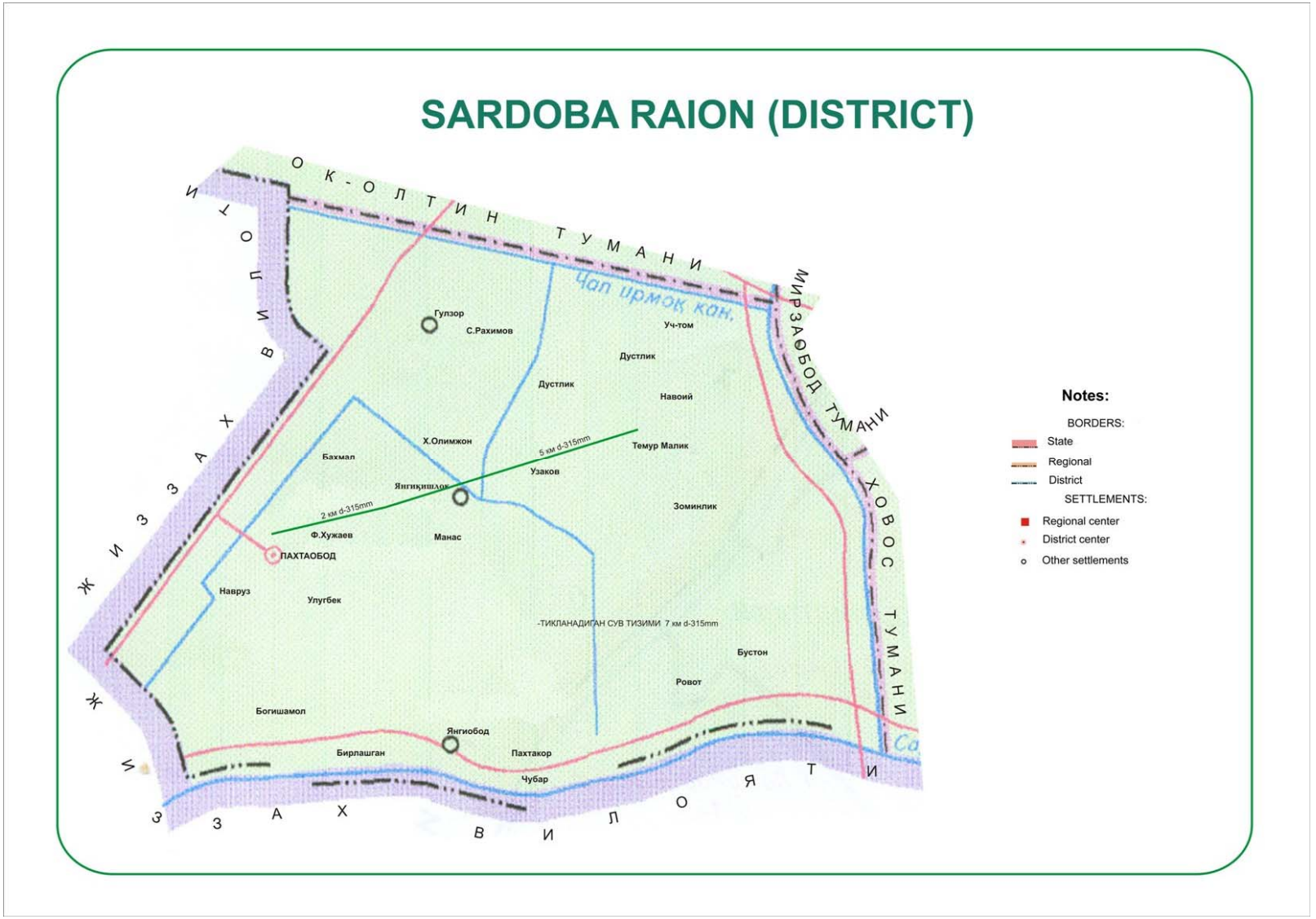
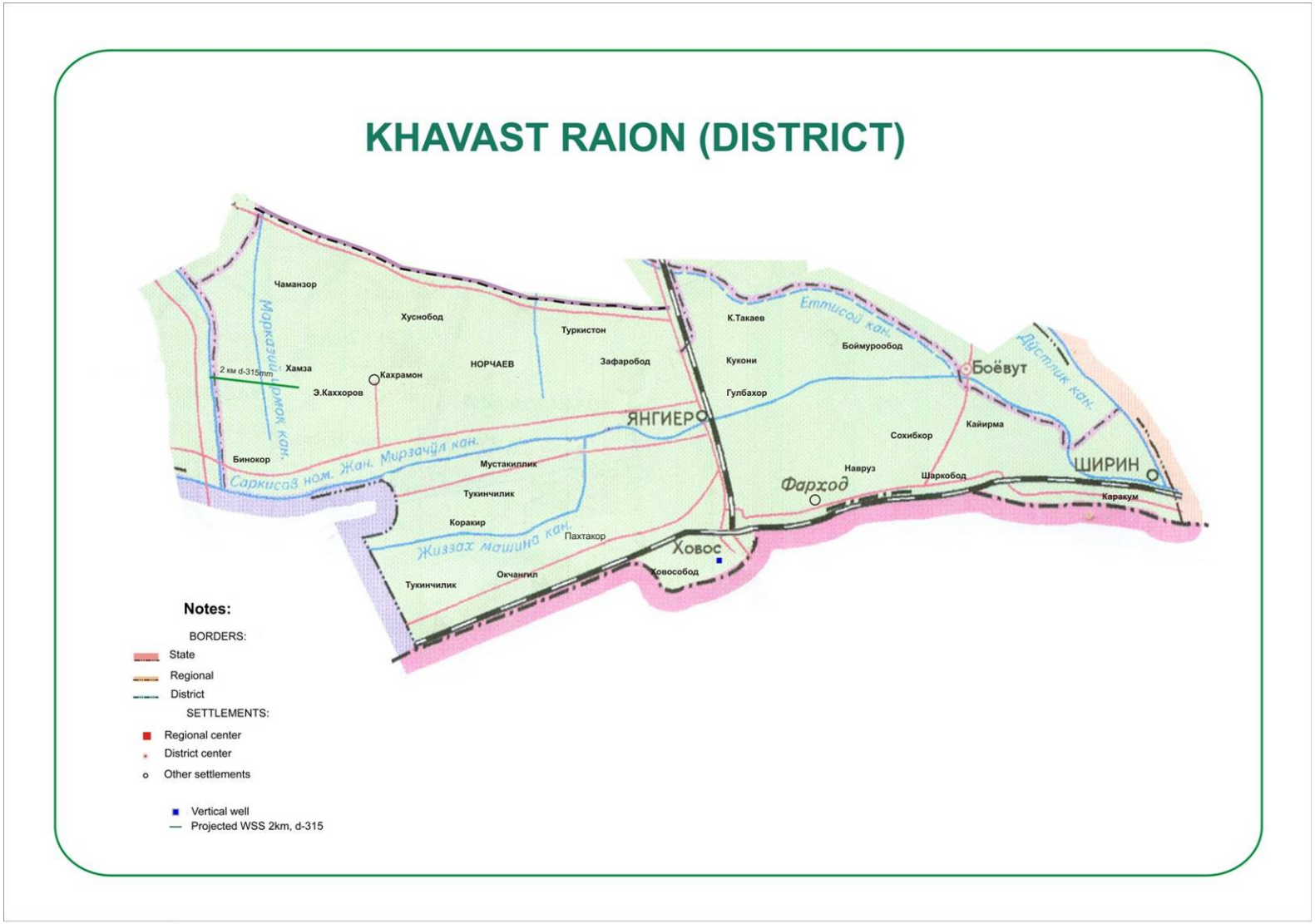

SARDOBA RAION (DISTRICT)
ОК-ОЛТИН ТУМАНИ
ИТОЛГИ ВИЛОЯТИ
ЖИЗЗАХ ВИЛОЯТИ
МИРЗАОБОД ТУМАНИ
ХОВОС ТУМАНИ
Чап ирмоқ кан.
Гулзор
С.Рахимов
Уч-том
Дустлик
Дустлик
Навоий
Х.Олимжон
Бахмал
5 км d-315mm
Темур Малик
Узаков
Янгиқишлоқ
2 км d-315mm
Зоминлик
Ф.Хужаев
Манас
ПАХТАОБОД
Навруз
Улугбек
-ТИКЛАНАДИГАН СУВ ТИЗИМИ 7 км d-315mm
Бустон
Ровот
Богишамол
Янгиобод
Бирлашган
Пахтакор
Чубар
Notes:
BORDERS:
State
Regional
District
SETTLEMENTS:
Regional center
District center
Other settlements

