

REPUBLIC OF MOLDOVA

Water Supply and Sanitation Project Implementation Unit

ENVIRONMENTAL ASSESSMENT

FOR SELECTED RURAL AREAS

FOR

National Water Supply and Sanitation Program

Rehabilitation of water supply services in selected rural communities

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ABBREVIATIONS AND ACRONYMS

EA	Environmental Assessment
EAMF	Environmental Assessment and Management Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EU	European Union
GoM	Government of Moldova
IDA	International Development Association
MENR	Ministry of Ecology and Natural Resources
NGO	Non-governmental organization
OP/ BP/ GP	Operational Policies, Bank Procedures and Good Practices
SEE	State Ecological Expertise
SEI	State Ecological Inspectorate
TA	Technical Assignment
UNDP	United Nation Development Programme
PIU	Project Implementation Unit
WHO	World Health Organization
WMO	World Monetary Organization
WB	World Bank

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1 GENERAL BACKGROUND FOR THE PRESENT PROJECT

Over the past 15 years, Moldova's citizens have suffered from significant deterioration of their water supply services and a virtual cessation of wastewater treatment. The impact has been felt through damage to human health from pathogen-contaminated water; from the sheer inconvenience of not having a 24 hour water supply; in the environmental degradation due to the inability to collect, treat and safely dispose of wastewaters; and in the industry, particularly in such sectors as food processing that need dependable supplies of clean water. Buoyed by a strengthening economy, the national government recently launched a consultative process around the development of a water supply and sanitation sector strategy that seeks to reverse the damage. At government request, IDA has been assisting with strategy development and IDA has also been asked to help mobilize international resources to assist with strategy implementation. This proposed project would provide very modest financial resources to that end, most importantly helping Moldova create the structures that would complement domestic resources with those available from international partners to put the sector back on a growth path to acceptable service provision.

The proposed project development objectives (PDO) are to (i) support the Government's effort to improve water and sanitation services through implementation of Second Water Supply and Sanitation Project that would channel most or all national and external financing to the sector along programmatic lines; and (ii) apply the policies of the Second Water Supply and Sanitation Project to improve water supply and sanitation services in selected localities.

This objective will be achieved through the rehabilitation, improvement, and expansion of water supply systems and sewage; improving the treatment and disposal of wastewater as well as enhancing overall management of the water sector.

The project will involve the following four components:

Water Supply and Sanitation Development

The project will be implemented in areas with problems of water availability or water quality, a relatively large population of poor and socially disadvantaged people and high community demand for improved services. Investments will be implemented in the following ten priority towns: Balti, Cahul, Ungheni, Causeni, Drochia, Falesti, Floresti, Orhei, Riscani and Soroca. These small- and medium-sized towns were considered the most important ones in the country in relation with institutional, socio-economic, financial and technical aspects.

The investments will include: (a) rehabilitation and expansion of distribution networks; (c) installation of water meters; (d) procurement of leak detection and construction equipment; (e) renovation of district and sewage pump stations; and (f) rehabilitation of wastewater treatment plants and renovation and extension of sewage pipelines.

Institutional Strengthening

This component will support Institutional strengthening and capacity building program; financial improvements and upgrading of equipment and materials; technical assistance with the Financial Action Plan; training of Apa Canal personnel based on a needs assessment to be prepared by the Apa Canals and the Technical Engineers/Advisors; and assessment and piloting of potential options

to facilitate the involvement of local private operations in the sector. The institutional coordination, capacity building, communication, information exchange and stakeholder participation among relevant institutions will also be improved thereby reinforcing the management network for more efficient and effective operation and service provision.

Project Management, Monitoring and Evaluation

This component will support project implementation and management including: (a) supervision of project investments; (b) PIU support, equipment, and training; (c) public information; (d) auditing and other fiduciary or technical services. PIU staffing will be financed by the WB project.

Rehabilitation of water supply services in selected rural communities

Over 65 rural localities are included for rural component of this project. The investments will be for: (1) construction of new water supply networks; (2) renovation of pumping stations; (3) cleaning of deep wells (or drilling, if needed); (4) installation of new water tanks; (5) construction/renovation of deep well protection areas (fence of concrete pillars with barbwire); (6) installation of water pipelines; and (7) renovation/construction of power supply lines (including electrical power transformer, if needed).

1.1 GENERAL BACKGROUND FOR EA

1.1.1 Classification of EA

The proposed investment program is to be financed by the World Bank using IDA resources through a specific investment loan that is considered environmental category B in accordance with the World Bank operational policy on environmental assessment (OP/BP/GP 4.01), since the project will provide rehabilitation of specific water and wastewater infrastructure investments. Therefore, an Environmental Assessment (EA) Report including an Environmental Management Plan (EMP) is to be prepared for the proposed investments. The estimated cost of the Project is US\$14 million. The project will be implemented by “Apele Moldovei” Agency through Pilot Water Supply and Sanitation Project.

1.1.2 Coverage and Goal of EA

The objective of this assignment is to provide assistance to the Agency “Apele Moldovei”, and other project beneficiaries in undertaking Environmental Assessment (EA) for the proposed Second Water Supply and Sanitation Project including preparation of Environmental Management Plan (EMP), in order to comply with relevant World Bank requirements and Moldovan environmental and construction regulations. The aim of the EA report is to analyze the potential adverse environmental issues related to infrastructure investments proposed under the Second Water Supply and Sanitation Project and to ensure that these aspects are addressed or mitigated in the project design.

1.1.3 Scope of Work and Tasks of EA

For the tasks detailed below, the Consultant together with the PIU will visit the project locations and will be in constant coordination with appropriate local government authorities (Municipalities, Water, Environment institutions) and/or research institutes for collecting necessary environmental and social data (e.g., noise; air, water, groundwater and soil quality; land use and cultural heritage aspects, land ownership, etc.) that will help determine a baseline situation of the pre-project scenario. During the project site visits particular attention should be paid to the local public (affected people) views on environmental and social effects imposed during the rehabilitation works of the proposed investments.

The priority list of proposed medium-term investments has been prepared based on the assumption that all proposed short-term investments has been carried out by 2010. After the short-term investments have been implemented there will be more information available about the operation of the water distribution and sewerage networks. Thus, before implementation of the proposed medium-term investment programme more information about the network should be collected and a full conditional analysis carried out. The proposed medium-term action will not be an objective of this study.

2 LEGAL FRAMEWORK IN REPUBLIC OF MOLDOVA

2.1 National policy and role of the Ministry of Ecology and Natural Resources

The Socio-Economic reform of the last years has created premises for transcending back from decentralization system to a centralized one. This issue diminished the local government implication in the decision-making process. As a negative factor, this influenced the political sector at the national, regional and local level. This factor adjusts major objectives of the environmental policy, including such factors as economic and social ones for the entire country.

The main institution responsible for prevention and mitigation of negative impact of economic activities on environment, use of natural resources and public health in the frames of national sustainable development is the Ministry of Ecology and Natural Resources. The Ministry is also responsible for ensuring a safe environment for the entire country.

Local environmental policy is based on national legislation acts, plans, concepts and strategies. This inter-connection would be reached through legislative and normative consolidation, integration of environmental protection demands on the national strategies of economic development and also social sphere. Other development aspects are those of regional and international collaboration, drawing of technical support and investments.

To attend European environmental standards Republic of Moldova would have to follow some principles as:

- Creation and reviewing the legal and institutional frameworks, adequate to national economy, synergy between national economy and environment;
- Integration of environmental demands on all spheres of national economical reforms, strategies of reformation of all national sectors;
- Creation of sustainable environmental security principles of citizens;
- Modification of environmental management system;
- Development of a sustainable mitigation and prevention system of environmental problems and accidents.

2.2 World Bank Environmental Safeguard Policies

Any World Bank project designed for financing, requires environmental assessment (EA) in the way to demonstrate its sustainability and to improve the decision making process. For any project processed with the participation of an International Funding Agency, in addition to the respective legislative requirements of Republic of Moldova, the proponent must also comply with the requirements of the funding organization.

Environmental and social policies and requirements of the World Bank are presented in the following reference safeguards:

* Operational Policy 4.01, Environmental Assessment, January 1999 (including Annex A, Annex

B, Annex C, dated January 1999)

- * Operational Policy 4.04, Natural Habitats, June 2001
- * Operational policy 4.09, Pest management, December 1998
- * Operational Policy 4.11, Physical Cultural Resources, July 2006
- * Operational Policy 4.12, Involuntary Resettlement, December 2001
- * Operational Directive 4.20, Indigenous Peoples, September 1991
- * Operational Policy 4.36, Forests, September 1993 (including Annex A, dated March 1993)
- * Operational Policy 4.37, Safety of Dams, October 2001
- * Operational Policy 7.50, Projects on International Waterways, June 2001
- * Operational Policy 7.60, Projects in Disputed Areas, June 2001.

The environmental impact assessment study for the National Water Supply and Sanitation Program Project was designed to evaluate its status in respect with all applicable World Bank environmental and social policies and guidelines. During the EA process for this project, a review of the World Bank environmental and social guidelines was carried out in respect with their relevance to this project and was outlined in the Environmental Framework Policy document. The policies directly relevant to this project are: Environment Assessment (OP 4.01), Cultural Property (OP 4.11) and Projects on International Waterways (OP 7.50) and the specific World Bank guidelines that were identified as being applicable to this project are present in the Environmental Assessment Sourcebook, Volume I and II (1991).

2.3 Legal environmental framework in Republic of Moldova

The Republic of Moldova is characterized by a new legislative base. Some of the main laws related to the project are described below:

- Constitution of the Republic Of Moldova (1994);
- Law on the Environmental Protection Nr.1515-XII of June 16 (1993);
- Law on Ecological Expertise and Environmental Impact Assessment Nr. 851-XIII of 29.05.1996 (1996);
- **The Water Code of Moldova Nr.1532-XII of June 22 (1993);**
- Land Code (1991) 828-XII of 25.12.91;
- **Law on Drinking Water Nr.272-XIV of February 10 (1999);**
- Law on Water Protection Zones and Strips along Rivers and Water Bodies Nr. 440-XIII of 27. 04. 95 (1995);
- Law on Sanitary-Epidemiologic Welfare of Population Nr.1513-XIII of June 16 (1993, amended in 1996);
- **Construction Norms and Regulations (СНП 2.04.01-04-85) ;**
- **The Rules on Surface Water Protection approved by the State Environmental Protection Committee Nr.03-13/57-442 of March 1 (1991).**

Other laws for this project are:

- Law on Quality in Construction (of 1996);
- Law about access to information (982-XIV of 11.05.2000);
- Law on Payment for Environmental Pollution (787- XIII of 26.03.96);
- Law on Air Protection (1422- XIII of 17.12.97).

The Governmental Decisions and Instructions:

- Instruction on the organization and conduction of ecological expertise (1996)
- Instruction on Order of Organization and Conduction of the State Ecological Expertise (2003)
- Governmental Decision on Standard provisions on use of water supply and communal sewerage systems (2002)
- Governmental Decision regarding Concept of sustainable development of cities and towns in Republic of Moldova (HGO1491 of 2002)
- Governmental Decision on regulation of relations in the field of water management and rational use of water resources in Republic of Moldova (619 of 16.08.1994)
- Governmental Decision on approving the Regulation regarding the mode and conditions for use of aquatic basin (745 of 03.11.1995)
- Governmental Decision on state sanitary-epidemiological supervision in the Republic of Moldova (1995)
- Governmental Decision on underground resources use licensing (1994)
- Sanitary Rules on atmospheric air prevention in localities (1998)
- Governmental Decision on Order on compensation for damage to forests (1992)
- Governmental Decision on verifying of projects and executing of construction works, technical expertise of projects and constructions (1996)
- Governmental Decision on increasing of exploitation safety of buildings and constructions, installations and pipe-lines which are sources of a heightened risk (1996)
- Construction Norm and Rules (СНП 2.04.02-84).

