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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

AND

GOVERNMENT

OF THE

REPUBLIC OF KAZAKHSTAN

Agricultural Competiteveness Project (ACP)

Environmental Review

DRAFT

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Note: This report has been translated from an original one in Russian language.

Acronyms

ACP	Agriculture Competitiveness Project
DEE	Department of Ecological Expertise
EA	Environmental assessment
EE	Ecological expertise
EIS	Environmental impact statement
EIA	Environmental impact assessment
FI	Financial intermediary
ECA	Europe and Central Asia region (World Bank)
FSU	Former Soviet Union
GDP	Gross domestic product
GLP	Good laboratory practice
CC	Coordination Center
CCEMS	Coordination Center environmental monitoring specialist
CGS	Competitive Grants Scheme
HYV	High Yielding Variety
IEC	Important environmental component
ISO	International Organization of Standardization
KZT	Kazakhstan tenge
MIS	Marketing information system
MEP	Ministry of Environmental Protection
MOA	Ministry of Agriculture
NEAP/SD	National Environmental Action Plan for Sustainable Development
NGO	Non-government organization
OP	Operational policy
OECD	Organization for economical co-operation and development
PRP	Peer Reviewing Panel
SITC	Standard International Trade Categories
UN	United Nations
UNECE	United Nations European Commission for the Environment
WB	World Bank

1 $ US = approximately 136 Kazakhstan tenge

1. INTRODUCTION AND BACKGROUND

1.1 Purpose

The purpose of this environmental review is to ensure that the Agricultural Competitiveness Project (ACP) meets the requirements of the World Bank as set out in Operational Directives 4.01 for financial intermediary projects.
The review consists of four main components: i) a review and summary of relevant legislation and the adequacy of the legislation to ensure environmental protection as it relates to the Project; ii) an analysis of probable impacts, mitigation and residual impacts of agricultural activities that would qualify for Project loan financing; iii) an analysis of the capacity of the Government of Kazakhstan and participating institutions, to recognize and address impacts of any activity for which a grant is being requested; and, iv) guidelines for environmental management of the project.

1.2 Agricultural Competitiveness Project (ACP)

Agrofood sector is essential for social and economic development of Kazakhstan that is why the agrofood policy is one of the priorities for the national development. The main component of the agrofood policy should be aimed to expand sales of the agricultural produce of Kazakhstan. That expansion should be accomplished due to both internal and external markets and this firstly requires increasing internal and external competitiveness of the Kazakhstani agrofood produce and agricultural raw materials.

To achieve the qualitative competitiveness of the produce it is required to take measures to introduce modern standards and methods to control them along the food chain for the major products, the first one should be the livestock products. This is particularly relevant due to new agricultural structure based on a small-scale commodity production. The public support to form modern market infrastructure for carrying the products from a field till the final consumer which is particularly acute under small-scale structure of the primary sector. Cooperative marketing associations and unions, marketing information system for market agents and entrepreneurs are required. Activities to enhance image of the Kazakhstani agricultural produce including and with a help of increasing the environmental indicators of production, developing and implementing of the environmental certification system and eco-marking will be contributed to the growth of competitive advantages of the Kazakhstani agricultural production.

The Project will consist of the following four components: (a) quality and safety management of agricultural products (b) agricultural marketing, (c) applied agricultural research and extension; and (d) institutional development and agricultural policy.

(a) Quality and Safety Management of Agricultural Products. The component will enhance the management of food safety control and quality certification along the value chain. It will comprise the following two sub-components:

Subcomponent 1.1. Harmonization and Development of Standards. The subcomponent will strengthen the ongoing effort of standards harmonization, including the safety (public) standards required by the Sanitary and Phytosanitary Agreement of the WTO and a set of quality (private) standards including organic production. To do so it will establish a Group of Experts on harmonization of regulations and standards of quality of agricultural products, and it will provide training on introduction of regulations and standards.

This sub-component will also introduce standards to certify and monitor organic production, a niche for which Kazakhstan's limited recent use of agro-chemicals (since Soviet era) and climate can provide a comparative advantage (the long cold winters reduce the incidence of many agricultural pests.)

Subcomponent 1.2. Quality and Safety Monitoring. The subcomponent will improve the capacity of the public and private sectors to monitor food quality and certify standards of agricultural products through an internationally recognized system for testing and monitoring of quality and safety. The component will:

- ③ establish two National Reference Laboratories in Astana and train its staff
- ③ modernize seed and input testing laboratories
- ③ provide training and financial incentives (matching grants) for accrediting necessary public and private line laboratories as needed along the value chain.