Figure 5


KHAVAST RAION (DISTRICT)
Чаманзор
Хуснобод
Туркистон
К.Такаев
Боймурообод
Кукони
Зафаробод
НОРЧАЕВ
Хамза
Кахрамон
Э.Каххоров
Гулбахор
ЯНГИЕР
Боёвут
Сохибкор
Кайирма
Бинокор
Мустакиллик
Навруз
Шаркобод
ШИРИН
Фарход
Тукинчилик
Каракум
Коракир
Пахтакор
Ховос
Ховособод
Окчангил
Тукинчилик
Саркисаз ном. Жан. Мирзачўл кан.
Жиззах машина кан.
Етмисой кан.
Дустлик кан.
2 км d-315mm
Notes:
BORDERS:
State
Regional
District
SETTLEMENTS:
Regional center
District center
Other settlements
Vertical well
Projected WSS 2km, d-315

Annex 2. Table 1. Specific water consumption per capita in settlements

№№	Water consumer	Specific average daily water consumption per capita during a year, l/day till 2010
1	Cities with centralized sewerage and total population more than 100 thous.capita (60-70% coverage with sewerage)	240
2	The same as above with population up to 100 thous.capita (20-25% coverage with sewerage)	160
3	Cities, uts and rayon centers with population of up to 50 thous.capita having no centralized sewer system (5-10% coverage with sewerage)	150
4	Rural settlements (5-7% coverage with sewerage) including livestock watering	170
5	Rural settlements (no coverage with sewerage) including livestock watering	115

According to normative documents (Annex №1 to Instruction of Gosarhitectstroy of the Republic of Uzbekistan №18 as of 16 April 2002 Amendments 31 to KMK 2.04.02-97 «Water supply. Outer networks and facilities») average annual specific water consumption till 2010 will be established depending on the level of equipping of living structures and comprises 115-240 l/day per capita.

Annex 3. ENVIRONMENTAL MANAGEMENT PLAN

Phase	Problem	Mitigation measures	Responsible agencies	Additional Environmental Costs
1. Repair-and-renewal operations	**Environment**			
Repair- and-renewal operations of water pumping stations, water, water intake facilities, equipment, distribution centers, water pipelines, CWR, water towers, construction of new water pipelines, WDC, laboratory buildings, well-drilling for drinking water supply, etc.	**1. Water resources**			
	1.1. Groundwater lowering	Liquidation of outflow of water at water-supply network and water intake construction	contractor	Main costs stipulated by the budget of the project
	1.2. Changing of regime of water supply to population	Development of water supply regime to population or its provision with imported water for the period of works implementation	Group of FS, Contractor	Costs on identified actions and requirements will be included in working documentation of contractor
	1.3.Water contamination (surface and ground waters) From cleaning of water intake facilities, pipes and distribution centers.	• Development of constituent components of project of production of works; • introduction of new efficient materials and constructions, technologies; • observation of repair-and-renewal norms and rules; • temporary storage of wastes, only in specially assigned places with their consequent utilization	Group of FS, Contractor	Costs on identified actions and requirements will be included in working documentation of contractor
	1.4.Water contamination from construction sites	• Provision of discharge of surface and drainage effluents from construction sites; • timely treatment of construction wastes; • execution of rehabilitation works at affected places	Contractor, PIU	Costs on identified actions and requirements will be included in working documentation of contractor

Phase	Problem	Mitigation measures	Responsible agencies	Additional Environmental Costs
	2. Land resources			
	2.1. Ground contamination with construction wastes and residuals	• Organization of timely collection of wastes/residuals produced due to repair-and-renewal works	Contractor, PIU	Costs on identified actions and requirements will be included in working documentation of contractor
	2.2. Ground contamination from fuel and oil leakage	• Containers for fuels and lubricants should be filled in accordance with established norms; • Not to allow oil products discharge to area relief; • Observe rules of fueling and transportation	Contractor, working mechanisms	
	2.3. Underflooding of territories adjacent to water supply networks and constructions in case of breakdowns and water leakage	Urgent execution of works on rehabilitation of water pipe lines, constructions and lands	Contractor, PIU	Costs on identified actions and requirements will be included in working documentation of contractor
	3. Atmosphere air			
	3.1. Dustiness of atmosphere due to excavation works	Watering of roads, repair-and-renewal and construction sites and appropriate cover for transport under wastes transportation	Contractor, drivers of appropriate vehicles PIU	
	3.2.Contamination with exhaust gases due to working aggregates and vehicle	Control of physical condition of cars. Observation of fueling rules	Contractor, drivers of appropriate vehicles	
	3.3.Noise, vibration due to working vehicles	Observation of demands on exploitation	Contractor	

Phase	Problem	Mitigation measures	Responsible agencies	Additional Environmental Costs
	4. Flora			
	Damage of trees and vegetable cover	All the damaged vegetation is subject to rehabilitation. Decorative trees damaged under execution of repair-and-renewal works will be substituted.	Contractor	Costs on identified actions and requirements will be included in working documentation of contractor
	5.Social economic aspects			
	5.1. Safe and healthy conditions of labor, accidents and emergency situations	Provision with rules on safety measures, labor protection by means of correct selection and technically justified parameters of working places and their organization.	Contractor	
	5.2.Stoppage of water supply and water quality loss	Taking all the necessary measures under designing of renewal works, development of water supply regime for the period of works execution and obligatory announcement of appropriate services, organizations and population.	Contractors	
	6. Physical and cultural heritage			
	Archeological chance finds representing cultural value	Cessation of works, informing interested organizations, provide their extraction according to established rules	Contractor	SVK, PIU, Regional inspection on protection of objects of cultural heritage
2. Exploitation and maintenance	***Environment***			

Phase	Problem	Mitigation measures	Responsible agencies	Additional Environmental Costs
Leakage of drinking water during transportation.	underflooding and water and ground contamination	Timely revealing of defects in the network, liquidation of leakage in short terms, control of drinking water quality	Local staff	
Exploitation of water supply networks, WDC, CWR	Contamination of water resources, grounds, deterioration of environment condition and population health	• Timely develop environment and other criteria regulating maximum acceptable loads to environment; • Observe protection of water objects (water intake sources) from contamination, pollution • Observe regime of water supply to population, established norms of their quality and disinfection; • Provide observation for regime of ground waters, their quality and record keeping at the site of water intake, development of measures on protection of ground waters; • Implement technological, forest improvement, hydro technological, sanitary –technical measures on agreement with bodies of state control; • Observe sanitary zone of protection at the water intake facility; • Introduce waste-free and low-waste technologies, reduce formation of wastes from production and domestic waste, make their disinfection, recycling,	Local staff	Financing of local authorities and local staff

Phase	Problem	Mitigation measures	Responsible agencies	Additional Environmental Costs
		observe rules of their sorting, storage, burial and utilization		
	Social economic aspects			
Exploitation of water intake facilities and water pipe networks	Violation of safety measures and hygiene of labor	Develop complex program on improvement of the condition of safety measures and hygiene of labor for maintenance staff	Local staff	Financing of local authorities and local staff
Disinfection of drinking water	health hazard of working staff	Exploitation of disinfection equipment with observation of safety measures requirements	Local staff	
3. Additional measures	***Environment***			
Additional equipment of hydro chemical monitoring laboratory of SVK	Absence of monitoring over the quality of drinking water	Equipment of laboratories with devices and methodics for identification of main ingredients of waters contamination	Uzkommunkhizmat, PIU, SVK	Financing from project budget for construction of facilities for 7 labs (estimated cost – 75,000 x 7= 525,000 USD)
To involve all the legislative, political, administrative and social possibilities for rapid reducing the level of contamination of surface and ground sources, and also for restriction of usage of ground waters of drinking quality for technical purposes; -Use maximum ecologically protected and explored reserves of ground drinking	Exhaustion and contamination of ground waters	Usage of mass media means and seminars for raising awareness on rational usage and protection of water sources among population of the region	Uzkommunkhizmat, PIU, SVK, OJSC «Mirzachul Hydrogeology»	Financing from project budget and further local authorities and SVK

Phase	Problem	Mitigation measures	Responsible agencies	Additional Environmental Costs
waters nearby cities and settlements, using the water from open water objects				
Drinking water disinfection	Threats to health condition of working personnel and population	Provision of disinfection equipment at sites of sources of water supply and its operation under safety requirements observance	Regional khokimiyat, SVK and local personnel of rayon vodokanals	Provide necessary financing on purchase and installation of disinfection equipment and include to project budget. Estimated demand in chlorine for 2012 - ~37 tons/year, for 2021- ~ 280 tons/year, estimated cost will comprise, accordingly, ~ 16 thous. USD and 107 thous. USD
Possible increase of unorganized wastewater discharge from population	Woresening of environmental situation within project area	To recommend in the nearest future organizing concrete based cesspools for collection of housing and faecal discharges from population. To consider the possibility to develop new project on arrangement of a centralized sewerage to the settlements with subsequent wastewater treatment activities.	Regional khokimiyat, SVK, local staff of rayon vodokanals, makhalla committees	To provide financing for new project on arrangement of a centralized sewerage to the settlements with subsequent wastewater treatment.