Existent legislative base was designed during 1993-1996 and does not include all international policies and acts that Republic of Moldova is a part to, also stipulations of European Union where Moldova wants to be a part of. In this context, objectives of the Strategy are a part of Action Plan Republic of Moldova – European Union. European legislation that is proposed to be harmonized to national one is:

- Directive 98/83/CEE about water quality for human consume - its proposed to be implemented through the law of drinking water;
- Council Directive 91/271/EEC about purification of urban wastewaters should be included in national legislation to approve the normative regarding conditions of evacuation of wastewaters in water basins;
- Council Directive 91/676/EEC about water protection against pollution caused by nitrates from farm sources – is necessary to be implemented to protect waters against pollution with nitrates from farm sources;

Present Strategy defines the main objectives of development of public services of water supply and wastewater networks in conformity with stipulations of EU Directives for:

- Drinking water – nr.98/83/EEC;
- Wastewaters from urban localities – nr.91/271/EEC;
- Surface waters for drinking water – nr.75.440/EEC;
- Dangerous pollutants in underground waters – nr.80/68/CEE;
- Dangerous pollutants in surface waters – nr.76/464/CEE.

The Directive about water 2000/60/EC defines a few elements that should be included in state policies. Implementation of mentioned Directive suppose elaboration of a Water management plan on hydrographic basins, in collaboration with Romania and Ukraine, in the frame of Convention

about protection and utilization of transboundary water streams and international lakes, through existing documents and by the bilateral collaboration.

2.4 National Water Supply and Wastewater Action Plan

According to the state statistic materials, around 50% of citizens drink water. that is under the sanitary conditions. Unfortunately the pollution of water basins with wastewater and non point sources of pollution is constantly increasing.

To solve all these problems, the following specifically steps should be taken:

- Increase financing capacity;
- Reconstruction and technical renovation of wastewater treatment stations and rehabilitation of pumping stations.

To achieve these goals regarding rehabilitation the water supply and wastewater systems, and to solve the problems of rational use of water resources and environmental protection, the Government of Republic of Moldova approved in April, 2002 the Water Supply and Wastewater Action Plan (“Program of Water Supply and Sanitation of localities of the Republic of Moldova up to year 2006”, # 519 dated April 23, 2003). Moreover, in 2005 the Action Plan has been revised and a new version was approved by the Government (“Program of Water Supply and Sanitation of localities of the Republic of Moldova up to year 2015”, # 1406 dated December 30, 2005).

The Action Plan covers 43 urban localities (municipalities and towns) with a total population of 1.5 mln people and 77 rural localities with a population of around 237 thousands. The main goals of the Action Plan are: protection of the population health; rational use of water; environment protection; pollution prevention of water resources; rational use of capital resources; improvement of services provided to consumers; improvement of operation of the water supply utilities.

The Action Plan outlines the following priority towns which need rehabilitation of the wastewater treatment plants and pumping stations: Sorooca, Rezina, Soldanesti, Hincesti, Basarabeasca, Ungheni, Causeni, Balti, Otaci and Chisinau. There is no special priority order outlined, as soon as practically all of the listed towns have deteriorated and poorly operating waste water treatment plants; the other smaller and less economically important towns and villages in Moldova do not have treatment plants at all.

For the town of Sorooca, the Action Plan stipulates that a rehabilitation of wastewater treatment plant within the territory of Moldova is necessary, as the old one, situated on the Ukrainian territory, was highly deteriorated during the recent years and is not available. For the Causeni town the need for urgent rehabilitation of available WWTP is stipulated.

Due implementation of this plan will result in the following major achievements:

- Improve the life quality
- Rational use of water
- Environmental protection
- Pollution protection and efficient use of water sources
- Rational management of capital investments

- Improve the quality of services
- Improve the economical efficiency of economic bodies through water supply and wastewater treatment

Taking into account the economic situation of Republic of Moldova, all the modernization activities and development of water supply and wastewater treatment principles would be implemented in 3 levels:

- 1st Small works and expenditures to renovation of existing systems;
- 2nd Modernization and development until 2009;
- 3rd Modernization and development until 2015;

2.5 Strategy on Water Supply and Wastewater Management

The Government of Republic of Moldova adopted the Strategy on Water Supply and Wastewater Management by the Government Decision nr.662 on 13.06.2007 in order to implement the main priorities regarding water supply and wastewater management.

According to the above mentioned Strategy, the main drinking water source represents the underground waters. With this waters are supplied 100% of rural and 30% of urban population, or around 65% of citizens. The Nistru River supplies around 32%, Prut – 2,8%, and another sources - 0,2 %.

The strategy develops the main objectives and principles of public services regarding water supply and wastewater management, the main criteria to develop the priorities for water supply and wastewater management for 2008-2012. Medium term criteria for 2008-2012, promote decentralization of public services in this issue and plan extending of water supply and wastewater management systems etc.

2.6 Strategy on Economic Growth and Poverty Reduction

The Parliament adopted the Strategy, a part of which address the sector of water supply and sanitation.

The main outlines of the strategy to be taken are:

- Development and modernization of the water supply and sewerage systems in 156 localities;
- Implementing the projects using new technologies of mechanical and biological treatment of wastewaters;
- Measures for collecting and treatment of rain wastewaters;

The strategy as a goal increases the number of population which would have access to the sewerage systems from 40% to 90% by 2006.

2.7 Other National Environmental Strategies and Programs

In the last few years Government of Republic of Moldova has adopted several national strategies and programs related to the environmental protection and sustainable development:

- National Program on Securing of Ecological Safety (nr.447 dated 04/17/2003);
- Government Decision about realization of some activities regarding the effectiveness of the central and local public administration (nr.1379 of 13.12.2004);
- Concept of Sustainable Development of Localities in Moldova;
- Strategy for Social and Economic Development of the Republic of Moldova for medium-term period (until 2005);
- National Program on Use of Industrial and Consumption Wastes.

3 NATIONAL AND LOCAL RESPONSIBLE STATE BODIES

There are several institutions in Moldova with a mandate to protect the environment, responsible for the water supply and sanitation. The most important of them are described below.

3.1 Ministry of Ecology and Natural Resources (MENR)

The responsibility for managing the water sector resources used to be the responsibility of a single authority, the Ministry of Environment, Construction and Territorial Development. In June 2004, however, there was an administrative organization. A new Ministry of Environment and Natural Resources (MENR) was created as the central authority responsible for the development and promotion of the state policy in the field of environment protection and use of natural resources. The MENR consists of the following departments:

1. Department of environmental strategies and policies;
2. Department of natural resources;
3. Department of protected areas and biodiversity;
4. Department of environment pollution prevention;
5. Department of science, technical assistance and European integration;

The Ministry has been mandated to deal with broad environmental protection issues, and it has primary responsibility for the supervision of environmental laws, norms, programs, and decrees in the Republic of Moldova. The Ministry's basic responsibilities are set out in the Law on Environmental Protection and its Regulation. It covers environmental management, protection and monitoring.

3.2 Agency “Apele Moldovei”

In base of Government Decision nr.904 from 09.08.2007 Republican Concern for Water Management “Apele Moldovei” was reorganized in to Agency “Apele Moldovei” (AAM). AAM is a state company established under the Government of Republic of Moldova. It consists of bodies specialized in the field of water use; flood prevention, design and investigation of surface and underground water sources.

Starting with the summer 2007 all responsibilities regarding development and promotion of state policy for water supply utilities were broken out under a newly created Agency “Apele Moldovei”. New created body was designated as the agency responsible for setting and implementing policy for water and sanitation services for both urban and rural areas. In small and medium sized cities water and wastewater systems are operated by semi-autonomous entities called Apa-canals, which are responsible to the local government and are represented at the national level by the Moldova Apa Canal Association (MAC). Responsibility for water sector services in small jurisdictions falls to the office of the mayor. In conformity with Annex nr.4 of Government Decision nr. 904 from 9th of August 2007 Apa Canal Association all operative administration is done by the Agency “Apele Moldovei”, in base of the signed contracts between AAM and local and central public administration.

3.3 State Ecological Inspectorate (SEI)

The State Ecological Inspectorate (SEI) represents a public authority subordinated to the Ministry of Environment and Natural Resources established as a separate legal entity. The SEI is an environmental protection regulatory and enforcement agency and performs the state control over the rational use and protection of the natural resources. Its basic responsibilities include monitoring environmental pollution and carrying out regular inspections for environmental violation and protection, as well as provision of monitoring data and information.

The main role of the SEI is to implement and enforce the environmental legislation through the control the following divisions of the inspectorate.

- Division of control of soil, subsoil, wastes, chemical substances;
- Division of control of water resources and atmospheric air;
- Division of fighting of poaching and illegal cutting
- Division of physical-chemical and metrological analyses of the environmental factors (central laboratory).

According to its Regulations the SEI plays a key role in controlling the development process and protecting the environment and human health from damage caused by pollution, in the assessment of proposed new development projects and extension, modifications, reconstruction, conservation demolition or liquidation of those already in existence. This goal is achieved through performing of the state ecological expertise of the design documentation of the proposed projects. In case of non-compliance with established regulations it can stop any activity. It also has powers to request initiation of criminal proceedings, and may impose penalties if laws are breached

The SEI monitors all facilities throughout the country with high environmental impact or large consumption of natural resources. The SEI issues permits to the relevant operations and carries out enforcement of the permit by inspection visits, monitoring and levying of fines in cases of non-compliance.

In each raion the SEI have subordinated Raional Ecological Service which are responsible for supervising of all environmental aspects and legislation in the entire raion including rural localities.

3.4 State Geological Agency of Republic of Moldova (AGeoM)

In base of Government Decision nr.1196 of 04.11.2004 AGeoM is a state agency subordinated to the Ministry of Ecology and Natural Resources. The responsibility of AGeoM is to assure the rational use and protection of mineral resources and underground waters in Moldova. AGeoM is responsible for promoting of state policy in the field of management and monitoring of underground resources in Moldova and is responsible for management and protection of underground water resource, state accounting of groundwater, including investigations for estimating groundwater reserves, as well as monitoring of ground water quality and regime, control of its protection and coordinate the documentation for special water use. AGeoM also provides the necessary hydro geological studies prior to issuing of permits for use of groundwater, geological research.

3.5 Ministry of Health

Regarding the Ministry of Health (MH) is the central authority for the health of the population and sanitary and epidemiological supervision in Moldova. In the field of water the main responsibilities lie with the State Scientific and Practical Center for Preventive Medicine (SSPCPM) which is subordinated to the MH; District and Municipal Centers of Hygiene and Epidemiology; and other organizations for preventive medicine.

The Ministry of Health is responsible for state sanitary and epidemiological supervision; for sampling and analyzing water quality in water bodies and groundwater used for drinking water supply; and for control over the observance of sanitary, epidemiological and hygienic regulations. These functions are assigned to the State Scientific and Practical Centre for Preventive Medicine. Its district subdivisions perform periodic sampling and quality analysis of water from centralized water supply systems, artesian wells and shallow groundwater wells.