(b) Agricultural Marketing Component. The component will improve agricultural producers' and processors' understanding of markets, ensure equal access to information, and promote the country's image to facilitate exports. It will develop the Marketing Information Systems of the Ministry of Agriculture and support development of marketing-oriented infrastructure along value chains (co-financing milk collection points, slaughter houses, storage and primary processing such as grading, cleaning, packing facilities, distribution networks, etc.). The component will comprise the following three subcomponents:

Subcomponent 2.1. Strengthening the existing Marketing Information System. The subcomponent will strengthen the existing system in the following three aspects: (i) adding quality classifications and price differentials to the existing price lists; (iii) increasing the frequency of price provided, providing at least a daily frequency for perishable agricultural products, (iv) complementing the existing web page with means of easier access to farmers and traders, such as mass media (newspapers, radios, TVs) and cellular phones; (v) strengthen the monitoring of information use, and (vi) training of staff.

Subcomponent 2.2. Development of Market-Oriented Infrastructure. The subcomponent will provide financial incentives to the private sector to increase its investment in marketing-oriented infrastructure. It will co-finance up to 40% of the cost of up to 200 post harvest infrastructure subprojects (or at least 1-2 subprojects in all districts of the two economic corridors) such as milk collection points, slaughter houses, storages, distribution networks, establishing of marketing associations or partnerships, etc. for the identified priority commodities in the northern and southern economic corridors. Business plans of proposals will be reviewed through the same system developed for the competitive grant scheme.

Subcomponent 2.3. Improving of the image of the agriculture of Kazakhstan. The subcomponent's activities will promote the image of Kazakhstan's agriculture and its produce in foreign markets and will include (i) holding relevant information campaigns / advertisement; and (ii) participation in fairs and international events to advertise the country agricultural products; and (iii) establishing/supporting a small Trade Promotion office and provide special training required to perform this specialized task.

(c) Applied Agricultural Research and Extension Component. The component comprise the following three subcomponents:

Subcomponent 3.1. Competitive Funding System. The subcomponent will set up and implement a competitive funding scheme for applied research and extension. This approach (called Competitive Grant Scheme, CGS) separates funding from delivery of research and extension services. Taking into account the present institutional situation and the medium term forecasts, the funding of research, extension and training will remain largely public, while the delivery, although still prevailingly in public hands, could become increasingly open to the private sector and civil society organizations. Thanks to this combined approach, a gradual move towards higher levels of engagement by the private sector and agricultural organizations will improve efficiency, dissemination, and adoption.

International experience proves that the CGS approach can contribute to increased adoption and transfer of technology because the approach strengthens the relationships between research centers and private farmers in setting priorities, formulating and evaluating proposals, and delivering the services. The proposed competitive funding system will complement but not substitute the core funding of the agricultural knowledge system.

Subcomponent 3.2. Support to the Public Research System. The subcomponent will also provide technical assistance to complete the design, implement, and monitor the draft plan to reorganize the existing agricultural research and knowledge transfer system. This subcomponent will also finance advance education for 60 young scientists.

Subcomponent 3.3. Public extension network. The subcomponent will establish a public network of extension. The MoA intends to proceed with the expansion of its presence in the rural areas, employing at least one extension agent per district and one extension supervisor per Oblast; altogether, this will represent about 200 new field staff in all 160 districts of the country and 14 supervisors.

(d) Institutional Development and Agricultural Policy. The component will comprise the following two subcomponents.

Subcomponent 4.1. Institutional Structure. According to international experience, the institutional setting of competitive grant systems requires setting up three bodies: (i) Governing Board, (ii) Secretariat, and (iii) Reviewing Panel.

The *Governing Board* will have the responsibility of defining the strategic guidelines of the project, including the funding systems under the previous three components. All major decisions of the Governing Board will be recorded in the project operational manual, which will be approved and revised by the Board. It will regularly meet four times per year, plus eventual extraordinary meetings as necessary (but not more than six time a year). The Board will be composed of 11 members with voting rights and by the Director of the Secretariat, without voting rights.

The *Coordination Center* will act as Secretariat of the project, comprising the three funding systems described in the previous three components. The Coordination Center will have the responsibility of implementing the decisions taken by the Governing Board in the operational manual. It will be responsible for the implementation of the whole project.

The *Peer Reviewing Panel* will be responsible for the selection of proposals submitted for the (i) line laboratories, (ii) market driven infrastructure and (iii) competitive funding scheme, according to the criteria defined in the operational manual. The Panel will be composed of national and international experts who will examine the proposals and will evaluate them

according to the multi-criteria methodology described in the operational manual. The operational manual will specify criteria and relative weights which will be made public in the Call for Proposals, to ensure high transparency.

Subcomponent 4.2. Agricultural Policy Monitoring. The subcomponent will strengthen the capacity of public sector to analyze, monitor and develop agricultural policy. To do so it will establish a Group of Experts on agricultural policy, and it will provide technical assistance and training on introduction of state support indicators. The subcomponent will also review and propose improvements to the current legislative framework for different sub-sectors, including fisheries.

1.3 World Bank Requirements

Safeguard policies

The Bank has a set of ten environmental and social safeguard policies of which the relevant ones to APPAP-II are briefly described in Table 5.1 of Section 5. These policies provide the framework for the Bank's overall goal of environmental and social protection. Any project that the Bank undertakes must meet the safeguard policy requirements. One of the policies is the policy on environmental assessment (see following).