ENVIRONMENTAL MONITORING PLAN

Phase	Problem	Mitigation measures	Monitoring of activities and environment	
			Monitoring activities	Responsibility for monitoring of environment
1. Repair-and-renewal operations	**Environment**			
Repair- and-renewal operations of water pumping stations, water, water intake facilities, equipment, distribution centers, water pipelines, CWR, water towers, construction of new water pipelines, WDC, laboratory buildings, well-drilling for drinking water supply, etc.	**1. Water resources**			
	1.1. Groundwater lowering	• Liquidation of outflow of water at water-supply network and water intake construction • Cementation and conservation of inoperable wells • Prohibiting use of drinking water for the purposes of irrigation	Current technical control and supervision over Repair-and-renewal operations	PIU, local staff, local agency for supervision of repair- and-renewal operations, local bodies of nature protection, geology
	1.2. Changing of regime of water supply to population	Development of water supply regime to population or its provision with imported water for the period of works implementation	Current technical control and supervision over repair- and-renewal operations	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of nature protection, geology, SES
	1.3.Water contamination (surface and ground waters) From cleaning of water intake facilities, pipes and distribution centers.	• Development of constituent components of project of production of works; • introduction of new efficient materials and constructions, technologies; • observation of repair-and-renewal norms and rules; • temporary storage of wastes, only in specially assigned places with their consequent utilization	Current technical control and supervision over repair- and-renewal operations and treatment of wastes	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of nature protection, geology, SES
	1.4.Water contamination from	• Provision of discharge of surface and drainage effluents from	Periodically during repair-and-renewal works	PIU, local staff, local agency for supervision

Phase	Problem	Mitigation measures	Monitoring of activities and environment	
			Monitoring activities	Responsibility for monitoring of environment
	construction sites	construction sites; • timely treatment of construction wastes; • execution of rehabilitation works at affected places		over repair- and-renewal operations, local bodies of nature protection, geology, SES
	2. Land (soil) resources			
	2.1. Ground contamination with construction wastes and residuals	• Organization of timely collection of wastes/residuals produced due to repair-and-renewal works	Periodically during repair-and-renewal works	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of SES, bodies of nature protection
	2.2. Ground contamination from fuel and oil leakage	• Containers for fuels and lubricants should be filled in accordance with established norms; • Not to allow oil products discharge to area relief; • Observe rules of fueling and transportation	Current control during repair-and-renewal works	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of SES, bodies of nature protection
	2.3. Underflooding of territories adjacent to water supply networks and constructions in case of breakdowns and water leakage	Urgent execution of works on rehabilitation of water pipe lines, constructions and recultivation of lands	Periodically during repair-and-renewal works	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of SES, bodies of nature protection
	3. Atmospheric air			
	3.1. Dustiness of atmosphere due to	Watering of roads, repair-and-renewal and construction sites and	Periodically during repair-and-renewal works	PIU, local staff, local agency for supervision

Phase	Problem	Mitigation measures	Monitoring of activities and environment	
			Monitoring activities	Responsibility for monitoring of environment
	excavation works	appropriate cover for transport under wastes transportation		over repair- and-renewal operations, local bodies of SES, bodies of nature protection
	3.2.Contamination with exhaust gases due to working aggregates and vehicle	Control of physical condition of cars. Observation of fueling rules	Periodically during repair-and-renewal works	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of SES, bodies of nature protection
	3.3.Noise, vibration due to working vehicles	Observation of demands on exploitation	Periodically during repair-and-renewal works	PIU, local staff, local agency for supervision over repair- and-renewal operations, local bodies of SES
	4. Flora			
	Damage of trees and vegetable cover	All the damaged vegetation is subject to rehabilitation. Decorative trees damaged under execution of repair-and-renewal works will be substituted.	After accomplishment of works	PIU, local staff, local agency for supervision over repair- and-renewal operations, bodies of nature protection
	5.Social economic aspects			
	5.1. Safe and healthy conditions of labor, accidents and emergency situations	Provision with rules on safety measures, labor protection by means of correct selection and technically justified parameters of working places and their organization.	Constantly	PIU, local staff, local agency for supervision over repair- and-renewal operations

Phase	Problem	Mitigation measures	Monitoring of activities and environment	
			Monitoring activities	Responsibility for monitoring of environment
	5.2.Stoppage of water supply and water quality loss	Taking all the necessary measures under designing of renewal works, development of water supply regime for the period of works execution and obligatory announcement of appropriate services, organizations and population.	Constantly during repair-and-renewal works	PIU, local staff, local agency for supervision over repair- and-renewal operations, bodies of nature protection
2. Exploitation and maintenance	**Environment**			
Leakage of drinking water during transportation.	underflooding and water and ground contamination	Timely revealing of defects in the network, liquidation of leakage in short terms, control of drinking water quality	Periodical control	Local staff, bodies of nature protection, SES
Exploitation of water supply networks, WDC, CWR	Contamination of water resources, grounds, deterioration of environment condition and population health	• Timely develop environment and other criteria regulating maximum acceptable loads to environment; • Observe protection of water objects (water intake sources) from contamination, pollution • Observe regime of water supply to population, established norms of their quality and disinfection; • Provide observation for regime of ground waters, their quality and record keeping at the site of water intake, development of measures on protection of ground waters; • Implement technological, forest improvement, hydro technological, sanitary –technical measures on	Daily monitoring for quality of drinking waters, their disinfection Periodical control by organs SES, for observation of State Standard	Operator, local staff of SVK, SES, organs of nature protection

Phase	Problem	Mitigation measures	Monitoring of activities and environment	
			Monitoring activities	Responsibility for monitoring of environment
		agreement with bodies of state control; • Observe sanitary zone of protection at the water intake facility; • Introduce waste-free and low-waste technologies, reduce formation of wastes from production and domestic waste, make their disinfection, recycling, observe rules of their sorting, storage, burial and utilization		
	Social economic aspects			
Exploitation of water intake facilities and water pipe networks	Violation of safety measures and hygiene of labor	Develop complex program on improvement of the condition of safety measures and hygiene of labor for maintenance staff	Periodical control	Local staff, SES
Disinfection of drinking water	Threats to the health of working staff	Exploitation of disinfection equipment with observation of safety measures requirements	Every decade control	Local staff, SES
3. Additional measures	**Environment**			
Additional equipment of hydro chemical monitoring laboratory of SVK	Absence of monitoring over the quality of drinking water	Equipment of laboratories with devices and methodics for identification of main ingredients of waters contamination (Cost of equipment and chemical reagents for 7 labs comprises 22,500 USD each, total cost 157,500 USD)	Arsenic, nitrates, nitrites, lead, fluorine, dry residue, iron, hardness, manganese, copper, polyphosphates, sulfates, chlorides, Syntet. Superficial active substances, oil products approximately 1 time per	PIU,SVK, bodies of nature protection, SES

Phase	Problem	Mitigation measures	Monitoring of activities and environment	
			Monitoring activities	Responsibility for monitoring of environment
			month. Special analysis, (virusologic and parasitologic, toxicological, radioactive analyses approximately 1 time per 2 months	
To involve all the legislative, political, administrative and social possibilities for rapid reducing the level of contamination of surface and ground sources, and also for restriction of usage of ground waters of drinking quality for technical purposes; -Use maximum ecologically protected and explored reserves of ground drinking waters nearby cities and settlements, using the water from open water objects	Exhaustion and contamination of ground waters	Usage of mass media means and seminars for raising awareness on rational usage and protection of water sources among population of the region	Periodically, once or twice a year	PIU,SVK OJSC Mirzachul Gidrogeologiya
Drinking water disinfection	Threats to health condition of working personnel and population	Provision of disinfection equipment at sites of sources of water supply and its operation under safety requirements observance	Regional khokimiyat, SVK and local personnel of rayon vodokanals	Final decision about the necessary analyses and frequency has to be agreed with the State Sanitary Epidemiological Inspection.

Annex 4. MINUTES OF PUBLIC DISCUSSIONS

CONSOLIDATED MINUTES OF PUBLIC DISCUSSIONS

Conducted in Akaltyn, Bayaut, Mirzaabad, Sardoba and Khavast Rayons of Syrdarya Region

Objectives of public discussions:

- To provide population of the city, wide publicity including NGOs, relevant stakeholders with information about proposed SWSP Project activities on construction and rehabilitation works.
- To inform stakeholders and other participants on REIA and to discuss it
- To discuss the potential adverse environmental impacts arising from proposed Project's interventions (including issues related to resettlement and social aspect).

Copies of full REIA with EMP were previously handed over to the Customer – Syrdarya RPE "Suvokova" for inter-departmental coordination and appropriate comments. Copies of summary information on EIA prepared in Uzbek/Russian languages were distributed to all participants at the beginning of the meeting.