3.6 State Scientific and Practical Center for Preventive Medicine (SSPCPM)

The SSPCPM is an agency subordinated to the Ministry of Health and represents a main organization with responsibility for maintaining the state sanitary and epidemiological supervision system. Its responsibilities include monitoring of drinking water quality and pollution; carrying out regular inspections for violation and protection of satisfactory sanitary conditions; providing monitoring and information.

3.7 State “Hidrometeo” Service

State Hydrometeorological Service is a public institution subordinated to the Ministry of Ecology and Natural Resources, which activity is regulated by the Governmental Decision Nr. 401 on “Some aspects of hydrometeorological activity in the Republic of Moldova” from 3 April 2003. The Service is administrated by the director appointed by the Government. According to the Parliament Decision Nr. 210-XIII from 29 July 2004, the Republic of Moldova accessed to the World Meteorological Organization (WMO) and Director was appointed as Permanent Representative of the Republic of Moldova with WMO.

Principal tasks of the Service:

- i. Monitoring of the state and variability of the hydrometeorological conditions and environmental quality for protection of population and national economy from dangerous hydrometeorological phenomena and high level of environmental pollution.
- ii. Meteorological, aeronautical, agrometeorological and hydrological forecasting as well as determination of the level of environmental pollution.
- iii. Warning about dangerous hydrometeorological disasters and high level of environmental pollution.
- iv. Dissemination of hydrometeorological data on environmental quality to the national public and local authorities and economic agents.
- v. Creation and operation of the National Hydrometeorological DataBase necessary for implementation of diverse socio-economic objectives and elaboration of the strategies for long-term development of the national economy.
- vi. Data exchange in the framework of the global system of hydrometeorological observations and fulfillment of commitments under the conventions and international agreements signed by the Republic of Moldova.

4 BASELINE ENVIRONMENTAL CONDITIONS IN RURAL SETTLEMENTS

4.1 Geographical background

Moldova is situated in the South-Eastern part of Europe. At North, East and South it is neighboring with Ukraine, at West – with Romania. The area is equal to 33,8 thou. km². From North to South it has 350 km, while from West to East – 150 km. Moldovan relief is presented by hills and plains, which are mostly in the central part of the territory. The highest elevation number above the sea level is 429 m (Balanesti) and the minimal – 5 m (Giurgiulesti).

Climate

The climate of Moldova is temperate-continental, influenced by Atlantic air masses coming from west, Mediterranean – from south-west, and continental – from north-east. Average annual temperature constitutes 8,7-10,8°. Annual precipitations decrease from North-West to South-East, from 800 mm to 513 mm. The highest quantity of precipitations is recorded for Codru – ancient oak forest, situated mostly in the central part of the country. In the cold season there is a surplus of rainfall over evaporation. In summer time the situation is opposite with a deficiency of rainfall. Therefore, recharge of groundwater is likely to occur in the cold season.

Moldovan rivers are a part of the Black Sea basin. The main rivers are Nistru and Prut, which have their springs in Carpati.

Land use

About 76 % of the area is occupied by agricultural land, 9.6 % are forests, 2.2 % is flooded land and 12.2 % is built-up area. Water supply of the cities is mainly from the rivers Prut and Nistru. Water supply of the rural population is mainly from shallow aquifers. Deep aquifers are the main sources of water supply for the state farms and some big industrial centers. The water quality of the shallow aquifers and some surface waters in Moldova is poor as a result of fifty years of over-intensive agriculture.

River basins and water resources

The country can be divided into three main river basins:

- The **Nistru River** basin. It covers about 57% of the country. Nistru has its origin in Ukraine and forms the border between Ukraine and Moldova in the north, north-eastern and south-eastern parts with an average annual discharge of 10 km³ into the Black Sea. The drainage system of the Nistru basin is different with a few rather big tributaries, each with a dense network of branches, draining large parts of the central part of Moldova. The Nistru valley itself is rather narrow with only a few small tributaries from Moldavian side. The River Raut, by far the biggest Nistru tributary in Moldova, drains the central northern part of the country. The Raut flows from Balti in northeastern direction, collecting water from all its tributaries from the north. It turns south-east near Floresti and joins the Nistru some 100 km further south at Dubasari, after collecting the water from all the branches of this stretch. Other big tributaries of the Nistru, crossing nearly the full width of the country, are the Bic that passes Chisinau and the Botna south of the Bic river.

- The **Prut River** basin. The Prut basin covers roughly one fourth of the country in the west. Most of the 30 tributaries that drain this part of the country are direct branches of the Prut. The Prut River, a tributary of the Danube, originates in Ukraine and forms the border between Moldova and Romania before flowing into the Danube just after crossing the border with Ukraine. The Danube River then continues for about 125 km before flowing into the Black Sea. Where the Prut River becomes the border between Romania and Moldova, its average annual flow is estimated at 2.9 km³. There are a number of small seasonal tributaries of the Danube

River Basin in southern Moldova that flow into the Danube after having crossed the border with Ukraine.

- The **southern** basins. In the southern part of the country, between the Nistru and Prut basins, there are several other rivers that originate in Moldova, flow across the border into Ukraine and then discharge into the Black Sea. Their basins cover about 8% of the country (Figure 4.1).

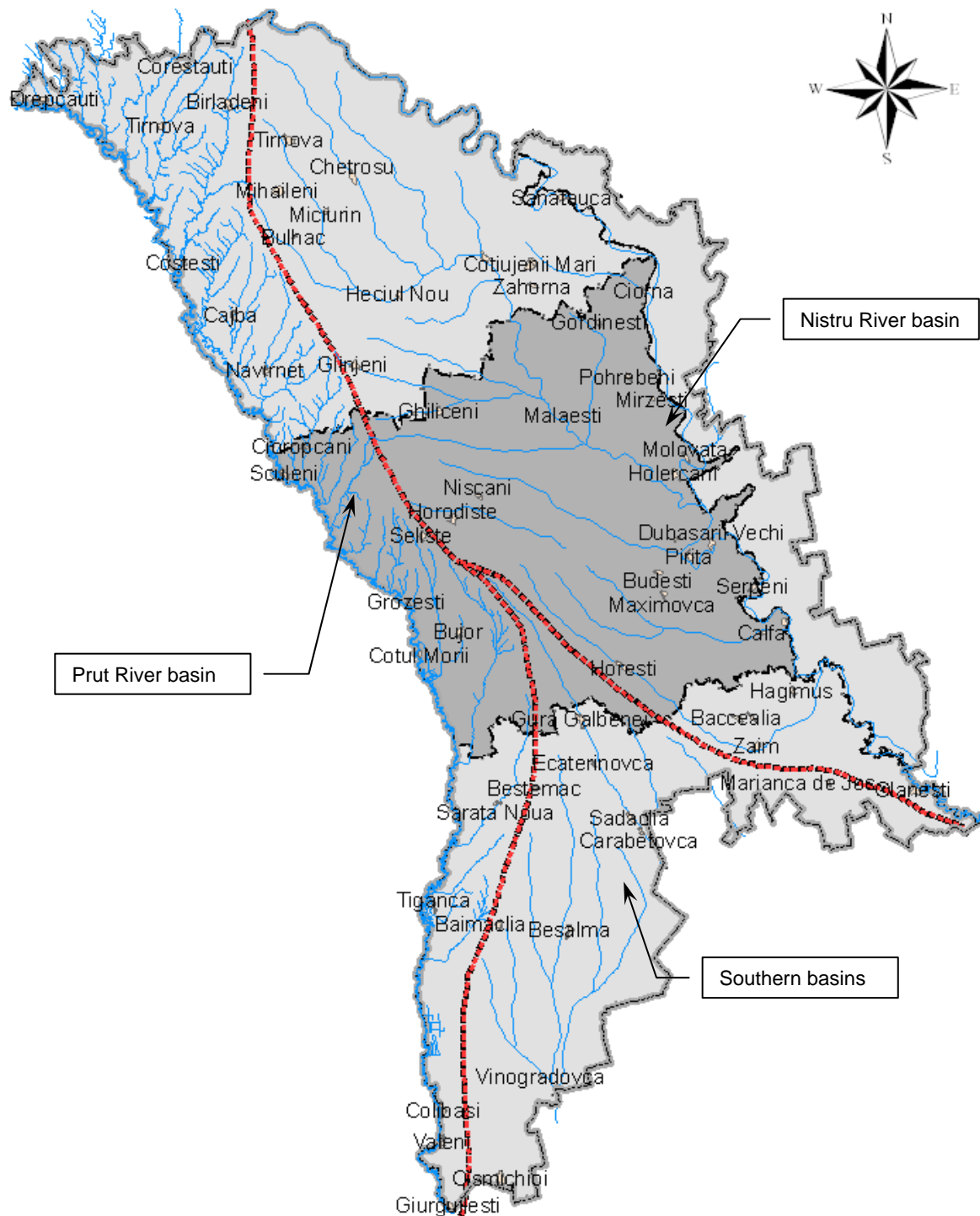


Figure 4.1 General situation map of selected rural localities

Figure 4.1 depicts general geographic situation of the selected rural localities. From the hydrogeological aspect, there are 19 localities in the Prut River basin, 36 in the Nistru River basin, and 10 localities in the southern small river basins.

The rural localities are from 32 administrative raions including the ATO Gagauzia.

In the northern part of the Republic of Moldova there are 19 villages that have a total area of 60 km². The total population number of all 19 localities is more than 59 thou. The Central raions are

comprised of 26 localities mainly along the Nistru and Prut rivers with the total surface 57 km² and more than 71 thou. inhabitants. In the Southern part of Moldova there were selected 20 localities with approximately 65 thou. inhabitants and a total surface area 54 km².

The total area of selected rural villages is 171 km², with approximately 195 thou. inhabitants.

4.2 Groundwater resources and quality in rural settlements

Drinking water in the rural areas is mainly fetched from dug wells. These dug wells are tapping the Upper Neogen and quaternary formations consisting of sedimentary rocks with high contents of clays and carbonate. Practically every house has its own dug wells in the yard with a diameter ranging from 1 to 2m. Groundwater tables are reached mostly within 10 m and the wells never become dry. The dug wells are generally very well constructed with good quality brickwork or concrete ring linings, often fenced and equipped with a roof of corrugated iron. Some dug wells are even decorated which demonstrates the awareness and sense of hygiene of the rural population when it comes to drinking water. Also the technical gear and constructions to fetch water by buckets are very well constructed with roller bearings and look very well maintained. Apart from the numerous dug wells, deep wells can also be found recognisable by the typical steel water towers. However, most of the deep wells are out of order nowadays.

4.2.1 Land use and shallow groundwater quality

The shallow phreatic aquifers of Quaternary or Neogene deposits in Moldova are lying on top of very thick clayey Pliocene and Miocene formations that separate them from the Sarmatian and Cretaceous aquifers at greater depth. The clayey base of these shallow aquifers is generally found at a depth between 3 and 30 m below the surface. The groundwater in these shallow aquifers is recharged and discharged at relatively short distances. Recharge of groundwater usually occurs by infiltration of rainfall in the higher part of hills and slopes. After passing through the aquifers, the groundwater discharges into the local streams or evaporates in depressions of the lower areas. Infiltration and discharge zones of these shallow aquifers may be at distances of some hundred metres up to a few kilometres.