Environmental assessment

The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA required. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity and scale of the project and the nature and magnitude of its potential environmental impacts. The four Categories are A, B, C, and FI. Category FI is applied to all proposed projects that involve investment of Bank funds through a financial intermediary (FI) to be used for sub-projects of which the environmental impacts can not be determined during appraisal of the World Bank project. Hence the financial intermediary is required to screen proposed sub-projects and must ensure that sub-borrowers conduct an appropriate EA for each sub-project, where warranted. Before approving a sub-project, the FI verifies that the sub-project meets the environmental requirements of appropriate national and local authorities and is consistent with the Operational Policies (OP) and other applicable environmental policies of the Bank.

In appraising a proposed FI operation, the Bank reviews the adequacy of country environmental requirements relevant to the project and the proposed EA arrangements for sub-projects, including the mechanisms and responsibilities for environmental screening and review of EA results. When necessary, the Bank ensures that the project includes components to strengthen such EA arrangements. As part of the process of selecting the project's PFIs, prospective PFIs will be required to provide to the Bank a written assessment of the institutional mechanisms (including, as necessary, identification of measures to strengthen capacity) for its sub-project EA work. If the Bank is not satisfied that adequate capacity exists for carrying out EA, Category B - sub-projects - including EA reports – will be subject to prior review and approval by the Bank.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 General

The 1995 Constitution of the Republic of Kazakhstan stipulates that "protecting the environment favorable for life and health shall be the goal of the State". Other general laws that are important for environmental protection include the Civil Code, the Presidential Decree on procedures for dealing with appeals, the Law on Public Associations (1996), the Code on Administrative Violations of Environmental Legislation and the Criminal Code (1998).

Following independence Kazakhstan made commitments to environmental safety and sustainable development and accordingly signed the resulting documents of the UN Environment and Development Conference (Rio-92), and became an active participant of the process of "Environment for Europe". Kazakhstan has taken a long-term approach to environmental policy development in its Strategic Plan Up To 2030 'The Environment and Natural Resources'. The main objective of this long-term strategy is the harmonization of society and the environment.

The country has established a number of executive bodies in the general field of environmental protection and these provide the formal channels for the implementation of State policies in the areas of environmental protection and rational use of natural resources.

Principles of the State policy in the environmental protection field were stated in the Conception of Environmental Safety approved by decree of the President of the Republic of Kazakhstan (April 30, 1996). In this decree the ecological problems of privatization and the need for environmental regulations were considered. The basis for environmental legislation arises from the decree. Following the decree a number of international conventions were signed and a system of environmental management was developed. Laws "On Environmental Protection", "On Special Protection of Natural Areas", and "On Ecological Expertise" were all introduced in 1997 following the decree. In 1998 the Law "On Radiation Safety" was introduced and in 2002 the Law "On Atmospheric Air Pollution" was introduced. Laws "On Subsoil and Subsoil Management", "On Oil", and "On Forestry, Water and Land Codes" were subsequently introduced.

In 2003 the Concept on Environmental Safety was reviewed and is currently the base document determining further development of environmental legislation, enforcement issues and serves as the basis for developing the national and regional programmes in the field of environmental protection.

Under the new Concept of Environmental Safety a number of provisions address various environmental problems. These include the provision of advanced scientific research in areas of environmental safety and resource management, environmental monitoring, and ecological zoning. The Concept includes a step-by-step implementation procedure as follows:

Step 1: (2004-2007) – reduction of environmental pollution and elaboration of action plan;

Step 2: (2008-2010) – stabilization of environmental quality levels and development of environmental requirements for resource management;

Step 3: (2011-2015) – improvement of environmental quality and achievement of a favorable level of ecologically sustainable development for society.

Kazakhstan recognizes a number of steps that have to be undertaken in order to achieve a goal of environmental safety including the protection of natural systems. These steps are all related to

current significant environmental issues experienced in Kazakhstan and elsewhere. These steps and related issues include:

- ③ reduction of impacts that result in global warming and ozone layer destruction
- ③ protection of biodiversity
- ③ prevention of desertification
- ③ soil protection
- ③ rehabilitation of ecological disaster areas (Aral Sea, military testing grounds, etc.)
- ③ prevention of Caspian Sea pollution
- ③ prevention of pollution and depletion of freshwater reserves
- ③ removal of pollution sources leading to air pollution, radioactivity, bacteriological and chemical pollution, transboundary pollution
- ③ reduction of industrial and domestic wastes
- ③ prevention of environmental disasters

2.2 Legal Instrumentation

The Kazakhstan Environmental Legislation comprises of almost 90 laws and regulations. At the same time there is a need to improve the legislation (including its compliance with the international conventions and agreements signed and ratified by the Republic of Kazakhstan during the course of independence), and ensure its execution.

There is a standing Law of the Republic of Kazakhstan "On Environmental Protection" and developing laws "On specially protected natural territories", "On Environmental Assessment", "On Protection, Reproduction and Utilisation of Fauna", "On Land Resources", "On Mineral Oil", as well as the Forestry Code, the Water Code, The President's Decree "On the Depths Utilisation".