Key Issues Discussed:

A) Presentation of technological part of the Project (M.R. Riskiev)

Seminars participants were briefed on structure of regional Vodokanal management. In the present vodokanal accomplishes services to population, amounting of 700 thousand people in the region. Experts on FS elaboration project have accomplished field trips and visited number of water supply objects by 5 districts and together with the regional vodokanal representative.

It was identified, that the system became deteriorated due to corrosion, electric corrosion, weather influence, erosion, salts in all 5 project districts. Participants are informed about allocation of credit in the amount of 14.2 million USD per each district. In the present the environmental and social assessment has been performed and the work is being conducted on FS elaboration. In the course of consultant's team work all wells were studied, inventory conducted, meetings with chairmen of makhallas were conducted.

General information has been provided on each district water supply scheme considering the specific location of main water sources.

Participants were informed of main plans and schemes of construction of new water supply objects, accordingly, by each of the districts and as a whole by project area.

B) Presentation of Environmental Impact Assessment (Kh. Abdullaev, N. Limankina, L.Frank)

Lecture has been delivered by environmental specialists Kh. Abdullaev and L. Frank, which presented main findings of conducted environmental impact assessment.

Main provisions, expressed by above expert with regard of Report on EIA on proposed project, were:

1. Initial information, current state of environment on project areas;
2. Identified possible negative impacts in the course of construction works;
3. Mitigation measures;
4. Environmental Management and Monitoring Plan.

Environmentalists have noted that the project "Water supply of Syrdarya region" shall impact the environment mostly in positive way. Consultants have also highlighted the concept of Environmental management Plan (EMP) and presented key peculiarities of EMP within the framework of the Project "Syrdarya region water supply".

I. Minutes of Public Discussion in Akaltyn Rayon

Venue: Akaltyn Rayon

Date: 24 November 2009

Discussion of Draft Report on EIA (1):

- In respect of assessment of project environmental component the project participants were interested in the issue, whether the process of new pipelines construction shall have a negative impact on district environment and population health. Ecologists have informed on short-term impact in the course of construction, and particularly, changes to fauna, emissions of diesel or petrol etc.
- Another issue – provision of water quality and its treatment. To that the participants were informed that within the framework the appropriate facilities on treatment, chlorination and disinfection of drinking water shall be constructed. Also the special laboratories shall be equipped with relevant equipment.

Discussion of Technological Part (2):

Participants of discussion were also interested in issues, such as:

- Technological aspect and **use of materials for main pipelines lying,** and namely, instead of metal pipes it is planned to lay plastic pipes considering the operation experience in regional centers and in Gulistan itself.
- Installation of bulk and individual **meters (water meters), schemes of payments for installations.**
- **Problem of regularity of power supply**, due to limited supply of power (about 4-5 hours a day). Participants were informed of plans on provision of emergency power supply system to key system objects.
- Some participants asked questions on how the **water supply to certain makhallas** ("Uchtom") shall be provided, particularly, SES representatives expressed their willingness to cooperate with them when planning the pipelines' laying.

Other Issues:

- Issue of **sewerage and waste waters removal perspectives** has been discussed. Particularly, this issue was of interest of educational institutions' directors at the territory of the district.
- **Irrational use and economy provision of drinking water** in order to eliminate using of drinking water for plots irrigation, car wash etc. Determination of parties, authorized for control of economy water use. Improvement of irrigation and watering system.
- On the issue of **forced resettlement** one participant has interested, will there be a necessity of such measures at direct lying of new pipes. Representative of regional

vodokanal has assured that such measures shall not be applied in the plans, and planning shall not affect the territories of households.

List of Participants:

#	Name	Organization	Position
1	Yalgashev S.	SES	Head of Department
2	Bobonizarov M.	Department on Nature Protection (Ecology)	Head of Inspection
3	Milikulov J.	PE “Suvokova”	Deputy Head of Department
4	Pilmov A.	U.Yunusov Farm	Chairman
5	N. Sirojetdinova	“Bakhodir Kodir Invest” Company	Chairman
6	Hakimova D.	“Bakhodir Kodir Invest” Company	Controller
7	Aminova Nafisa	PE Suvokova	HR Dept. Specialist
8	Mamadjanova O.	PE Suvokova	Customer Affairs Department Specialist
9	Hodjimuradova T.	Makhalla Committee	Chairman Advisor
10	Yarikulov H.	Ferghana RCC	Secretary
11	Umarov Sh.	PE Suvokova	Accountant
12	Surimanov Z.	Khokimiyat/Financial Department	Economist
13	Arimov H.	Market of Akaltyn	Manager of Local Market
14	Rahimov G.	«Halq Bank»	Deputy Manager
15	Namazov A.	State tax inspection	Deputy Manager
16	Primov K.	PE Suvokova	Head
17	Hayduraev F.	College	Deputy Director
18	Kapalov SH.	College	Deputy Director on Curricula
19	Kukanov H.	Makhalla Committee «Andijan»	Deputy Secretary
20	Kukanov K.	SES	Head Doctor
21	Mavlyanov A.	Andijan RCC	Chairman
22	Ahmedov R.	Khokimiyat	Deputy Khokim
23	Yulbarsova B.	Makhalla Committee	Representative
24	Buranova M.U.	Makhalla Committee	Representative
25	Isakova N.	Makhalla Committee	Representative
26	Jonhirasova O.	Makhalla Committee	Representative
27	Berdiev B.	Makhalla Committee	Chairman
28	Mamatova H.	Makhalla Committee	Representative
29	Egamov H.	College	Director
30	Temirov O.	College	Director
31	Haydarov O.	College	Director
32	Babaev E`.	College	Director
33	Adizova R.	Makhalla Committee	Representative
34	Ibragimov A.	“Kamolot” Social Movement	Representative
35	Abdurahimov E`.	Sardoba RCC	Representative
36	Karaeva G.	Kindergarten № 7	Head
37	Ahmedova M.	Kindergarten № 3	Head
38	Bobonova N.	Kindergarten № 11	Head
39	Turabova B.	Kindergarten № 30	Head

40	Igamberdieva O.	Kindergarten № 4	Head
41	Rahimova R.	Kindergarten № 2	Head
42	Mirzaev U.	Power Distribution Network of Akaltyn rayon	Chief Engineer
43	Burubaeva H.	Makhalla Committee	Chairman
44	Matkarimova O.	Rural community	Chairman
45	Tolipova M.	Makhalla Committee	Representative
46	Shiradieva D.	Makhalla Committee	Representative
47	Berdimurodov S.	Rayon Gas Supply Service	Chief Engineer
48	Hasanova Sh.	NDPU, political party	Deputy Chairman
49	Hudaberdieva H.	Khokimiyat – Women Council	Deputy Chairman
50	Djamatbaev M.	«Sardoba» condominium	Representative
51	Riskulov B.	Rural Agriculture Department of Akaltyn rayon	Head
52	Pazliev Z.	Khokimiyat	Chief Specialist
53	Oripov K.	PE Suvokova of Akaltyn rayon	Director

II. Minutes of Public Discussion in Sardoba Rayon

Venue: Sardoba Rayon

Date: 25 November 2009

Discussion of Draft Report on EIA (1):

- Initially arisen issue was on in what extent the report stipulates for the risk of environment worsening after improvement of water supply system due to lack of sewerage, **load to waste waters discharge may lead to contamination of environment, lands, ground waters, as well as injure the sanitary-epidemiologic condition** in the district. Regarding this issue the ecologists have assured that such risk is studied by them and there is a necessity to take elimination measures in future.
- Participants have discussed regarding the necessity **of full restoration of lands and landscape to initial state** after installation and laying of pipes, as well as, mainly, in water intake facilities locations.
- Besides, certain participants were interested in **certain measures,** aimed to **improvement of environmental condition of** certain territories, due to the fact that the population in those is suffering problems with this.
- Necessity has been noted to conduct training of specialists on construction acceptance rules with consideration of environmental aspect and requirements.

Discussion of Technological Part (2):

- **Technology of materials application and** rules of **pipes'** installation.

Other Issues:

- Problem of **power supply regularity**, due to limited power supply. Participants have been interesting in applied schemes of interaction of vodokanal structures and power supply organizations after implementation of the project.
- On the **resettlement issue** participants have interested in how the issue with buildings on the construction path shall be solved. They have been informed that no such situations are foreseen by the plan, however, if such shall occur, then the compensation measures shall be applied (except for unauthorized unregistered buildings).
- **Issue of improved services' cost** in future, payment order and organization of payments collection system has been discussed. Also the issue was raised of low-income families (support from makhalla and sponsor aid).
- Participants have discussed the perspectives of enterprises (shirkats) creation for improvement of **infrastructure management** on sites.