Since there is no natural barrier between the aquifers and the pollution sources at the surface, it can be safely assumed that contamination of these open phreatic aquifers by anthropogenic sources of pollution may occur at any place where these sources occur unprotected. Polluted water will infiltrate and join the groundwater flows on their way towards the discharge areas. The level of chemical substances in the groundwater will accumulate in the direction of flow as more polluted locations are passed. This process may be partly reversed by reactions between the chemical substances and the sub-soil, when conditions are favourable. In some cases decay may bring down the concentration levels.

Pollution sources are usually directly related to land-use. Most villages and industries are situated in the valleys and on the lower slopes of hills, while the high slopes and plains are covered by arable lands or natural vegetation. In many cases the groundwater situation in the villages may thus be effected by the diffuse pollution from the arable lands at higher topographical levels.

Sources of Nitrate and Chloride in Shallow Aquifers

The following two major sources of nitrate can be mentioned which may end up in the shallow groundwater:

- Local pollution from leaking toilets, pit privies, animal stables and sheds, pigsties, chicken farms, uncontrolled open and leaking sewerage systems, etc.;
- NO₃ from an overdose of fertilisers and/or manure gifts.

The high NO_3 contents in the villages are obviously related to leaking toilets and animal stables, manure heaps, leaking sewers and other waste disposals. It is a common situation in rural areas where the soil is built up by porous sediments allowing nitrogen containing fluids with NH_4^+ , NO_2 , urea from excrements etc. to percolate easily downwards to the water table. Oxidation then results in NO_3 , which is stable in groundwater in an oxidic environment.

On the other hand NO_3 will be reduced to NH_4 and finally to Nitrogen gas by organic materials and minerals like Pyrite (FeS_2) when the nitrate-rich groundwater travel deeper in the aquifers. With groundwater travel times of more than 25 years most of the original NO_3 content is reduced.

In samples from the deep wells NO_3 is totally absent due to the reducing (anoxic) conditions in the deeper aquifers and the fact that the groundwater has a residence time of much more than 25 years, usually, tens or even hundreds of years.

The high concentrations of Total Dissolved Solids (TDS), SO_4 , NH_4 , is also an indicator of the anthropogenic pollution. The variability over short distance is great and the groundwater quality depends on the hydrological situation and the presence of polluting sources near houses and settlements.

4.2.2 Groundwater quality in deep aquifers

Deep wells consist of cased small diameter boreholes with depths usually more than 100 m. They are recognisable in the field by the typical rugged steel water towers used as storage and to maintain pressure in a piped distribution system. Deep wells are mainly found near former state farms, industrial plants, wine and tobacco factories and in some cases also near villages for water supply.

For the chemical analysis of the deep groundwater as described here, deep wells were selected with depths of more than 100 m. No distinction is made between the tapped aquifers (N_1S_1 , N_1S_2 , N_1S_3 and K_2) because of the general lithology which can be described as shallow marine carbonate aquifers with mappable limestone horizons, chalks, marls and varying amounts of clays and silts with high calcium carbonate contents. Geochemically there is no difference between the aquifer when it comes to groundwater.

The groundwater quality of the deep wells differs strongly from that of shallow groundwater. The most striking difference is the much lower hardness, the higher pH and the total absence of NO_3 . Hardness is usually much lower than 7 German degrees. This is typical for deep groundwater with residence times in the aquifers of tens and even hundreds of years. The groundwater is anoxic implying that all the NO_3 has totally been reduced. Due to the long residence times of many thousand of years, this deep groundwater has exchanged the Ca and Mg ions for Na from the marine Miocene clayey sediments. Sodium ions are adsorbed to the clay minerals in the marine Miocene sediments. When flushed with CaMg- HCO_3 types of groundwater, the Ca and Mg become adsorbed and Na is expelled from the clay minerals into the groundwater. This is well known as cation-exchange when marine sediments are flushed with fresh groundwater. This hydrogeochemical process yields the common NaHCO_3 or NaCl types of deep groundwater and the higher pH values of about 8. The long travel times of the deep groundwater in the Miocene sediments have also resulted in higher Cl contents. High Cl values can only be explained by man-made pollution and/or processes of dissolving Cl from marine sediments like the Miocene Rocks.

Inorganic Trace Elements in deep aquifers

High contents of fluoride (F) are found in some deep wells tapping groundwater which exceeds limits (set by EEC and Moldavian drinking water standards). The wells with fluoride concentrations exceeding the limits are found in the western part of Moldova with increasing concentrations near the Prut river. The explanation for this distribution is the fact that in this part of the aquifers the groundwater has the typical very soft NaHCO_3 type of water. The solubility product of NaF is much higher than CaF_2 (mineral Fluorite). Thus removal of Ca ions from the solution by adsorption and replacement with Na will result in increasing fluoride concentrations. Hydrochemical analyses of the collected data sets demonstrate that most shallow and deep groundwater aquifers are under-saturated with respect to CaF_2 even at high F concentrations. This also illustrates the effect of removal of Ca from the solution by cation exchange processes. The solution remains under-saturated with CaF_2 thus F can still be dissolved when CaF_2 is available in the sediments as a mineral.

4.3 Water quality suitability in rural areas

Chemical suitability of the shallow and deep aquifers for drinking water supply is presented in Annex I-A and B. The current assessment of groundwater quality is based on the hydrochemical information stored in a GIS database collected from: the State Hydrometeorological Service (SHS), the Geological Association of Moldova (AGeOM), State Scientific and Practical Center for Preventive Medicine (SSPCPM) and other agencies.

The most critical chemical components in both shallow and deep groundwater are: fluoride (F), chloride (Cl), sulphate (SO_4), TDS and in some cases NH_4 . The nitrogen (NO_3) is not involved in the evaluation since the concentration in almost all shallow well across Moldova exceeds the WHO/EEC and Moldavian standards. Therefore, only the concentrations of the above mentioned chemicals were used to prepare maps showing the suitability of the shallow and deep aquifers to be used as source for drinking water. There are two classes: suitable and not suitable. Suitable means that all five components have concentrations below the Moldavian standards. Non suitable means that at least one or a maximum of all five chemical elements exceed the maximum concentration limits.

The general suitability map illustrated in Annex I-A shows that most of the groundwater is not suitable for drinking water when compared to the Moldavian standards. In the northern part of Moldova and the Nitru basin area the shallow groundwater is more suitable for drinking purposes than in the southern part and Prut basin area. Almost for all rural settlements, according to the suitability map the groundwater is not suitable for drinking purposes. Most villages have one component exceeding the standard, while eastern and south-eastern parts show that the water is contaminated by two and more components.

The chemical suitability of deep groundwater aquifers shows interesting patterns, Annex I-B. According to the hydrogeological information stored in the database the most suitable for drinking purposes are the northern, eastern and southern regions of Moldova. Two and more chemical components make the quality of deep aquifers for Northern and Central regions being unsuitable for drinking purposes.

As it is observed from Annexes I-A and B the groundwater is not suitable to be used as drinking water according to the Moldavian standards of water quality. Application of different less strict standards from different countries (as an example the USA Fluorine maximum admissible concentration is 4 mg/l) may change the chemical suitability patterns observed.

4.4 SOCIO-ECONOMIC CONDITIONS

There are 541 water supply systems in the country, of which 46% correspond to the hygienic-epidemiological standards and 3% possess the necessary authorizations and licenses for their functioning. Only 17% from the rural population of the country are supplied with water from the district/centralized water supply systems, the rest of the rural population use the water mostly from wells. At present 150 thousand wells are used as individual decentralized water sources, they use the phreatic waters of an unsatisfactory quality in most of the cases due to the high contents of nitrates, sulfates, chlorates, high mineralization level, high level of water hardness etc. During the last years, in this context the presence of high content of nitrates, as well as the high degree of water mineralization has been recognized as the most dangerous facts regarding the quality of the potable water. At present 67% from the existent water supply networks in the rural localities does not correspond to the hygienic standards.

The closure of local health facilities, the lack of found for primary healthcare and the inability of patients to afford pharmaceuticals have led to further deterioration of health situation and also a greatly reduced the efficiency of public health monitoring, particularly in rural areas. The fact that the quality of medical service in rural areas is traditionally lower than in the large cities and declining suggests that morbidity statistics for rural areas most likely under – represent actual incidences of water related diseases.

Waters microbial pollution causes 35-40% of infections of intestinal diseases. The poor quality of drinking water is a factor witch determines up to 20-25% of acute diarrheic diseases and viral hepatitis A (especially in rural zones) and 15-20% of somatic diseases reported in the country. In case of other diseases the percentage is even higher (for example in the case of dental fluorosis 100%). During the elaboration of the National Environmental Action Plan (NEAP) in 1996 the first efforts to calculate the social and economic impact of water pollution have been made. The conclusion generated high concerns: the polluted drinking water (rural and urban) led to be between 950 and 1850 premature deaths annually. The monetary cost to the economy was assessed to be in the range of 5-10% of GDP. But the social negative effects of the illnesses and deaths caused directly and indirectly by the polluted drinking water are immeasurable and of big concern of the local government and for the international organizations.

The general objectives of the national acts is to improve the living conditions (the quality of life) and thus to contribute to the social economical development of the population in rural areas. Specific goals are the following:

- To create normal living conditions for the inhabitants by providing them potable water;
- To improve the sanitary hygienic situation of the villages;
- To reduce the risk of contracting diseases because of inadequate quality of water;
- To reduce and prevent the transboundary pollution of the aquatic environment;
- To instruct the local inhabitants regarding the importance of the hygienic environment issues;
- To create opportunities for economic development in the villages.

The proposed objectives result from the basic acute problems of rural communities, namely:

- The lack of water supply, distribution, treatment and sanitation system;
- The lack of an efficient water management system and of managerial capacities in the referenced systems.

5 ANALYSIS OF ALTERNATIVES

The water sources in Republic of Moldova have a high level of pollution which needs a complex of rehabilitation measures. Such low quality of the water is determined by the malfunctioning of most of the wastewater treatment plants. Self purification capacity of the natural waters is very low due to the imbalance of biological production in water ecosystems produced by anthropogenic factors.

The health conditions of population groups correlate with the quality of environmental compartments, specifically with the water quality. The nutrients compounds have a growing role in water courses pollution and also in human bodies. It penetrates in human organisms basically with drinking water. The discharges of waste water in rivers and generally in all water basins will result with very high probability to infections and parasitical diseases, especially among teenagers and children.

The main objective of this study is to ensure the environmental security, which consists in implementing a set of technical and organizational measures in order to keep as much as possible un-altered state of the environment and to recover the deteriorated components, so that to maintain the environmental balance.

As we know the project was divided into two main phases – one pre-feasibility phase when 15 towns all over the country were analyzed, and one feasibility phase for preparation of feasibility studies for ten towns selected from the first 15. On recommendation of the Consultant and after discussions with the Client and the World Bank the feasibility phase includes the following ten towns: Bălți, Cahul, Căușeni, Drochia, Fălești, Florești, Orhei, Rîșcani, Soroca and Ungheni.

At the recent common decision of WB and Moldova Government was included also the rural component of this project. Over 65 rural localities were considered for: 1) construction of new water supply network, 2) renovation of pumping stations, 3) cleaning of deep well (or drilling, if needed), 4) installation of new water tanks, 5) construction/renovation of deep well protection areas (fence of concrete pillars with barbwire), 6) installation of water pipelines, and 7) renovation/construction of power supply lines (including electrical power transformer, if needed).

5.1 Alternatives for RURAL SETTLEMENTS

Estimates of the investments in water supply system for rural localities required to secure that the water supply and sanitation systems can operate acceptably were prepared for a short period of time.