Environment policy and the principles for environmental management in Kazakhstan are expressed in the existing legal system relating to environmental protection. The Law on Environmental Protection is the main environmental law and was promulgated in 1997. There are 14 other related environmental legal instruments, several of which have been recently introduced. These instruments determine competence, use, management, conservation, licensing, responsibilities for sanctioning violations, the division of functions and international cooperation for environmental protection and the protection and use of natural resources.

- Law on the Protection, Reproduction and Use of Animals, 1993
- Decree on Oil, 1995
- Law on Licensing, 1995
- Decree on Underground Resources and their Use, 1996
- Law on Environmental Protection, 1997
- Law on Ecological Expertise, 1997
- Law on Population Health Protection, 1997
- Law on Specially Protected Natural Territories, 1997
- Law on Use of Nuclear Energy, 1997
- Law on Radiation Safety, 1998
- Law on Air Protection, 2002
- Law on industrial security on dangerous production facilities, 2002
- Water Code, 2003
- Land Code, 2003

- Forestry Code, 2003

Draft Laws and sub-laws in Preparation (as of 2004)
- Draft law on the Protection, Reproduction and Use of Animals
- Draft sub-law on production and consumption waste
- Draft law on protection of climate and ozone layer of earth
- Draft sub-law on ecological insurance
- Ecological Code

The environmental legislation contains approximately 170 legislative, normative and methodological documents that regulate environmental protection and the rational use of natural resources. Some laws from the Soviet period are still in force. Further laws are envisaged on ecological control, investment and ecological audit and there are a number of other environmental management areas that are wanting for appropriate legislation. The majority of the required regulations and standards were elaborated and approved however, legal status of ecologically vulnerable areas and various outstanding environmental problems still remain and mechanisms for enforcing these instruments are insufficient and mostly ineffective.

Law on Environmental Protection (1997)

The Law on Environmental Protection views environmental protection as a precondition for sustainable development. Its declared aims are to maintain ecological safety, prevent entrepreneurial and other activities from having a harmful effect on natural ecosystems, preserve biodiversity and ensure the efficient use of nature. The Law defines the rights and responsibilities of citizens and social associations. It describes the duties of government bodies, the requirements of natural resource use and its regulation, and measures to prevent and clean up environmental pollution. It lays down the regulation of environmental emergency situations and environmental disaster zones, objects of environmental protection of special environmental, scientific or cultural value, environmental monitoring, information and statistics, environmental education, economic mechanisms, and the control of environmental protection.

The Law designates organizational structures for environmental protection, establishes the basis for environmental standards and requirements, procedures for licensing, permitting and control, economic incentives for nature and environmental protection, and environmental auditing, and creates a framework for international environmental protection. It allows fees to be charged for pollution above the permitted limits, it underscores the right of the public to live in a healthy environment and to claim compensation for damage to health and environment.

With regard to the agricultural production the Law designates the necessity to apply the Limited Allowable Norms for agrochemicals application. When designing and operating the agricultural sites the Law precepts to record the normative for environmental quality; processing and utilization of hazardous wastes, low and no wastes production technologies, effective measures to prevent environmental pollution, reproduction and rational use of nature resources are to be provided.

Law on Ecological Expertise (1997)

The Law on Ecological Expertise (1997) focuses on the assessment of environmental effects. This law addresses the legal responsibility for the accounting of environmental effects of economic development projects and activities and is important for ensuring environmental quality. The Law includes principles to be followed, environmental monitoring requirements and the role of public ecological expertise.

The Goals for Environmental Expertise are as follows:

1) to determine the completeness and correctness of impact assessment on the environment and population health including analysis of potential social, economic and environmental implications;

2) to arrange the comprehensive, scientifically-grounded analysis and impact assessment of the planned management, economic. Investment and other activities on the environment and population health;

3) to check the observance of the environmental requirements comprised in the laws, standards, norms and rules acting on the territory of the Republic of Kazakhstan;

4) to produce conclusions for the environmental expertise, their distribution to the organizations making decisions on the expertise site implementation as well as providing the authorities and population concerned with the required information.

Land Code (2003)

The Land Code of the Republic of Kazakhstan, adopted on June 20, 2003, addresses lands protection, land management, monitoring and land cadastre. It includes goals and objectives for land protection (Art.139), and obligations of land owners and users towards land protection (Art.140); standards for the maximum permissible concentration of hazardous substances in the soil (Art.141); environmental, sanitation and other special requirements with regard to land development(Art.142); objectives and organization of the state with respect to land use and land protection (Art.144, 145); officials responsible for enforcement (Art. 146); and, functions of the executing agency with respect to the control of land use and land protection (Art. 147).

2.3 National Environmental Action Plan

The National Environmental Action Plan for Sustainable Development (NEAP/SD) was created as a plan for solving the priority environmental issues for the period 1998-2000. The plan currently defines the environmental policy and action program. The priorities identified include: reduction of industrial pollution, introduction of resource saving technologies, combating of desertification, stoppage of topsoil destruction, rational use of water resources and avoidance of water pollution, reduction of forest loss, biodiversity protection, protection against radioactive pollution, and health protection.