List of Participants:

#	Name	Organization	Position
1	Kholmanov D.	PE «Ichimlik suv» of Sardoba rayon	Director
2	Shukurbaev A.	Veteran of work	Pensioner
3	Rainkulov A.	Veteran of work	Pensioner
4	Kulmatov A.	RCC «Gulzar»	Chairman
5	Mamarakhimov D.	RCC «Chulkuvar»	Chairman
6	Tillyagov G.	RCC «Yangi Kishlok»	Chairman
7	Shavrukov F.	Makhalla Committee «Makhmal»	Chairman
8	Kushmanov A.	RCC «Kurgan Tepa»	Chairman
9	Ashirov A.	Beautification service of Sardoba rayon	Agronomist
10	Chilmirzaev A.	Leasehold Farm "Mertuza-Malokhat"	Farmer
11	Tolbaev B.	Rayon financial department	Head of Department
12	Jabbarov O.	Leasehold Farm «Ozod Pulka Maydoni»	Clerk
13	Ostanov A.	PE «Ichimlik suv» of Sardoba rayon	Operator
14	Ergashev M.	Rayon financial department	Specialist (Accountant)
15	Satvaldiev D.	RCC «Chulkuvar»	Assistant Chairman
16	Mirzaev Z.	«Sardoba Telecom»	Specialist (Operator)
17	Salomov G.	State Department on Architecture and Construction	Chief Architect of Sardoba rayon
18	Shukurulaeva S.	Women council under the Khokimiyat of Sardoba rayon	Specialist
19	Khusanbaeva J.	Organizational Department under the Khokimiyat of Sardoba rayon	Specialist
20	Babobekova D.	Department on Water Supply and Rural Agriculture under the	Specialist

		Khokimiyat of Sardoba rayon	
21	Khudaberdiev B.	Department of Communal Services under the Khokimiyat of Sardoba rayon	Specialist
22	Usmanov A.	Organizational Department under the Khokimiyat of Sardoba rayon	Specialist
23	Tangatarov F.	Makhalla Committee	Representative
24	Tangatarov N.	Department of Communal Services under the Khokimiyat of Sardoba rayon	Specialist
25	Kholukulov R.	Department of Communal Services under the Khokimiyat of Sardoba rayon	Specialist
26	Tursunov A.	Makhalla Committee	Representative
27	Mirsaatov M.	Social Employment Centre of Sardoba rayon	Director
28	Nodirov U.	Social Employment Centre of Sardoba rayon	Deputy Director
29	Abduraipov K.	Social Employment Centre of Sardoba rayon	Inspector
30	Khokimov D.	Social Employment Centre of Sardoba rayon	Lawyer Consultant
31	Adylov K.	NDPU, political party	Representative
32	Dariev Kh.	Organizational Department under the Khokimiyat of Sardoba rayon	Specialist
33	Alaberdiev A.	Department of Communal Services under the Khokimiyat of Sardoba rayon	Specialist
34	Mukhamatdiev A.	RCC «Pakhtaabad»	Chairman
35	Basimov Sh.	Farm “Uzakov”	Land Surveyor
36	Bamlaev K.	Power Distribution Network	Chief Engineer
37	Mukhtarov A.	Power Distribution Network	Engineer
38	Turgdaliev J.	Economical Department under the Khokimiyat of Sardoba rayon	Specialist
39	Mamarakhimov U.	Leasehold Farm «Kholbaev»	Farmer
40	Mallaev A.	Economical Department under the Khokimiyat of Sardoba rayon	Economist
41	Permatov B.	RCC «Гулистан»	Chairman
42	Abdulahatov B.	Makhalla Committee	Representative
43	Yusupov A.	Makhalla Committee «Ravat»	Chairman
44	Turdaliev G.	Makhalla Department on	Head

		Communal Services of Sardoba rayon	
45	Perimkulov U.	Khokimiyat	Deputy Khokim
46	Karimova M.	Makhalla Committee «Khalqabod»	Chairman
47	Hozibaeva G.	Makhalla Committee «Navruz»	Chairman
48	Rahmatullaeva G.	Makhalla Committee «F.Khodjaev»	Chairman
49	Hasanov T.	Makhalla Committee «Khalqabod»	Chairman
50	Mamatkulov H.	Makhalla Committee «F.Khodjaev»	Assistant
51	Babaeva N.	SES	Deputy Head Doctor
52	Berzibekova g.	SES	Deputy Head Doctor
53	Janov U.	Beautification service of Sardoba rayon	Communal Issues Specialist
54	Ashirova I.	Beautification service of Sardoba rayon	Economic Issues Specialist
55	Mamaraimova A.	Makhalla Committee «Navruz»	Chairman
56	Mahamatov A.	PE «Ichimlik suv» of Sardoba rayon	Operator
57	Domiyarov N.	PE «Ichimlik suv» of Sardoba rayon	Operator
58	Ismailov H.	SES	Sanitary inspector
59	Kaynarova D.	Rayon Department on Social Security	Specialist
60	Chimirzaev Yu.	Legal NGO	Specialist

III. Minutes of Public Discussion in Bayaut Rayon

Venue: Bayaut Rayon

Date: 26 November 2009

Discussion of Draft Report on EIA (1):

- Expert Natalya Limankina has noted that the impact on environment shall take place during the project implementation, the project shall mainly have a positive impact (new chlorination facilities shall be constructed in all districts for water treatment). This shall lead to improved state of population health. It is planned to equip laboratories of Vodokanal with water content controlling equipment.

Discussion of Technological Part (2):

Participants of discussion have raised the following issues:

- **Peculiarity of ground waters location** in the district and specific character of water supply system. Population is facing the elevation of ground waters level, which formerly been solved by using of vertical collectors, that been pumping the water out, eliminating the ground waters level elevation. It was offered to renew the rehabilitation of such facilities.

- **Obstruction of existing wells and boreholes** due to dumping of waste stones. Participants were informed that "Geologiya" organization is dealing with cleaning of such wells. However, due to complicacy of such works it is necessary to foresee the construction of new ones.
- Number of questions was asked in order to get information on **construction** of that or another **certain facilities,** quantity (foe example, water towers, and water intake facilities). Particularly, in Bayaut district, it is planned to construct 20 new towers and 6 Water Intake Facilities.
- Issue of **auxiliary power supply** for water supply system in the district was discussed. Accordingly, tentatively it is planned to conduct additional line for 4km.
- Account of landscape and natural characteristics when laying the pipes. Due to high level underground saline waters, it is necessary to conduct appropriate measures on elimination of drinking water mixing with underground saline water streams.
- Installation of bulk and individual **meters (water measure), schemes of payment for installations**. Issue of payment for service connections and willingness to pay by population.
- Also **the issue of keeping of old water supply system** until the new one is constructed has been discussed.
- Conduction of **wide explanatory work** with population in respect of financial consequences of water supply system improvement.

Other Issues:

- Issue **of sewerage and waste waters discharge** was discussed.
- **Irrational use and economy provision of drinking water** to eliminate using of drinking water for watering of plots and gardens. Identification of parties authorized for control of water economy use.
- Issue of **shirkats establishment** to assist vodokanal in management of water supply services' organization in the future.

List of Participants:

#	Name	Organization	Position
1	Abdumabiev A.	RCC "Usmanov"	Chairman
2	Sadiev Sh.	Makhalla Committee "Yangiobad"	Chairman
3	Djuraeva N.	Khokimiyat	Deputy Khokim (mayor)
4	Hatamov A.	Makhalla Committee "Manaviyat"	Chairman
5	Kazakbaev Yu.	Makhalla Committee "Navoiy"	Chairman
6	Haydorov H.	Makhalla Committee "Yuldashobod"	Chairman
7	Hudaykulov S.	Makhalla Committee "Bunyodkor"	Chairman
8	Nosirov O.	Makhalla Committee "Olmazar"	Assistant Chairman
9	Djumaev D.	Makhalla Committee "Usmanabad"	Chairman