Actual alternatives with non existing water supply or critical situation of actual water pipes, wells and needs for water in rural areas don't have a real alternative at this moment. Just some localities received grants from different donors for construction or renovation of water supplies.

5.1.1 Water Supply System

If the water supply systems, in the rural areas from main source deep wells, are not reanimated it will stagnate at the same level and with small steps will decrease its potential. The loss will continue to increase constantly. The only alternative is to use the polluted water from phreatic wells.

5.1.2 Waste Water Treatment Plants

In the absence of the project financing the sewerage network and construction of new water waste treatment plants all waste waters will damage the environment and will increase pollution of underground and surface waters.

Just a few WWTP are functioning in rural area and not at whole capacity.

5.1.3 Actual (short term) investment priorities (year 2007 – 2009):

- construction of new water supply networks,
- renovation of pumping stations,
- Cleaning of deep wells (or drilling, if needed),
- Installation of new water tanks,
- Construction/renovation of deep well protection areas (fence of concrete pillars with barbwire),
- Installation of water pipelines,
- Renovation/construction of power supply lines (including electrical power transformer, if needed).

If adequate alternatives would be chosen the investments in base of this project can reduce environmental pressure and improve environmental quality of the water basins and the quality of life of rural residents. The alternatives were drawn on base of present situation, negotiating with local authority bodies and regarding Strategy on Water Supply and Wastewater Management, and National Water Supply and Wastewater Action Plan.

6 ENVIRONMENTAL IMPACTS AND RISK ASSESSMENT OF PROJECT ACTIVITIES

6.1 Potential Environmental Impact and Risk Assessment

Short-term rehabilitation and construction activities for rural settlements

1. The following short-term activities are expected to secure that the water supply and sanitation systems in rural localities included in the project:
 - construction of new water supply networks,
 - renovation of pumping stations,
 - Cleaning of deep wells (or drilling, if needed),
 - Installation of new water tanks,
 - Construction/renovation of deep well protection areas (fence of concrete pillars with barbwire),
 - Installation of water pipelines,
 - Renovation/construction of power supply lines (including electrical power transformer, if needed).

These activities impacts are however low compared with the benefits of the project and its overall positive impact on water environment and human health.

The Environmental issues likely to be associated with these activities include:

- Noise generation
- Impact on water quality and resources
- Impact on water by the construction run-offs
- Morbidity with water related diseases
- Disposal of water treatment sludge
- Disturbance during construction and rehabilitation works
- Protection of air quality from the construction dust
- Protection of historical/cultural areas
- Possibly result in removal or relocation of trees and vegetation

6.1.1 Impact of Noise

Most of the noise generated during rural road works and soil excavation is that of the earth-moving equipment including excavators, transportation vehicles and other heavy construction machineries. For all above specified activities, especially during rural road excavations, renovation and construction of new pumping stations there are houses within 10-50 m of the road works and construction sites for which the noise impact will be significant. Therefore, the noise level shall meet the required standards. Major mitigation measures include: (1) no construction at night (from 22:00 pm to 6:00 am) using heavy machinery near residential areas, (2) no discretionary use of noisy machinery, (3) good maintenance and proper operation of construction machinery, (4) installation of temporary sound barriers if necessary, and (5) avoiding large vehicles transport routes through residential areas.

6.1.2 Impact on water quality and resources

The proposed activities will most likely have positive impacts on water quality and resources. During renovation of water supply networks there will be significant improvement in water access by limiting the water loss and improve the quality of water pumped through the network.

Construction of water supply for social building in some rural localities can result in pollution of ground and surface water by wastewater due to the lack of sewerage system.

6.1.3 Impact on groundwater by the construction run-offs

During road excavations to renovate the water supply and sewerage networks there will be construction debris, and other solid wastes that could have adverse short-time impacts on the surrounding environment and especially on the underground water. The most practical and effective mitigation measure is timely clean-up. To minimize the impact, all on-site refuse must be stored in closed containers before disposal at landfill site. To prevent muddy runoff and soil erosion during storm rain, retaining walls and intercept ditches shall be built in construction areas to divert the muddy runoff into the storm water detention ponds for sedimentation prior to discharging to storm water drains.

6.1.4 Morbidity with water related diseases

Phreatic and surface water are polluted in almost 80% of rural localities with chemical and biological pollutants. Improved water supply and sanitation will have a positive impact on population health. The water related diseases will be minimized.

6.1.5 Disposal of water treatment sludge

This project does not include rehabilitation of WWTP if existent. If the local authorities will find additional financial support for construction or rehabilitation of WWTP or sewerage system the impacts will be included in annexes. A positive impact will have the proper disposal of the water treatment sludge and prevention of sludge run-off into surface water bodies and groundwater during rehabilitation and flushing of existing sewerage network.

6.1.6 Disturbance during construction and rehabilitation works

Rehabilitation and construction activities will produce short-term air pollution, muddy runoff, restricted access to buildings and roads, possible effect of vibration on old buildings, sewage and human waste, debris, spoils, and traffic congestion. Also the rehabilitation and construction works will possibly result in removal or relocation of trees and vegetation along or within the construction sites. These impacts are temporary and original vegetation must be recovered or replanted after construction.

Construction activities will possibly interfere with the existing utilities, e.g. water, storm water drains, gas pipelines, telecommunication cables, and power cables, etc., and will result in temporary suspensions of the services. Avoidance of and/or clearance with other utilities shall be carefully coordinated during the design and construction stages. Emergency measures including response plans shall be in place to minimize potential adverse impacts.

Environmental protection measures in connection with the construction activities are required as part of the construction contracts. Environmental friendly practices such as dust control, provision of storm water runoff detention ponds, controlled disposal of spoiled materials, and car/truck wheels washing before leaving the construction site are necessary measures to be specified in the construction contracts.

6.1.7 Protection of air quality from the construction dust

There will be possible negative short-term impacts on air quality from the construction dust, transportation and vehicle emissions. All vehicles and construction machineries shall be operated in compliance with the relevant vehicle emission standards and with proper maintenance to

minimize air pollution. Mitigation measures to minimize dust generation during construction include: (a) enclosure of demolition sites, (b) spraying dusty roads with water, (c) maintaining moisture on construction materials, (d) covering transportation vehicles, enforcing speed control, and selecting transportation routes to minimize impact on sensitive receptors, (e) covering or spraying exposed soil or storage areas, and (f) minimizing on-site construction material storage time.

6.2 Social – economic impacts during project activities

6.2.1 General background

Social-economic environment impact involves following elements: settlements, way of life, industry, number of work places, cultural heritage, ethnics, using of land funds, etc. The consequences of the relations between the mentioned components and certain ecosystems, cycles and interactions should be also considered.

The population in the proposed rural area is approximately 195 thousand inhabitants. The rural localities involved in present study have a poor mixture of industry. Many of the above mentioned rural localities were influenced by the 90's recession. Exception is a few cases because of the good industry mixture and social services and no dependence from governmental money.

The calculation of the monthly household revenue at the local level is difficult to accomplish in most Eastern European Countries. The situation is similar in Moldova. Usually the National Commission for Statistics (or similar entity) calculates the average household revenues at a national level without giving any values for county or local level.

6.2.2 Land acquisition and land rent

For implementation the project may acquire land for permanently and temporary use. It may be specifically necessary for some villages if there is a need to build/drill new deep wells, pumping stations or water supply civil buildings. In general frames, no resettlement is expected.

In cases if it's needed the land allocation will be done in accordance with the **Law of the Republic of Moldova “On Expropriation for the Public-Useful Scopes”** # 488-XIV dated June 08, 1999 (published in the Official Monitor of the Republic of Moldova # 42-44/311 dated April 20, 2000). The procedure is stipulated by this Law on lands expropriation from private owners for the public needs.

6.2.3 Persons affected by the Project

In the region of 65 stipulated villages would be a significant number of project affected persons in Moldova. Usually other nearby settlements will not be affected. A number of local people will be involved directly into the project implementation. They will be involved for such activities as:

- construction of new water supply networks,
- renovation of pumping stations,
- Cleaning of deep wells (or drilling, if needed),
- Installation of new water tanks,
- Construction/renovation of deep well protection area (fence of concrete pillars with barbwire),
- Installation of water pipelines,
- Renovation/construction of power supply lines (including electrical power transformer, if needed).

- Operation of water supply systems;
- Operation of pumping stations;
- Other works.

If appropriate human health and worker safety measures during construction are developed and implemented by the construction company, which will be responsible for these measures, no important negative impacts can be registered.

6.2.4 Transportation related environmental impacts

During the construction or reconstruction phase (excavation and pipe-laying), old water supply system or sewerage systems, transportation of different technologic parts there could be expected traffic congestion along the roads inside of the villages and near by. The conventional way to solve this problem is to build the side-tracks for vehicles during the construction. These temporary roads are usually narrow, and the vehicles will not be able to pass each other. During the construction, spoil encroaching on the road surface will be dusty and on wet days, the roads will be covered with mud and become slippery.

Another conventional opinion is to work during appropriate (e.g. non rush) hours.

Obligatory should be taken all the necessary measures in order to minimize the detrimental effects of network construction. Pro-active information will be implemented in order to have the considered residents or daily passers-by to be informed of the date and duration of the works in their area. This information will be disseminated through, local mass-media, articles, posters and meetings with population. The contractor will be required to implement safety and road signs in sufficient quantities and at the appropriate location, in order to facilitate the traffic diversion and to reduce the risk of jam and car accident.

6.2.5 Electric Power

During the implementation of the project, electricity may be temporarily cut-off. It regards all constructions or reconstructions including water supply systems, sewerage systems, etc. The procedure of public information through the posters, meetings and mass-media will be implemented.

It is not supposed to remove the existing power lines in case if any other construction units will be built or reconstructed. The construction may require some reorganization of power supply network, which may result in the temporary electricity cut-offs for the part of surrounding area, including for the residential and social buildings.

6.2.6 Cultural Properties

The main objects of cultural property are located several kilometers distance from the project area. The most important are churches, monasteries, monuments etc. Findings of archaeological or historical relics during the network excavation may possibly happen. The construction works will be coordinated and approved with the Ministry of Culture of Moldova; the representative of the Ministry will be appointed, responsible for the project supervision. Before any action is taken, a broad public information campaign will be carried out with the publication of the intended actions and works in the Official Monitor, display of posters, publication in local and central (as the Project will have National importance) newspapers, radio and TV advertising.

In case of any archaeological findings during the excavation works, appropriate measures will be taken for investigation, study and protection, in accordance with the Moldovan Law. First of all, the excavation and other works will be stopped in the area of chance findings, and the Works Supervisor and the Representative of the Ministry of Culture supervising the works will be notified immediately.

This procedure is regulated by the **Law on Culture of the Republic of Moldova # 413-XIV dated 27.05.1999** (Official Monitor of the Republic of Moldova # 83-86/401 dated 05.08.1999). The area of this Law involves the protection and using of cultural properties. The above procedure is also regulated by the Regulation on organization of Archaeological digging in the Republic of Moldova (approved by the Session of Archaeological Commission at the Ministry of Culture on 21 March, 2001).

6.3 Specific Social – Economic Impact for RURAL LOCALITIES

After project implementation in rural areas the most important impacts will be positive. It is expected to be better access to and quality of water resources for social buildings (schools, kindergartens, hospitals, etc.) and households.