However, as of 2000 NEAP/SD was not being totally implemented due to a lack of funding. Some of the priority projects identified in NEAP/SD have been financed by different IFCs, including WB. NEAP/SD was not revised and evaluated after 2000.

2.4 Sectoral Plans

A number of sectoral strategic plans exist of which the most relevant are the Strategic Water Resources Plan, the Forest Programme, the National Strategy and Plan of Action for Preserving

and Balancing the Use of Biodiversity, the National Plan of Action for Combating Desertification, the Programme for Ecological Education and the National programme for health and Environment.

The environmental issues are addressed under the Industrial and Innovation Development Programme of the Republic of Kazakhstan for 2003-2015 where the section for the Environmental Policy takes place. In accordance with the programme one of the priorities for industrial development is to make the industry more eco-friendly. This component provides incentives for implementation of low wastes technology, science intensive production development, resource intensive production decrease, applying the international standards ISO 9000 and ISO 14000. However it was noted that on the account of old technologies operation there is a ground to assume that reduction of pollutants emissions to the environment will not occur the nearest future.

2.5 International Agreements and Conventions

Kazakhstan is a permanent participant of the international forums on environmental protection, a member of the UN Sustainable Development Commission, and it actively initiates agreements at the bilateral and regional level. The country has ratified the three Rio conventions (United Nations Framework Convention on Climate Change, Convention on Biological Diversity, Convention on Combating Desertification) and has signed the Kyoto Protocol. It has accession status to the Montreal Protocol on Ozone Depleting Substances, the UNECE Convention on Long Range Transboundary Air Pollution, is Party to the UNECE Convention on the Transboundary Effects of Industrial Accidents and has ratified the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Kazakhstan has ratified the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.

In total to date Kazakhstan has signed 19 international conventions and has elaborated national action plans for implementation. The Republic of Kazakhstan will have to do a hard work to adapt the international agreements regulations in the system of general and environmental legislation.

Obviously Kazakhstan will sign soon the Kartagena protocol on BioSafety. Importance of this issue was emphasized in the new Concept of Environmental Safety. At the present time the requirements for genetically modified organisms monitoring are reflected in the series of major laws and rules in the field of veterinary, plant protection and customs control.

2.6 Institutional Framework for Environmental Regulation

The state and citizens responsibility for environmental protection is fixed under the Constitution of the Republic of Kazakhstan and complies with the priorities of the long-term Strategy "Ecology and Natural Resources - 2030", one of the main objectives of which is the creating of strong environmental management system. A transition to the market economy requires the restructuring of the entire structure of public environmental authorities and accurate responsibilities division at all levels. The central executive authority in the field of environmental protection is the Ministry of Environment comprising of the following:

1. Department for Legal Support and International Cooperation
2. Department for Environmental Policy and Sustainable Development
3. Department for Expertise and Licensing

4. Department for Institutional and Financial Activities
5. Department for State Control
6. Republican State Enterprise «Informational and Analytical Centre»
7. Republican State Enterprise «Kazaviamet»
8. Republican State Enterprise «Kazhydromet»
9. Republican Inspection Office
10. Oblast (Municipal) Territorial Authorities for Environmental Protection

Coordination of participants' actions is accomplished on the basis of the sole monitoring of programmes and projects. The ministries, institutions, local executive authorities, private sector are supporting the information flows by submitting the data on the programmes and projects to the Ministry of Environment according to the special forms.

MEP is responsible for the integration of environmental protection issues into decision-making processes, environmental control and interdepartmental coordination. However the MEP has no responsibility for control and management of natural resources (water, forest, mineral and biological resources but not land) since it was delegated to the Ministry of Agriculture and Ministry of Energy and Mineral Resources. It has responsibility for ensuring that the environmental requirements for various economic and other activities are met. In particular it ensures that these activities do not pollute or dispose of waste in a manner consistent with the various legal instruments. Of particular concern are production wastes and potentially hazardous chemical, biological and radioactive substances. It also ensures that all activities are in compliance with the norms and rules for storage, transportation, neutralization and burial of chemical and biological substances. Where applicable MEP also ensures the prompt and proper execution of measures on restoration and preservation of fertile soils and the prevention of soil erosion.

The departments of the Ministry and the Vice-ministers design and organize the policies, which the committees implement. The Ministry and the committees have territorial offices in the oblasts and the cities of Almaty and Astana. At the local level environmental protection management is carried out by the akimats and regional subdivisions of the MEP.

There are also specialized state authorities under other Ministries which execute specific aspects of environmental protection and these include:

- Committee for Forestry, Fishing and Hunting Industries of the Ministry of Agriculture;
- Agency for Land Resources Management;
- Committee for Water Resources of the Ministry of Agriculture;
- Committee for Geology and Resource Protection of the Ministry of Energy and Mineral Resources.