10	Ajulanov Sh.	Makhalla Committee “Usmanabad”	Assistant Chairman
11	Djuraev M.	Makhalla Committee “Mirishkor”	Chairman
12	Hamrakulov O.	Makhalla Committee “Navbakhor”	Chairman
13	Mansurov H.	Makhalla Committee “Sh.Rashidova”	Chairman
14	Haydarov S.	Organizational Department under the Khokimiyat of Bayaut rayon	Chairman
15	Otomuradov B.	Makhalla Committee “Istiklol”	Chairman
16	Markaev U.	Makhalla Committee “Pakhtakor”	Chairman
17	Abdulazizov B.	Makhalla Committee “Ozodlik”	Chairman
18	Ibramilov R.	NDPU, political party	Chairman
19	Muhtaev Z.	Makhalla Committee “A.Temur”	Chairman
20	Mirahirov I.	Makhalla Committee “Shirin”	Chairman
21	Ismailov Sh.	Microcredit Bank	Credit Inspector
22	Ganiev T.	Makhalla Committee “Yangi buston”	Assistant Chairman
23	Hidiryav I.	Makhalla Committee “Dustlik”	Chairman
24	Pardaev Sh.	Makhalla Committee “Markaz”	Chairman
25	Mahmudov A.	Nature Protection Department (Ecology)	Head of Inspection
26	Urmonov I.	RCC “Bayaut”	Chairman
27	Samadov A.	RCC «Olmazor»	Chairman
28	Mallaev T.	RCC «Tinchlik»	Chairman
29	Kuldoshev J.	RCC “Dekhkanabad”	Chairman
30	Umarov M.	RCC “1-Bayaut”	Chairman
31	Haydarov Sh.	RCC “Usmanabad”	Chairman
32	Ibodullaev A.	RCC “Gallakor”	Chairman
33	Primkulov H.	RCC “Darvazakir”	Chairman
34	Abdunabiev A.	RCC “J.Usmonov”	Chairman
35	Mirohirov I.	RCC “Shirin”	Chairman
36	Markaev R.	Rayon Communication Department	Head
37	Omanlipov S.	Agrobank	Credit Department Specialist
38	Hatamov Sh.	Rayon financial department	Deputy Head
39	Abdusamatov O.	Rayon Newspaper	Chief Editor
40	Davlyatov A.	Rayon Health Centre	Head Doctor
41	Abdurahmonov P.	SES	Head Doctor
42	Hudoberdiev B.	Makhalla Committee	Representative
43	Ismoilov K.	Rayon Department of Public Education	Head
44	Mamatov A.	College №14	Director

45	Turdiev I.	Industrial College	Director
46	Mamanov U.	College «1-Bayaut»	Director
47	Sultanov A.	College nam.after U.Yusupov	Director
48	Suvonov A.	College «Dehkanabad»	Director
49	Juraev N.	150- Motor transport park	Director
50	Fazilov D.	Khokimiyat	Khokim (mayor)of the Rayon

IV. Minutes of Public Discussion in Mirzaabad Rayon

Venue: Mirzaabad Rayon

Date: 01 December 2009

Discussion of Draft Report on EIA (1):

- Participants discussed the issues regarding the necessity of **complete reinstatement of soils and landscape to initial state** after installation and laying of pipes. As the construction may affect territories, representing both environmental and economic value for local population.
- Besides, necessity of **explanatory works** conduction among the population in order to provide with regard to environmental, sanitary-epidemiological safety of water supply systems' operation in future.

Discussion of Technological Part (2):

- Provision of **control of construction** and pipes lying in order to avoid irrational waste of means and accomplishment of quality work of contractor organizations. It was proposed to conduct monitoring of rehabilitation process from municipal authorities' side. Participants have come to conclusion, that special attention is to be paid to the control of construction from the commission side, which should be formed.
- Several issues rose regarding direct **designing layout** of new pipes, water towers, use of contemporary computerized systems of tracing of infrastructure state for breakdowns elimination and others.

Other Issues:

- Issue was raised regarding **sewerage** of the district, as with water supply system improved the second issue shall arise, such as waste waters discharge. In this connection the participants fixed at necessity to solve the issue and fixed at that the only solution is – cesspools.
- **Issue of the cost of improved services** in future, order of payment and organization of billing system was widely discussed. Also the issue was raised on low-income families.
- Participants have discussed the perspectives of **enterprises** (shirkats) establishment in order to improve **management of infrastructure** on places.

List of Participants:

#	Name	Organization	Position
1	Umarov R.	Leasehold Farm “Danoboy bob”	Head (manager)
2	Djurabaev T.	Leasehold Farm “Kurkartlik dehkon”	Head (manager)
3	Nazarov A.	Leasehold Farm “Vahitjon”	Head (manager)
4	Anarbaev U.	Leasehold Farm “Bobur”	Head (manager)
5	Azizbaev n.	Плантация «Tubzor»	Head (manager)
6	Berkbaev O.	Leasehold Farm «Sholmurod Urishev»	Head (manager)
7	Kadirov O.	Leasehold Farm «Alyamgan Nutirosh»	Head (manager)
8	Kushiev A.	Leasehold Farm «Charvoz»	Head (manager)
9	Turgonov A.	Leasehold Farm «Darmatinkomiyat»	Head (manager)
10	Hudalishukurov B.	Leasehold Farm «Dehkon»	Head (manager)
11	Kolibarov R.	Makhalla Committee	Chairman
12	Kurbashiva M.	Makhalla Committee «M.Ulugbek»	Chairman
13	Galieva R.	Makhalla Committee «Tashkent»	Chairman
14	Subarova M.	RCC «Zaravshan»	Chairman
15	Botirova N..	Main Communal Department of the Rayon	Specialist
16	Toshmulatova G.	School № 29	Deputy Director
17	Andakulov S.	State Department of Nature Protection (Rayon)	Head of Environmental Inspection
18	Mustafaev N.	SES	Head Doctor
19	Sidikov A.	Leasehold Farm “Sherzod Abdusalomov”	Head (manager)
20	Haydarov M.	Leasehold Farm “Gulyamdosh Saidjonov”	Head (manager)
21	Turdiev M.	Leasehold Farm “Napkaratchi”	Head (manager)
22	Atadjanov S.	Leasehold Farm “Makhamad”	Head (manager)
23	Dehkanov A.	Leasehold Farm “Adilbek”	Head (manager)
24	Mahkanbaev U.	Leasehold Farm “Unumdor”	Head (manager)
25	Botirov Sh.	Leasehold Farm “Kuiyjikoti”	Head (manager)
26	Nizamov Sh.	Leasehold Farm “Bayoz bobo”	Head (manager)
27	Aripov N.	Leasehold Farm “Zaynitdin Alorov”	Head (manager)
28	Kattabekov A.	RCC “Navbakhor”	Chairman
29	Yusupov U.	Leasehold Farm “Chakhra orzu”	Head (manager)
30	Guliev H.	Leasehold Farm “Ilbek	Head (manager)

		Keljakhon”	
31	Boyturaev I.	Leasehold Farm “Pakhtaobod”	Head (manager)
32	Imankulov M.	Leasehold Farm “Baymach”	Head (manager)
33	Tursunkulov F.	Leasehold Farm “Maftuna Farkhod”	Head (manager)
34	Hakliev N.	Leasehold Farm “Toychuk bob”	Head (manager)
35	Irkabaev N.	Leasehold Farm “Erkobad Ovladi”	Head (manager)
36	Kuychikov A.	Leasehold Farm “Omronkhon”	Head (manager)
37	Parmanov O.	Department of Water Economy of the Rayon	Head
38	Ishanov U.	Department of Water Economy of the Rayon	Head of Section
39	Abdusatarov M.	Leasehold Farm “Nurligichi”	Head (manager)
40	Achilov A.	Leasehold Farm “Yulduz-A»	Head (manager)
41	Rashidov B.	СФУ «Akhmed Kulbekov»	Agronomist
42	Murodov F.	Leasehold Farm “Kora Suvlik Dehkon”	Head
43	Kushieva M.	Makhalla Committee «Yangi Ovul»	Assistant Chairman
44	Hudaykulov N.	Makhalla Committee «Navruz»	Chairman
45	Djumanov M.	Makhalla Committee «Don-aryk»	Chairman
46	Bekdjuraeva N.	Khokimiyat – Women council	Deputy Head
47	Hudjabekova R.	Kamolot Movement	Secretary
48	Hudjanov O.	Rural community	Chairman
49	Yakubov M.	Makhalla Committee “Mirzachul”	Head of Community Committee
50	Hodjamurodov R.	Makhalla Committee “Mirzachul”	Head of Community Committee
51	Tokaeva H.	Women Committee	Chairman
52	Turdiev G.	PE “Ichimlik suv”	Director

V. Minutes of Public Discussion in Khavast Rayon

Venue: Khavast Rayon

Date: 02 December 2009

Discussion of Draft Report on EIA (1):

- Ecologist Kh. Abdullaev has paid the attention of participants to the issue of monitoring of deep wells for drinking water, and particularly, to **necessity to isolate deep drinking wells** from surrounding soil and saline water horizons located above. It was noted, that

this fact should be considered when drilling the new wells. Besides that, necessary to regularly take samples of water from wells for chemical analysis.

- Participants are informed of necessity to **construct and equip of laboratories in the district,** as well as construction of separate administrative building for vodokanal with provision with all necessary inventory. In case of emergency situations they shall promptly react and eliminate the consequences.
- It was noted to **inadmissibility to plots and gardens watering with drinking water** due to limited reserves of underground water sources.
- Taking of measures on **avoidance of sand intrusion into wells, creation of sanitary zones** around the wells, as due to high level ground waters there is a risk of hazardous mixtures intrusion into horizon.
- To conduct **analysis of 46 natural fountain wells,** located at the territory of the district for their fitness for water supply.
- Creation of **sanitary-hygienic zones** around large farmer and cattle-farming entities, institutions (prison) on the path of new branches' construction of water supply system.