7 ENVIRONMENTAL MANAGEMENT PLAN

7.1 Environmental Management Plan Background

Prediction of the potential adverse environmental and social impacts arising from development interventions is at the base of the environmental assessment (EA) process. An equally essential element of this process is to develop measures to eliminate, offset, or reduce impacts to acceptable levels during implementation and operation of projects. The integration of such measures into project implementation and operation is supported by clearly defining the environmental requirements within an environmental management plan (EMP).

EMP provides an essential link between the impacts predicted and mitigation measures specified within the EA report, and implementation and operational activities. The EMP document outline the anticipated environmental impacts of projects, the measures to be undertaken to mitigate these impacts, responsibilities for mitigation, timescales, costs of mitigation, and sources of funding. Environmental management plan (EMP) outline the mitigation, monitoring, and institutional measures to be taken during project implementation and operation to avoid or control adverse environmental impacts, and the actions needed to implement these measures. They provide a crucial link between alternative mitigation measures evaluated and described within the EA report, and ensuring that such measures are implemented. EA reports are essentially planning documents with no legal basis. In many cases, mitigation measures outlined in EAs are described in illustrative terms, or have neither been committed to by the borrower nor reflected in the project design. In this regard, the EMP is a basis for negotiation and reaching agreement with borrowers on a project's key social and environmental performance standards.

7.2 Organization for ENVIRONMENTAL MANAGEMENT PLAN

a. Project Implementation Unit

The implementation of the project will be divided into a three (3) main phases as follow:

- Pre-Construction Phase;
- Construction Phase;
- Operation Phase.

The implementation during all phases of the project will be managed by the Pilot Water Supply and Sanitation Project Implementation Unit including preparation, coordination with approval state agencies and will engage environmental monitoring and supervision organizations. Also Project Implementation Unit will prepare the environmental monitoring reports. The proposed general organization for Environmental and Social management of the project is presented in the following Figure 7.1.

To ensure that applicable national, provincial and municipal environmental laws, regulations and standards, as well as WB environmental and social requirements are respected during Project preparation and implementation, an Environmental and Social Specialist (ESS) was engaged temporarily by the PIU. During implementation the PIU will have a similar responsibility, using either a member of its staff or a temporary consultant as an ESS. This ESS will coordinate monitoring activities during construction with the contractors and concerned government agencies, in order to ensure the effective implementation of the mitigation measures decided in the EMP. Another responsibility will be to report concerning monitoring activity, compliance status and corrective actions to Government of Republic of Moldova, via PIU.

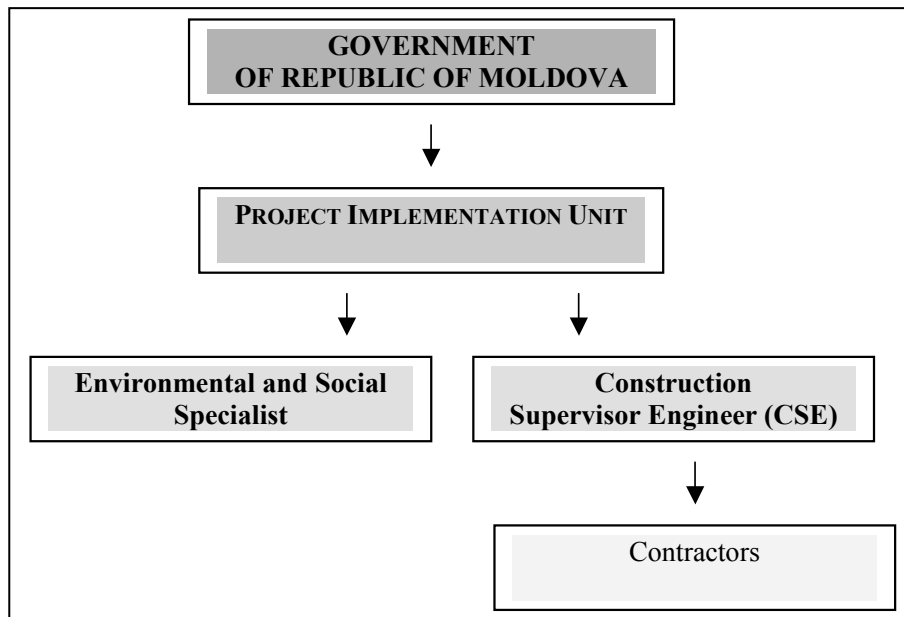


Figure 7.1 Organization for Environmental and Social management of the project

b. Governmental Institutions Support

The Government of Republic of Moldova through the Ministry of Ecology and Natural Resources RM and Agency “Apele Moldovei” will support and guide in monitoring activities and in the implementation of mitigation measures. In this way Local Environmental Inspection will control with local water authorities regarding monitoring of all related activities in its accordance with national environmental legislation and standards. Particularly it would be an act of control. The State Scientific and Practical Center for Preventive Medicine (SSPCPM) through its local office will provide assistance for random sampling of water drains and effluents inside and around contractor installations. These sampling and analysis will confirm or infirm the appropriateness of contractors' water quality monitoring.

c. Contractor and its obligations

Contractors are responsible for project construction and quality. As such they will be responsible for implementing the mitigation measures outlined in the EMP, bid documents, design documents and their construction contracts. To be effective, the environmental and social obligations of a contractor must be comprehensively specified and individually payable through the contract documents. The preparation of detailed environmental and social specifications for the Contractor will be a first mitigation measure proposed prior to the bidding process, with the objective to have a contractual document which establishes clearly the obligations of the contractor, the quantities of work involved and the related cost of measures.

d. Obligations of local water management authorities

In order to ensure the main Environmental Management Plan principles the Local Water Institutions would be responsible to present a quarterly environmental report to Project Implementation Unit about implementation of the environmental principles stipulated in EMP at local level. Local Water Institutions will provide respective inspection and monitoring of daily construction activities.

7.3 Capacity building program

Institutional Strengthening and Technical Assistance Program

This component will support Institutional strengthening and capacity building program; financial improvements and upgrading of equipment and materials; technical assistance with the Financial Action Plan; training of Local Water Institutions personnel based on a needs assessment to be prepared by the Local Water Institutions and the Technical Engineers/Advisors; and assessment and piloting of potential options to facilitate the involvement of local private operations in the sector. The institutional coordination, capacity building, communication, information exchange and stakeholder participation among relevant institutions will also be improved thereby reinforcing the management network for more efficient and effective operation and service provision.

Local Water Institutions environmental consultant responsibilities

For implementation of EMP, Local Water Institutions will hire an environmental consultant. He/she will:

- Help environmental responsible person from Local Water Institutions to monitoring all activities regarding EMP.
- To exam contractors proposals (in the light of environmental protection requirements) and identify the gaps not covered by the proposed measures or budget;
- To prepare the environmental clauses which will be included in the contractor's contracts for implementation of proposed activities;
- To ensure that contracts proposed by the contractors are prepared for agencies / companies which provide goods and services and environmental permits in conformity with national environmental requirements.
- To organize publishing of materials on environmental matters in the WSS sector for specialists and for general public;
- To organize undertaking of measures for improvement of documentation ensuring incorporation of environmental protection requirements into program or projects on construction/ rehabilitation of water supply and sewerage.
- To supervise independently or jointly with the State Ecological Inspectorate the mitigation and environmental protection measures stipulated in Environmental Management Plan for each activity included in EMP or future will be implemented;
- To ensure implementation of the monitoring plan as well as establishing of baseline for investment activities and efficiency of mitigation measures.

Environmental consultant will work closely also with technical engineers, Local Water Institutions staff, PIU, Raional Ecological Inspection, etc.

Specific trainings will be required focusing on monitoring observations and frequencies, the reporting of observations on standard forms, the communication procedures at construction site level, project and WSS sector management:

Needs of training	Training
Training for local official and non-official leaders and active persons	Creating and management of Local Water Institutions (Asociatii de gestionare a apei (ONG)) if that doesn't exist.
Training for responsible	Participation at specialized training regarding

environmental specialist of Local Water Institutions	environmental standards and regulations for WSS sector.
Training for Local Water Institutions staff and engineers	Training regarding EMP implementation (management, mitigation, monitoring, responsibilities, standards, regulations, etc.)
Training for Local Water Institutions staff	Project management and financial regulations Including special software and methods
<p>For reducing the training budget the PIU and Local Water Institutions can organize common training courses because of small number of participants from each rural localities.</p>	

8 Environmental Management Plan - RURAL LOCALITIES

The impacts of the WSS project in the rural localities are limited and are primarily related to the impacts associated with the:

- Construction of new water supply networks for social buildings and installation of water pipelines.
- Renovation of pumping stations,
- Cleaning of deep wells (or drilling, if needed),
- Rehabilitation of existing water tanks,
- Renovation of deep well protection areas (fence of concrete pillars with barbwire),
- Operation of water supply systems;
- Operation of pumping stations;

Table X. Mitigation & Monitoring Plan (MMP) .

Phase Planning/Project Preparation - P Construction - C Rehabilitation - R Operation - O Decommission - D						Component and Activity	Impact or Concern (Environmental – E Social – S Economical - Ec)	Mitigation Activities	Responsible Authority for Implementing Mitigation	Monitoring Requirements and parameters	Responsible Agency for Monitoring and Enforcement
P	C	R	O	D							
	C	R	O		Cleaning of deep well (or drilling, if needed), Construction of new water supply network for social buildings / Installation of water pipelines. Household connections and business entities connection to this main pipeline will be possible if they will contribute 100% cost of connection.	S , E c	Better access of social buildings (schools, kindergartens, hospitals, etc.) and population to water resources. 24/24 hours per day quality water.	Repair and maintenance daily water supply network.	Local water authority / Mayoralty	Periodic inspection water supply network.	Local water authority / Mayoralty / PIU
P		R	O		Construction/renovation of deep well protection area (fence of concrete pillars with barbwire),	E , E c, S	Improvement of the water quality	Repair and maintenance daily water supply network.	Local water authority / Mayoralty	Periodical tests water quality	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
			O		Construction/renovation of deep well protection area (fence of concrete pillars with barbwire),	S	Reduction in morbidity associated with improper water treatment and distribution. The life expectancy will increase	Repair and maintenance daily water supply network.	Local water authority / Mayoralty	Periodical tests <u>for</u> water quality	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty

Phase Planning/Project Preparation - P Construction - C Rehabilitation - R Operation - O Decommission - D					Component and Activity	Impact or Concern (Environmental – E Social – S Economical - Ec)	Mitigation Activities	Responsible Authority for Implementing Mitigation	Monitoring Requirements and parameters	Responsible Agency for Monitoring and Enforcement
P	C	R	O	D						
	C	R				Dust generation	Vehicles delivering materials should be well maintained and covered to prevent/reduce spills, emissions and dispersion To plan carefully construction works to minimize air pollution employment of dust suppression measures, use traffic routing measures, bound construction areas	Contractor	Periodical tests for air pollution, immediate actions in case of complains from nearby residents	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
	C	R				Pollution by waste gas from construction machinery and transport vehicles	Repair and maintenance of construction machinery and transport vehicles will be strengthened at normal time; traffic control will be properly done to avoid traffic jam and reduce gas emission	Contractor	Air quality monitoring	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
	C	R				Noise pollution/vibrations from hauling tracks/ moving vehicles and working equipment	Control construction methods and used machinery and equipment Careful timing of works in residential areas/ restrict construction to certain hours To avoid loud beep signals in settlements/ to minimize disturbance to residents	Contractor	periodic inspection of construction activities to ensure equipment noise and dust abatement systems are in place; work is carried out during normal construction hours	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
	C	R				Littering of territory adjacent / road / garden damage to landscape due to waste & excavated materials disposals/ stockpiling of materials	To plan carefully construction works to minimize impact on flora, fauna, habitats/ careful sitting, alignment, design of associated infrastructure to minimize impacts	Contractor/ Local water authority / Mayoralty	periodic inspection of construction activities,	Raional Ecological Inspection, Mayoralty