The executive bodies and their local representation conduct their activities within the bounds of established powers. Granting of permissions for various activities, monitoring and control of the conditions of resource management and measures to ensure effective implementation are all conducted at the local level. However, the various divisions of the regional akimats and regional departments of environmental protection often do not follow all of the environmental protection legislative requirements for the various aspects of environment protection.

Land resource management functions of the government include the organization and control of activities to ensure rational land use and restoration of any disturbed lands.

According to a government regulation dated 06.09.2001, No.1154 "Rules for Granting of Permission for Environment Pollution" it is necessary to ensure that the affected community is involved in aspects of environmental protection, particularly the decision making process. However, the community is often ignored in this regard. To ensure public consultation amendments to the Law on public expertise will require amendment.

Non-governmental organizations (NGOs) are currently underutilized and are a source of valuable talent that the government could take advantage of in natural resource management programs.

Inspection

Ministerial bodies ensure State control over the protection of the environment. Controls include the observation of environmental conditions and the changes caused by economic and other activities, the supervision of plans and measures aimed at the protection and rehabilitation of the environment, the rational use and reproduction of renewable natural resources, the respect of environmental legislation, as well as environmental quality and all other regulatory requirements.

Inspectors control enterprises (public and private) according to a schedule. They monitor and control in accordance with their own methodology. 11,704 inspections have been carried out during the half year of 2003 (29 inspections per one inspector), 17,736 violations have been disclosed, 5,123 fines have been imposed at the amount of 26 M tenge. The major share of inspections (42%) is the land resources and mineral fertilizers and pesticides wastes management inspections.

However lack of indicators to qualitatively assess the effectiveness of control and enforcement system does not allow determining the effectiveness of environmental enforcement in Kazakhstan related to the environmental quality. The number of fines and prescriptions do not necessarily ensure the measures taken directed to the environmental conservation in Kazakhstan. The issues for enforcement are drawn with a special attention under the new Conception for Environmental Safety. With a support of OECD the projects directed to the enforcement system reforming are implemented in Kazakhstan.

Public knowledge

All information on the environment must be provided to citizens and NGOs, and may be published in the media. There are provisions in the Law on Environmental Protection for the provision of mandatory information at the beginning of any project and on the results of environmental expertise. Environmental expertise requires public input and large developers meet this requirement usually through public hearings. The public also has the right to prepare a voluntary public environmental expertise. However at the present time a lot of mechanisms of public participation are not developed and weakly practicably applied.

A need to strengthen the public role in making the environmentally significant decisions is considered at the level of national environmental policy. The concept of environmental safety is assuming to develop the mechanisms for providing to public with the requested environmental information and holding the public discussions on major economic projects which are able to significantly effect the environment.

Monitoring

The State monitoring system that was in operation in Soviet times collapsed in 1997. The Law on Environmental Protection prescribes the establishment of a single State environmental monitoring system, the monitoring of environmental conditions and the monitoring of conditions of the natural resource base. Presently the Ministry of Environmental Protection is making large efforts to reinstate the monitoring network of Kazhydromet and planning for significant investments to develop the modern environmental monitoring system, firstly on the territory of Caspian Sea region.

The lack of a monitoring system and the dispersal of environmental information make it difficult for the public and the NGOs to locate and obtain data.

2.7 Ecological Expertise Procedure (or preparation of an environmental impact statement)

The procedure for gaining the appropriate environmental permission begins with the project or activity proponent submitting a general business and investment plan to the Department of Ecological Expertise (DEE) within the MEP. An environmental expertise corresponds to the environmental impact statement (EIS) known in western countries. The law requires the preparation of State environmental expertise for all projects, new enterprises, and also enterprises that are privatized or alter their production processes. It is also required for:

- proposals on projects, contracts and international treaties which may affect the environment
- draft laws and other legal documents that are likely to affect the environment if adopted
- documents on monitoring environmental requirements during the operation of an economic activity
- applications for licenses and certificates for the use of natural resources

This is done under the Law of Environmental Protection. All projects and activities require this permission and there is no exclusion list. The Department makes a decision as to whether or not the proposed project or activity will have a significant effect on the environment. If the Department decides that there are no effects on the environment the environmental permission is granted to the proponent. If the Department determines that the project or activity would have an effect or effects on the environment, a full description of the project is prepared by the proponent using published guidelines provided by the Department. The Department then analyzes this full description. The description will include any laboratory analysis to back up the proponent's findings re: environmental impact. Laboratory results are usually objective, since these are independent bodies not wishing to jeopardize their reputations and opportunities for providing their services in the future. If the Department feels that the full description is lacking in certain detail it may request that the proponent provide additional information. If the Department feels that, based on the full description, the environment could be compromised in one way or another, it will require ecological expertise (EE) for the project.

EE is basically equivalent to an environmental impact statement. An environmental impact assessment (EIA) is one of the documents required for the preparation of an environmental expertise. Certified experts prepare the EIA. The EIA process includes the determination of the types and levels of the impact of the activity on the environment, the prediction of probable environmental changes if the project were implemented, the development of environmental protection measures in the project implementation and the definitions of environmental

protection requirements in the project. Legislation also requires that the EIA include alternatives to the proposed action, including that of no action. Socio-economic effects are also included in the EIA.