Discussion of Technological Part (2):

- **Coverage of construction process, introduction of hot lines for** information of citizens**.**
- Solution of issues on **connection of distant households.** Participants have been informed that the water supply shall cover the whole territory of the district as a maximum.
- **Resolution** of possible **disputable issues with neighboring regions,** for example, Jizzakh, since the certain part of water for domestic needs is supplied from these territories.
- Separately discussed **the situation with Mekhnatabad zone** due to lack of own drinking water sources in there.

Other Issues:

- Issue of **possibility of aryk (ditch) system restoration** and organization of running water ingress from canals has been discussed.
- **Sewerage of district and construction of cesspools** for households, especially for multifamily housings.
- Participants made a special emphasis on necessity **to organize control of designing and construction** from the side of makhalla and citizens.
- **Aid to low-income families** at the expense of makhalla committee budget.
- Issue regarding the **cost of services in future** for water supply and possible coverage options has been discussed in detail.
- Perspective of water supply systems **management on the basis of** enterprises (shirkats).
- Role of makhalla and activity of **consumers' rights protection** organizations in the process of rendering of services. Other alternative mechanisms for protection of consumers' rights.

List of Participants:

#	Name	Organization	Position
1	Kultaev K.	Makhalla Committee “Kukon Karabchi”	Head of Community Committee
2	Ibragimov Yu.	“Ferdavsi” Condominium	Chari
3	Turdikulov T.	Rayon newspaper “Khovos ovozi”	Editor in Chief
4	Islamova D.	Makhalla Committee “Tinchlik”	Chairman
5	Azimov O.	Makhalla Committee «Karvon Saroy-1»	Assistant Chairman
6	Sultanov I.	Makhalla Committee «Karvon Saroy-2»	Assistant Chairman
7	Egamberdiev A.	Khokimiyat	Chief Assistant Khokim
8	Atamedjanov J.	Beautification Department	Foreman on wells
9	Narkulov N.	Rural Hospital	Deputy Head Doctor
10	Mutarov U.	College «Gulbar Kishlok»	Deputy Director
11	Adilov A.	Leasehold Farm «Adilov A.»	Head
12	Hudaberdiev D.	Rayon Dept. of Public Education	Methodical Advisor
13	Vaydulaev A.	Rayon tax inspection	Specialist
14	Narbutaev G.	Makhalla Committee “Blagotvoritelny”	Chairman
15	Oripov R.	Water Supply Department of Railroad Station of Khavast Rayon	Head of Department
16	Isaev Sh.	Rayon exchange of Khavast rayon	Inspector
17	Fazieva H.	Women council under khokimiyat of Khavast rayon	Specialist
18	Shakirov F.	Architecture department of Khavast rayon	Chief Architect
19	Narkujiev I.	RCC “Pakhtakor”	Chairman
20	Babadjanova U.	SES	Operator
21	Baymuradova B.	Rayon department of statistics of Khavast	Operator
22	Nabiev T.	Makhalla Committee “Amir Temur”	Chairman
23	Kamilova T.	Khokimiyat	Specialist
24	Hayrulaev O.	Khalq bank	Deputy Manager
25	Hudjamurodov U.	Leasehold Farm “Birodar”	Chairman
26	Allaberdiev A.	Healthcare department of Khavast rayon	Head
27	Muhitdinov S.	Rayon department of statistics of Khavast	Specialist
28	Haydarov Sh.	Makhalla Committee “Istiklol”	Assistant Chairman
29	Kamilova S.	Makhalla Committee “Tinchlik”	Chairman
30	Ahmedov H.	Makhalla Committee “Dustlik”	Chairman

31	Sultanov I.	Makhalla Committee “Karvon Saroy-2”	Assistant
32	Bozorov O.	Makhalla Committee “ Farkhod”	Chairman
33	Hakroev H.	Makhalla Committee “Khavotorg”	Chairman
34	Otabaev B.	Makhalla Committee “Кахрамон”	Chairman
35	Karabaev M.	Makhalla Committee “Turkiston”	Chairman
36	Rahmatullaev T.	Makhalla Committee “Khusnabad”	Chairman
37	Zakirov B.	Makhalla Committee “Chamanzar”	Chairman
38	Boirov N.	Makhalla Committee “Dustlik”	Chairman
39	Otabekov T.	Farkhad Agrobank	Manager
40	Suyunov J.	«Nuroniy» Foundation	Chairman
41	Abdullaev K.	Leasehold Farm «Kurkhona Forish»	Farmer
42	Yuldashev F.	PE Suvokova	Acting Head
43	Urakov B.	PE (Agroprom)	Economist
44	Abdusatarov K.	Leasehold Farm «Bog dola»	Chairman
45	Mavlyanova G.	LLC «Communal Khizmat kursatish»	Deputy Director
46	Fayzieva H.	Khokimiyat	Chief Assistant of Khokim on Gender Affairs

B. Conclusion

Active participation in given workshop has demonstrated the importance, which inhabitants of all five projects districts attitude to the issue of drinking water supply improvement with. Majority of participants were concerned of details of future project. Also, acute issues were arising with waste waters discharge and risk of environmental situation worsening, creation of sanitary zones around water supply facilities. Many were interested in environmental situation and water quality in this or another certain areas, on which the implementation of project measures is possible. Participants in all five districts agreed the adoption of the EIA report in submitted edition and in conclusion expressed gratitude to organizations, financing this timely project.

Information on Proposed Syrdarya Water Supply Project and Announcement of Joint Public Discussions (in Uzbek/Russian Language)

Source: **Regional public, social and political newspaper "Syrdaryo Khakikati"/ "Syrdaryinskaya Pravda"**

Title of the Article: **"Drinking Water Provision Guarantee"** (1);
"Project Aim – to Improve Water Supply to Rural People" (2)

Date: **18 November 2009 (1); 21 November 2009 (2)**

(1)


Юксак маънавият-енгилмас куч

Сирдарё ҳақиқати

Оммавий ижтимоий-сиёсий газета

Газета 1963 йил 1 июндан чиқа бошлаган ⊙ № 93 (9366) ⊙ 2009 йил 18 ноябрь ⊙ Чоршанба

ИЧИМЛИК СУВ ТАЪМИНОТИ КАФОЛАТИ

Республикамизда бир қатор лойиҳалар асосида сув манбаларини асраш, аҳолини, айниқса, қишлоқ аҳолисини тоза ичимлик суви билан таъминлаш, сув иншоотларининг санитария шароитларини юксак талаблар даражасига кўтаришга йўналтирилган технологияларни жорий этиш бўйича халқаро молия институтлари, донор – мамлакатлар имтиёзли кредитлари ва ўз маблағларимиз ҳисобидан кенг кўламли ишлар амалга оширилмоқда. "Оқолтин, Боёвут, Мирзаобод, Сардоба ва Ховос туманларида ҳамда Меҳнатобод зонасида сув таъминоти тизимини яхшилаш" лойиҳаси ана шундай лойиҳалардан бири саналади. Ўзбекистон Республикаси Президентининг 2008 йил 12 июндаги 890-сонли қарорида ҳам бу масалага алоҳида эътибор қаратилган. Ушбу лойиҳа Жаҳон банки билан келишилган 2009-2016 йилларга мўлжалланган лойиҳалар дастурига киритилган.

Жорий йилнинг май ойида Ўзбекистон Республикаси Вазирлар Маҳкамаси томонидан вилоятимизнинг юқорида номлари зикр этилган ичимлик сув ресурслари тақчиллигидан кўпроқ азият чекаётган, сув тармоқлари тизимининг аҳволи қониқарсиз бўлган бешта туманида 2010-2020 йилларда сув тармоқлари тизимини ривожлантириш ва модернизациялашни назарда тутган фармойиши қабул қилинди.

Мазкур лойиҳанинг муваффақиятли амалга оширилиши биринчи навбатда аҳолининг туб манфаатларини кафолатлайди, турмуш фаровонлигини оширади, уларнинг ижтимоий жиҳатдан ҳимояланишини янада кучайтиради. Бундан ташқари, ушбу лойиҳа мақсадида сув ресурсларини асраб-авайлаш юзасидан олиб борилаётган ҳозирги давр сиёсати, сув таъминоти инфратузилмасини янада такомиллаштириш ва ривожлантириш, вилоят "Сувоқава" ишлаб чиқариш бошқармаси, унинг туман бўлимларида ишлар самарадорлигини ошириш билан бирга корхоналарга кўрсатиладиган хизмат учун белгиланган тарифларнинг оптимал даражасини сақлаб қолиш масаласи алоҳида ўрин тутади.

• Диққат, янги лойиҳа!