Phase Planning/Project Preparation - P Construction - C Rehabilitation - R Operation - O Decommission - D					Component and Activity	Impact or Concern (Environmental - E Social - S Economical - Ec)	Mitigation Activities	Responsible Authority for Implementing Mitigation	Monitoring Requirements and parameters	Responsible Agency for Monitoring and Enforcement
P	C	R	O	D						
		R				E Odor from dredged anaerobic sediment is to be expected.	clean regularly the vehicle, that will be maintained periodically for normal operation, to monitor and control the odor;	Contractor/ Local water authority / Mayoralty	Air quality monitoring	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
	C	R				E Accidental potential pollution of soil and surface waters	To plan carefully construction works to minimize impact on water resources To prevent leaks/spills during transportation/loading-unloading of constructional materials	Contractor/ Local water authority / Mayoralty	Periodical tests of surface and underground water quality	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
	C	R				E Rehabilitation and construction works will possibly result in removal or relocation of trees and vegetation along or within the construction sites.	To plan carefully construction works to minimize impact on flora, fauna, habitats/careful siting, alignment, design of associated infrastructure to minimize impacts Replanting trees and vegetation after rehabilitation	Contractor/ Local water authority / Mayoralty	Preventive measures, Periodic site inspection	Raional Ecological Inspection, Mayoralty
					Renovation of pumping stations and other civil buildings	Impact of accidental discharge of pollutant	Emergency measures for specific accidents will be worked out, so that control and solution can be done promptly in case of an accident; In case of an accident, the cause will be found out as soon as possible, to organize prompt repair and to solve the problem in the shortest possible time, to prevent spreading of pollution / leakage. To prevent leaks/spills during transportation/loading-unloading of waste materials and waste water To plan carefully construction works to minimize air / water / soil pollution	Contractor/ Local water authority / Mayoralty	Periodical tests of surface and underground water quality	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty

Phase Planning/Project Preparation - P Construction - C Rehabilitation - R Operation - O Decommission - D					Component and Activity	Impact or Concern (Environmental – E Social – S Economical - Ec)	Mitigation Activities	Responsible Authority for Implementing Mitigation	Monitoring Requirements and parameters	Responsible Agency for Monitoring and Enforcement
P	C	R	O	D						
						<p>Complying with the technical design documents and effective construction norms</p>	<p>To be certain that the project implementation is complying with the technical design documents and effective construction norms.</p> <p>Verify if:</p> <p>Appropriate human health and worker safety measures during construction are developed and implemented by the construction company, which will be responsible for these measures;</p> <p>The documents prepared for specific works by the construction company are correct;</p> <p>The reconstruction works are conducted in accordance with construction norms and according to construction technologies;</p> <p>construction timetables and traffic diversion schedules at the project site are posted</p>	Contractor/ Local water authority / Mayoralty	Hire local technical supervisors, responsible for verifying the quality of performed reconstruction works	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty
						<p>Complying with the Environmental standards and legislation documents and effective construction norms</p>	<p>The following activities will be mitigated during construction works:</p> <p>Waste materials including asbestos roofing at site will be taken to proper disposal area and authorized location after a preliminary approval by Local Environment Inspection (if exist).</p> <p>Safety Precautions during asbestos roofing removal will include performing of all works with appropriate protection measures. After removal, the roofing will be stored in an isolated location, authorized by Local Environment Inspection and environmental specialist;</p>	Contractor/ Local water authority / Mayoralty	Hire local environmental supervisor, responsible for verifying the environmental requirements	State Sanitary Inspection, Raional Ecological Inspection, Mayoralty

Phase Planning/Project Preparation - P Construction - C Rehabilitation - R Operation - O Decommission - D					Component and Activity	Impact or Concern (Environmental - E Social - S Economic - Ec)	Mitigation Activities	Responsible Authority for Implementing Mitigation	Monitoring Requirements and parameters	Responsible Agency for Monitoring and Enforcement
P	C	R	O	D						
							<p>In order to protect the environment, after the opening of the platforms for garbage accumulation at each site will be installed. The platforms will be installed in accordance with environment requirements.</p> <p>At all sites the downspouts shall be connected to drain pipes, in order to prevent and to remove the water away from the foundation;</p> <p>The perimeter of the grounds will be properly sloped to ensure adequate drainage at all construction sites;</p> <p>Use materials of the best quality consistent with the character of works;</p> <p>Branded materials will be handled, stored, used and processes carried out, in strict accordance with manufacturer's instructions and recommendations;</p>			

8.1 Cost estimates and sources of funds for EMP

Decisions regarding appropriate mitigation measures should be justified by an economic evaluation of potential environmental impacts, aimed at:

- Measuring the cost-effectiveness of different mitigation options where a project is required to meet a set of environmental standards or achieve specific environmental objectives;
- Determining the appropriate level of mitigation where there is scope for a trade-off between environmental quality and the costs (and benefits) of achieving it.

The implementation of the EMP measures relies on the intervention of several agencies using their internal budgets. Most of the activities involving routine measurements, field sampling or testing are to be provided by the Local water institution or by the contractor would be included in its proposal costs.

Draft budget for EMP implementation (USD)

Budget line	Description	2008	2009	2010	Total	Comments
Training for responsible environmental specialist of Local water institution	Participation at specialized training regarding environmental standards and regulations for WSS sector.	200			200	To be increased, if necessary
Training for Local water institution staff and engineer	To organize a training regarding EMP implementation (management, mitigation, monitoring, responsibilities, standards, regulations, etc.)	200			200	To be increased, if necessary
Training for Local water institution staff and Mayoralty	Project management and financial regulations	200			200	To be increased, if necessary
Public awareness	Leaflets, booklets, placards, local TV-radio stations / newspapers information demission	200	200	200	600	To be increased, if necessary
Additional field studies		tbd	tbd	tbd	tbd	The needs for additional field studies may be raised during construction and rehabilitation activities of WSS. The cost can not be carefully predicted. It is recommended maintaining a certain financial reserve.
Monitoring of mitigation measures during construction phase	Implication of resource expertise	400	300	300	1000	The needs for additional specific inspection/monitoring of EMP requirements may be raised. The cost can not be carefully predicted. It is recommended maintaining a certain financial reserve.
	Analyses / laboratory investigations of water quality , air, soil	500	500	500	1500	A part of these laboratory investigations can be covered by raional laboratory of Preventive Medicine authority. The needs for additional specific inspection/monitoring of EMP requirements may be raised. The cost can not be carefully predicted. It is recommended maintaining a

Budget line	Description	2008	2009	2010	Total	Comments
						<p>certain financial reserve.</p> <p>In case of 2-3 localities from the same Raion will need the same investigations they can contribute to one common contract with laboratory to minimize the expenses.</p>
TOTAL		1700	1000	1000	3700	

9 PUBLIC PARTICIPATION, INFORMATION AND CONSULTATIONS

9.1 *Public participation in project implementation*

The implementation of the project will include such components as public consultation, information and public participation in decision making process at all phases as Pre-construction, Construction and Operation. All these activities are based on **Convention on access to information, public participation in decision-making and access to justice in environmental matters (signed by Republic of Moldova (Aarhus, Denmark, 23rd – 25th of June 1998), Law about access to information (Law of Republic of Moldova Nr.982-XIV from 11.05.2000) and Law about Environmental Expertisation and Environmental Impact Assessment (Law of Republic of Moldova Nr.851-XIV from 29.05.1996).**

Public participation is an integral part of the planning process to ensure that the plan takes into account the needs and concerns of the users the system is intended to serve. Public participation is particularly important for the development and planning of any large construction and rehabilitation works. The utilities will include the public participation, awareness and education component in their plans. The utility identified of all stakeholders to be reached through education and awareness rising and the extent of public participation and consultation in decision-making.

The specific publicity campaigns, stakeholder consultations, working groups, advisory groups, and surveys will be used during the project implementation period and later, after the completion. As soon as the proposed Project will have the national importance rather than the regional one, information will be distributed also via the Republican mass-media, including the newspapers, radio, TV.

9.2 *Objective and method*

The Objectives of the Public Consultations Study are:

- To provide information to water consumers and other key stakeholders about the improved of water quality, the risks associated with the discharge of polluted waters into the natural water bodies, the costs of improvements etc.;
- To involve the public into the implementation of project. For this scope it was necessary to assess and analyze the opinions of the population living in the area of the proposed projects.

This general Objective involves the following specific goals:

- Identify the opinions of the surface water bodies, and indirect Danube river region population concerning the proposed works on construction / rehabilitation and further operation of WSS systems in their respective villages;
- Identify the opinions of non-governmental and governmental workers concerning the proposed activities;
- Identify the main positive and negative impacts of the proposed project on natural, social, cultural, economic environment;
- Identify the main issues of concern and mitigation measures and responsible parties for their implementation.

Target Groups of the study:

- Local government in 65 rural localities;
- Public health and environmental inspectors from raional authorities ;
- Water consumers living in different parts of the villages and therefore having different access to water supply and canalization services, because of the lacks in development of water and wastewater systems in Moldova;
- Representatives of ethnic communities;
- NGOs – a voluntary organizations of citizens created by them in order to pursue common interests and advocate for the realization of civil, economic, social and cultural rights;
- Business representatives.

9.3 Public Consultation Planning

In the period 12-29 February 2008 the Report would be published in mass-media sources as:

- web pages;
- articles in local newspapers,
- E-mail

Also it will be sent to local Mayoralty, NGOs for information and comments. The necessary expenditures for publications would be provided from local sources of Local Water Institutions and PIU.