A team of specialists, some of whom will be members of the Department and others, who will be recruited externally, depending on the nature of the project, will conduct EE and the particular specialist needs. The costs of the ecological expertise will be borne by the project / activity proponent.

The whole procedure from first submission of a project or activity by a proponent to the final granting of environmental permission would generally require a three month period if the project or activity is not complex or the potential impacts are not overly significant. In more complex and serious cases where the environment could be under serious threat, the process could take as long as six months or more.

The Department monitors all projects. Large projects in excess of $50 million in value are screened and managed (including monitoring) by the Department's staff in head office. Projects and activities of values less than $50 million are handled by the local branches of the Department providing that these projects do not have high risk. High-risk projects / activities, regardless of value, are administered through head office.

Some projects, which pose a serious threat to aspects of the environment, are rejected. Monitoring supposedly is continuous and project proponents are often fined for violating standards such as those set for effluents and air emissions (see Section 2.6 - *inspection*).

The Law on EE requires that the preparation of State environmental expertise should be an open public process. However, it only requires the distribution of information, but not actual public participation in the process. State expertise is binding and public environmental expertise must be prepared for any project on the list of projects for which it is obligatory.

The responsibility for EE is at the State level for large projects, and the oblast level and city level for small projects. The developer pays all costs. If a negative decision is taken at the oblast level the developer can appeal to the Ministry. In 1999 environmental expertise was conducted 8,694 times.

Assessment of impact on the environment and human health is the obligatory and integral part of pre-project documentation. List of agricultural activities which impact assessment is recommended to be fully performed include only the enterprises for intensive poultry or pork fattening with over: 1) 85 000 broilers, 60 000 chickens, 2) 3 000 piglets (over 30 kg) or 3) 900 pigs.

List of agricultural activities for which the overall assessment is proposed by the public expert authorities on the basis of preliminary expertise or using the threshold level (criteria) determined by the normative documents (extraction).

1) agricultural lands restructuring projects;

2) virgin lands or weakly reclamated regions utilization for intensive agricultural production;

3) water resources management projects including irrigation and drainage projects for agriculture;

5) intensive livestock projects (excluded under Attachment 1);
6) intensive fisheries;

Food industry (selectively):
1) production of vegetable and animal oils and fats;
2) packaging and preserving of animal and vegetable produce;
3) slaughterhouses;
4) enterprises producing fish flour and oil;

2.8 Capacity for Environmental Management

The wide range of legislative efforts and policy programmes does not correspond to the weak institutional structure at the sub-state level. Policy integration and institutional cooperation are still underdeveloped and are far from taking into account the important link between environment and both human and national security. Furthermore, as with most other states in Central Asia, there is a severe lack of financial resources for the implementation of policy programmes and monitoring activities, which are crucial for the development and adjustment of appropriate measures and policies.

Environmental information is weak and systematic environmental monitoring was discontinued in 1997. Available information is not easily identified and access to information in general is difficult.

The Department of Ecological Expertise (DEE) of MEP is staffed throughout the country at the oblast level. Staff at both DEE headquarters and at the field level is highly trained, although currently understaffing is a problem. Head office is currently staffed with six specialists but an additional four specialists is required if the work load is to be addressed in a timely fashion. As well, the local offices are under the strain of a heavy work load and could use additional specialists to process proposals and conduct monitoring in a more efficient and timely manner. Although they have the experience and skills to assess the impacts of projects and mitigation required, it is not known that such assessments always take place effectively. All staff would benefit from additional training, particularly training that is based on methodologies used in other countries where environmental assessment is rigorous.

In Kazakhstan 70% of the environmental work of the state is conducted by local offices though often they are not supported by sufficient financial resources. Budgets allocated for environment protection only amount to 0.5% of GDP.

Ecological monitoring is sub-standard and the state network of observation stations makes up only 20% of the optimal number with the instrumentation equipment from 40 – 80% of that required, however, equipment shortages are currently being addressed. Monitoring systems of different ministries and departments are poorly coordinated.

The Law on Environmental Protection, like other laws is not of a direct application and requires by-laws before it can be fully implemented. Some by-laws are still missing, especially those that provide operational procedures. Their lack creates many problems, leads to inconsistency in the implementation of environmental policies, and limits their effectiveness. Of particular importance are operational regulations on environmental monitoring, on procedures for environmental expertise, on environmental auditing, on environmental insurance, on public access to information and public participation, and on procedures for certification and on handling emergency situations. As well, there is an urgent need for the revision of air, water and land quality standards and establishment of standards where these are missing.

Environmental inspections face several problems including low wages, ill trained inspectors, insufficient budgets, and outdated laboratory facilities. The issue of environmental enforcement is one of priorities of new Concept of Environmental safety and needs strengthening of institutional capacities, including training of inspectors, development of indicators of effectiveness of environmental inspection, etc.