Лойиҳани амалга ошириш жараёнида бевосита мавжуд сув таъминоти тармоқларини реконструкция қилиш, ишламай қолганларини тиклаш, модернизациялаш ҳамда янги сув таъминоти объектлари, шунингдек, ёрдамчи бинолар ва иншоотлар қуриш, консалтинг хизматлари кўрсатиш, "Сувоқава" ишлаб чиқариш бошқармасининг юқорида қайд этилган туманларидаги корхоналари институционал потенциалини мустаҳкамлаш масалалари эътиборга олинган.

Бундай кенг кўламли ишларни рўёбга чиқариш учун Ўзбекистон ҳукумати ва Халқаро ривожланиш Ассоциацияси (МАР) ўртасида 88 миллион АҚШ доллари миқдорида кредит ажратилиши тўғрисидаги битимга эришилди. Шунингдек, Ўзбекистон томонидан ушбу лойиҳа 12 миллион АҚШ доллари миқдорида молиялаштирилиши кўзда тутилган. Лойиҳанинг ижрочи агентлиги ҳам аниқланди. Бу вазифани "Ўзкоммунхизмат" агентлиги ва Сирдарё вилояти ҳокимлиги ўз зиммасига олди. Сирдарё вилояти "Сувоқава" ишлаб чиқариш бошқармаси лойиҳани реализация қилувчи агентлик саналади. Лойиҳада шунингдек, лойиҳани мувофиқлаштирувчи ва реализация қилувчи гуруҳлар ташкил этилиши ҳам кўзда тутилган. Биринчи гуруҳ Тошкент шаҳрида "Ўзкоммунхизмат" агентлиги ҳузурида жойлашган бўлиб, айнан ана шу гуруҳ республикамиздаги банклар, вазирликлар ва идоралараро ҳаракатларни мувофиқлаштириб туришни амалга оширади. Лойиҳани реализация қилиш бўйича тузилган гуруҳ эса Сирдарё вилояти маркази – Гулистон шаҳрида жойлашган.

Ҳозирда лойиҳанинг техник-иқтисодий деталлари асосини ишлаб чиқиш бўйича иш олиб борилмоқда. Бунда асосий эътибор сув таъминоти объектлари қурилиши ва фойдаланишга топширилишининг энг кам сарф-харажатли, бироқ юқори сифатли оптимал варианти схемасини танлаб олишга қаратилмоқдаки, қуриладиган сув таъминоти ресурслари бу иш билан шуғулланадиган ташкилотларга аҳолини кечаю кундуз сифатли ичимлик суви билан таъминлаб туриш имкониятини берсин. Бундан ташқари, лойиҳанинг маҳаллий экологик таъсирига, унинг флораси, фаунаси, сув ҳавзалари ва бошқа омилларига ҳам алоҳида аҳамият берилади, шунингдек лойиҳанинг ижтимоий баҳоси ҳам тайёрланади. Айнан экологик ва ижтимоий баҳолаш натижалари бўйича шу йил 24 ноябрдан 2 декабргача лойиҳа амалга ошириладиган беш туманда туман ҳокимликлари, вилоят "Сувоқава" ишлаб чиқариш бошқармаси, шаҳар ва туманларнинг коммунал хизмат бўлимлари, фуқароларнинг ўзўзини бошқариш органлари ва кенг жамоатчилик билан биргаликда лойиҳанинг муҳокамасини ўтказиш режалаштирилган. Муҳокамалар чоғида вилоят туманларининг сув таъминоти, ичимлик сувининг сифати, экологик хавфсизликни таъминлаш, объектларни реабилитация қилиш, бўлғуси тарифлар, аҳолининг такомиллаштирилган хизматлар учун тўловларга тайёргарлиги ва бошқа масалалар билан боғлиқ муаммолар кўтарилади.

Лойиҳани муваффақиятли амалга ошириш энг чекка қишлоқ туманларида истиқомат қилувчи аҳолининг сифатли ичимлик сувдан баҳраманд бўлишини кафолатлайди, иқтисодиёт тармоқлари, ижтимоий соҳа объектлари ва албатта, биринчи навбатда бутун аҳолининг ўсиб бораётган тоза ичимлик сувига бўлган эҳтиёжи тўла қондирилади.

Мария МАЛИНОВСКАЯ,
Лариса ФРАНК,
Тошкент шаҳар "Донаев менеджмент консалтинг" масъулияти чекланган жамият ходимлари.

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СЫРДАРЬИНСКАЯ ПРАВДА

Высокая духовность - непобедимая сила!

МАССОВАЯ ОБЩЕСТВЕННО-ПОЛИТИЧЕСКАЯ ГАЗЕТА

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ЛАГОУСТРОЙСТВА СЕЛА

ЦЕЛЬ ПРОЕКТА - УЛУЧШЕНИЕ ВОДОСНАБЖЕНИЯ СЕЛЬЧАН

В нашей республике ведется широкомасштабная работа по внедрению водосберегающих технологий, обеспечению населения, особенно сельских районов, качественной питьевой водой, повышению санитарных условий очистных сооружений в рамках реализации проектов на базе льготных кредитов международных финансовых институтов, стран-доноров и собственных усилий. К числу таких относится и проект «Улучшение системы водоснабжения Акалтынского, Баяутского, Мирзаабадского, Сардобинского и Хавастского районов», включая мехнатабадскую зону. Как и было предусмотрено постановлением Президента нашей республики № 890 от 12 июня 2008 года, проект включен в согласованную со Всемирным банком программу проектов, намеченных на период 2009-2016 годы.

В мае нынешнего года было принято и соответствующее распоряжение Кабинета Министров республики, предусматривающее обеспечение развития и модернизации водопроводных сетей 5 вышеназванных районов нашей области на 2010-2020 годы, как испытывающих наибольший дефицит водных ресурсов и имеющих неудовлетворительное состояние систем водоподачи.

Успешная реализация проекта гарантирует прежде всего интересы населения, повышение качества жизни людей, усиление их социальной защиты, а также отвечает современной политике ресурсосбережения, направлена на дальнейшее совершенствование и развитие инфраструктуры водоснабжения, эффективной работы районных и областного производственного управления «Сувокава», сохраняя вместе с тем оптимальный уровень тарифов за оказываемые предприятиями услуги.

В ходе реализации проекта предусмотрена как реконструкция существующей системы водоснабжения, так и восстановление, модернизация и строительство новых объектов системы водоснабжения, а также вспомогательных зданий и сооружений, консалтинговые услуги, институциональное укрепление потенциала 5 районных предприятий «Сувокава» и непосредственное управление проектом.

Для реализации столь широкомасштабной работы достигнуто соглашение между правительством Узбекистана и Международной Ассоциацией развития (МАР) о выделении кредита в размере 88 миллионов долларов США. А также предусмотрено софинансирование со стороны Узбекистана в размере 12 миллионов долларов. Определено и исполнительное агентство, которым стало агентство «Узкоммунхизмат» и Сырдарьинский областной хокимият. Агентством по реализации проекта стало областное производственное управление (ОПУ) «Сувокава». Проектом также предусмотрено создание групп координации и реализации проекта. Первая расположена в Ташкенте при агентстве «Узкоммунхизмат» и именно она будет осуществлять координацию действий между банком, министерствами и ведомствами нашей республики. Группа реализации проекта расположена в областном центре - городе Гулистане.

В настоящее время осуществляется разработка детального технико-экономического обоснования проекта. Это прежде всего вызвано необходимостью выбора оптимального варианта схем водоснабжения с наименьшей стоимостью строительства и эксплуатации, но при высоком качестве предоставляемых услуг водоснабжающими организациями, круглосуточным обеспечением населения качественной питьевой водой. Кроме этого, проводится обязательная оценка воздействия проекта на экологию местности, ее флору и фауну, водоемы и т д., а также будет сделана и социальная оценка проекта.

Именно по результатам экологической и социальной оценок планируется проведение общественных публичных обсуждений проекта с 24 ноября по 2 декабря этого года в пяти проектных районах совместно с районными хокимиятами, ОПУ «Сувокава», коммунальных служб городов и районов, ННО, органов самоуправления граждан и широкой общественности. В ходе этих обсуждений будут подняты проблемные вопросы, связанные с водоснабжением районов области, качеством питьевой воды, обеспечением экологической безопасности, планами реабилитации объектов, будущих тарифов, готовности населения платить за усовершенствованные услуги и др.

Успешная реализация проекта – гарант того, что у жителей даже самых отдаленных сельских районов появится возможность пользоваться качественной питьевой водой, полностью будут удовлетворены растущие потребности отраслей экономики, объектов социальной сферы и, конечно же, прежде всего населения в качественной питьевой воде.

Мария МАЛИНОВСКАЯ, Лариса ФРАНК. ООО «Донаев Менеджмент Консалтинг» г. Ташкент.

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