Starting with 12st of February Draft of the Environmental Assessment Report will be presented to the all relevant institutions and interested people for consultation. Its supposed to meet Local Public Administration, Local Environmental and Preventive Medicine bodies, NGOs, mass-media, interested people, others. Schedule of the consultations is presented below:

Nr.	Locality	Perriod	Expert	
1.	Balti town	Localities from North part of country	26 th of February	S. Budesteanu / R. Bajureanu
2.	Cahul town	Localities from South part of country	27 th of February	S. Budesteanu / R. Bajureanu
3.	Chisinau town	Localities from Central part of country	28 th of February	S. Budesteanu / R. Bajureanu

10 CONCLUSIONS

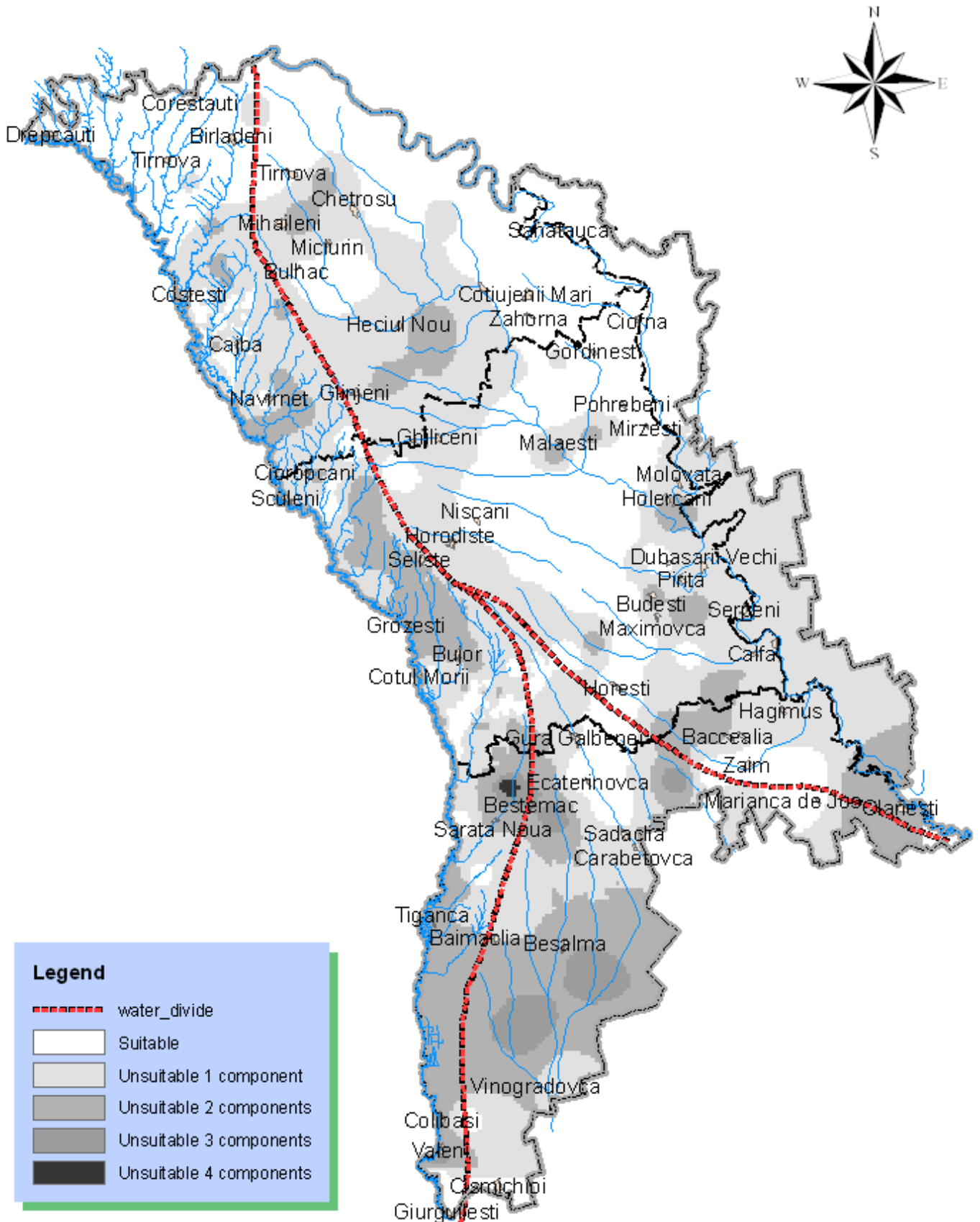
The proposed project development objectives (PDO) are to (i) support the Government's effort to improve water and sanitation services through implementation of Second Water Supply and Sanitation Project that would channel most or all national and external financing to the sector along programmatic lines; and (ii) apply the policies of the Second Water Supply and Sanitation Project to improve water supply and sanitation services in selected localities.

This objective will be achieved through the rehabilitation, improvement, and expansion of water supply systems, as well as enhancing overall management of the water sector:

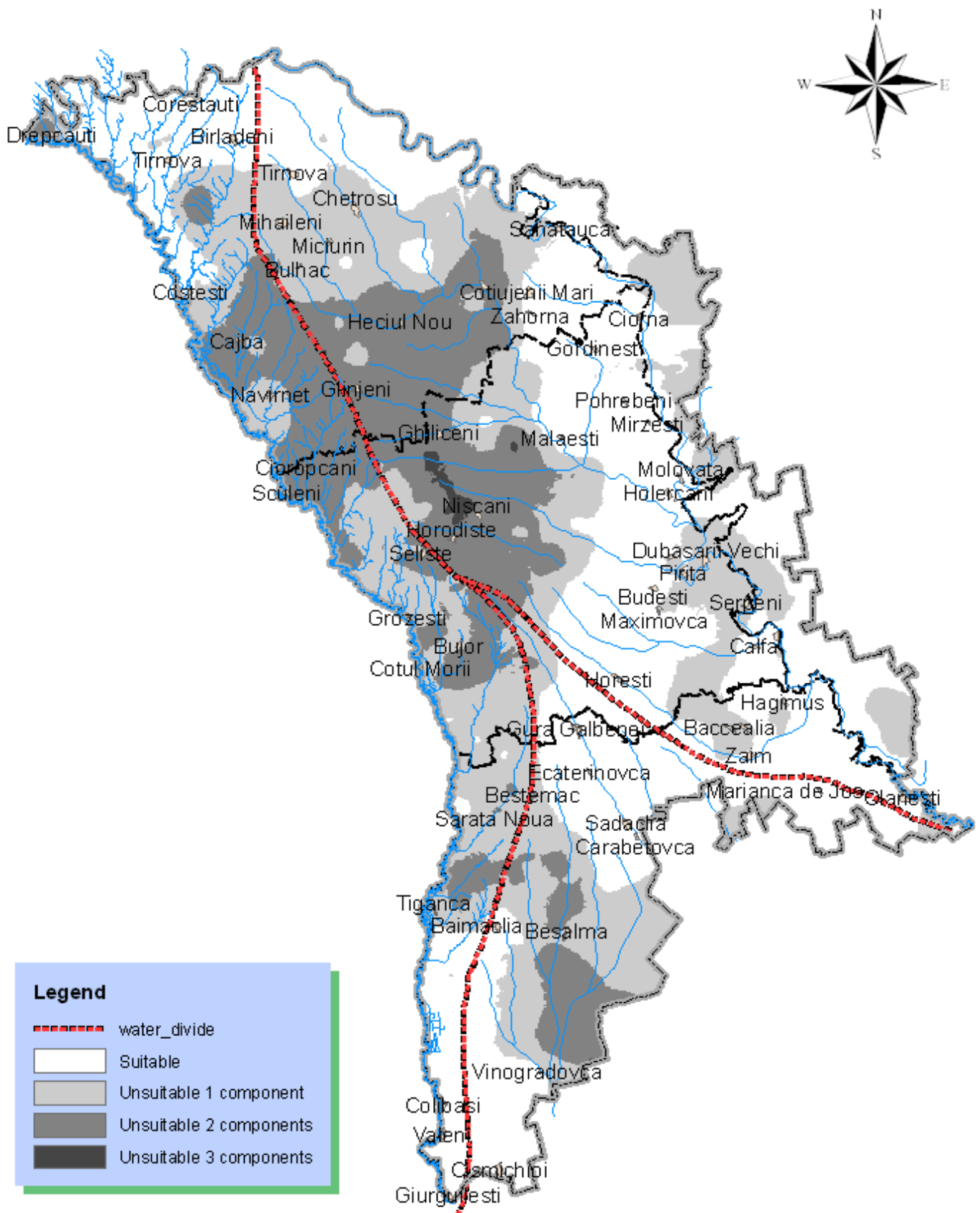
- Construction of new water supply networks,
- Renovation of pumping stations,
- Cleaning of deep wells (or drilling, if needed),
- Installation of new water tanks,
- Construction/renovation of deep well protection areas (fence of concrete pillars with barbwire),
- Installation of water pipelines,
- Renovation/construction of power supply lines (including electrical power transformer, if needed).
- Operation of water supply systems;
- Operation of pumping stations;

The current Environmental Assessment demonstrates that the project will not have any major negative environmental impacts. However, there could be some short-term impact on the environment mainly during construction and rehabilitation works which is explained in Annex II. Additional conclusions will be added soon.

Annex I-A: Water quality suitability for shallow aquifers



Annex I-B: Water quality suitability for deep aquifers



Annex II Potential impacts - RURAL LOCALITIES

In the region of 65 stipulated villages would be a significant number of project affected persons in Moldova. Usually other nearby settlements will not be affected. A number of local people will be involved directly into the project implementation. They will be involved for such activities as:

- Construction of new water supply network ,
- Renovation of pumping stations,
- Cleaning of deep well (or drilling, if needed),
- Rehabilitation of existing water tanks,
- Construction/renovation of deep well protection areas (fence of concrete pillars with barbwire),
- Installation of water pipelines,
- Operation of water supply systems;
- Operation of pumping stations;
- Other works.

Project interventions at different phases	Environmental impacts			Impacts classified by:		Mostly affected environment						
		Positive	Negative	Type	Magnitude	Socio-economic	Human	Bio-physical				
								Ambient air	Surface water	Ground water	Soil	Biodiversity
Construction of new water supply network, Installation of new water tank, Installation of water pipelines, Renovation of pumping stations, Renovation of civil structures of water supply	Better access of population and social institutions to water resources. 24/24 hours per day quality water.	x		Permanent, Direct, Local ,	Significant	x	x			x		
	Improvement of the water quality	x		Local , Direct	Significant	x	x			x		
	Reduction in morbidity associated with improper water treatment and distribution. The life expectancy will increase	x		Local	Significant	x	x			x		
	Reduce impact of infiltration of pollutant in soil and ground water	x		Local	Significant				x	x	x	
	Dust generation		x	Local, reversible, temporal	Minor		x	x	x			
	Reduction of water leaks and water losses	x		Permanent, Local ,	Significant	x	x		x	x	x	
	Noise pollution/ vibrations from hauling tracks/ moving vehicles and working equipment		x	Local, reversible, temporal	Minor		x	x			x	x
	Littering of the adjacent territory / road / garden damage to landscape due to waste & excavated materials disposals/ stockpiling of materials		x	Local, reversible, temporal	Minor		x		x		x	x
	Disturbance during construction;		x	Local, reversible,	Minor		x					

Project interventions at different phases	Environmental impacts		Impacts classified by:		Mostly affected environment							
	Positive	Negative	Type	Magnitude	Socio-economic	Human	Bio-physical					
							Ambient air	Surface water	Ground water	Soil	Biodiversity	
			temporal									
Soil pollution by components of combustion gases emitted by construction vehicles (esp. heavy metals)		x	Local, reversible, temporal	Minor					x	x	x	
Rehabilitation and construction works will possibly result in removal or relocation of trees and vegetation along or within the construction sites.		x	Local, reversible, temporal	Minor								x
Pollution by waste gas from construction machinery and transport vehicles		x	Local, reversible, short term	Minor		x	x					
Reduced access to residences and or businesses during the period of construction		x	Local, reversible, short term	Minor	x	x						
Reduced pedestrian access		x	Local, reversible, short term	Minor		x						
Impact of accidental discharge of pollutants		x	Local, reversible, short term	Minor		x	x	x		x	x	
Rational use of fixed reserves and spaces, improvement of sanitary and social conditions, using of modern heating systems and ecologically safe construction materials, improvement of aesthetic view, improvement of drainage systems	x		Local, long term	Significant		x	x	x	x	x	x	
Appropriate human health and worker safety measures during	x		Local	Significant		x						
Use of appropriate construction methods	x		Local	Significant	x	x						
Collection of construction waste/ collection asbestos separately from other waste	x		Local	Significant		x	x	x	x	x	x	
Restoration of lands, trees and grass planting	x		Local	Significant								x
Clean-up of construction sites	x		Local	Significant						x	x	
Damage to cultural/heritage structures		x	Local	Negligible	x							x