Consulting community

The consulting community mostly represented in the form of private consulting firms and consists of competent professionals in a variety of fields. In according to requirements of MEP consulting firms should have a license for conducting of EIA, ecological audit and other types of environmental expertise.

There appears to be limited capacity within this community for conducting EAs at a level that would be required by the World Bank for any sub-projects that may fall into Category B. Individuals within the community would have the skills to carry out aspects of the EA but not to coordinate and construct an EA to Bank standards.

However ecological expertise in according to DEE procedures would provide the environmental scrutiny very similar to that provided in an EA for Category B. During the last 3-5 years some professional NGOs and private consulting firms become aware of environmental practices which are not required by state control bodies, like cleaner production, waste minimization and EMS of ISO14001 standards. It seems possible that soon a consulting community in Kazakhstan will have capacity for delivering more sophisticated environmental expertise, including EAs in accordance to requirements of international financial institution.

3. METHODOLOGIES

3.1 Determination of Activities and the Subprojects Potential Impact

The project activities are characterised with rather variable potential impact on the environment. They could be aggregated into 3 categories having similar types of impact.
The first category *(Laboratory/Testing stations)* relates to the activities under the Quality and Safety Monitoring Subcomponent propose improvement of public and private sectors capacity to monitor food quality and certify standards of agricultural products through an internationally recognized system for testing and monitoring of quality and safety. These include establishment of two National Reference Laboratories in Astana, modernisation of testing laboratories (9 regional and 89 rayon labs) and purchasing of 400 mobile laboratories. 20 grants will be allocated for private laboratories within the framework of the project CGS. The necessity for environmental assessment of the activities is conditioned on that they are linked with an application of toxic substances and toxic wastes formation.
The second category (Marketing Infrastructure) comprises of the subprojects directed to establish the marketing infrastructure required to promote the Kazakhstani agricultural produce. These activities may provide for construction or upgrading of slaughterhouses, collection and storage points for milk, meat, fish and other products.
The third category (Agriculture production and processing technologies) combines the subprojects directed to applied research in the field of agricultural production and skills replication at the agricultural entrepreneur level. The project will concentrate on the following seven group of agricultural products, which were selected according to export potentials and/or relevant social impact: (i) Meat and meat products; (ii) Milk and Milk Products; (iii) Grains; (iv) Oil seeds; (v) Cotton; (vi) Fruits and vegetables; (vii) Fish and fish products.

Table 3.1: Description of Main Categories of Project Activities

Broad Categories	Description
Laboratory/Testing stations	Include modernization of veterinary and plant protection laboratories.
Marketing infrastructure	Include post harvest infrastructure such as milk collection points, slaughter houses, storages, distribution networks, etc.
Agriculture production and processing technologies	Include plant cultivation, livestock-breeding, seed testing, etc. Would include any industry involving the primary processing of agricultural products, like meat, milk, fish, etc.

Matrices (Annex A) were developed for each of the three categories of project activities presented in Table 3.1. The matrices addressed each group in general terms and identified the broad potential direct and indirect environmental impacts for each group. In addition, consequences of each impact have been identified as well as the possible mitigation measures to be taken. Each group is given an impact level of significance prior to mitigation and a residual level of significance following mitigation. The likelihood of an impact occurring is indicated.

Matrixes in Annex B represent the detailed analysis for direct and indirect impact on the environment as well as the mitigation measures for 10 potential types of subprojects presented in Table 3.2

Table 3.2: Probable sub-projects

- Laboratory Testing
- Veterinary services
- Seed testing
- Fertilizer
- Pest management/ Pesticides
- Plant production technologies (land preparation, sowing and harvesting implements)
- Livestock production technologies
- Slaughter houses
- Primary Processing (milk, meat, fish, cotton)
- Storage facilities (collection and cooling)

3.2 Baseline Data

Only secondary data has been collected for this assessment. Since the review is sectoral in nature the data that has been collected and described in Section 4 includes only descriptive broad information on two economic corridors and does not reflect any one particular site where sub-projects may occur.

3.3 Scoping and Bounding[1]

The basis of scoping has been the identification of the Important Environmental Components (IECs). These are the environmental features relevant to the project and which are deemed important enough to focus on during the environmental review process to protect against negative impacts. These have been identified based on experience from other similar studies. The IECs are listed in Section 5.4.

During project preparation it was decided that, given the size of the country, it would be preferable to target project actions geographically rather than covering the whole country. Instead of concentrating on a pilot region, the project preparation team decided to focus most project activities in two economic corridors, a Northern corridor and a Southern corridor, where labor, transportation, ancillary services, and industries are most abundant. This facilitates implementation, increases spillovers, and makes project results more visible. The corridors were selected to reach a significant share of agricultural activities conducted on a limited covered land area.

3.4 Consultation and Disclosure

[1] Scoping: Identification of the potential impacts that are relevant and significant in order to contain the extent of the assessment
Bounding: placing a realistic geographic limit on the assessment

During the preparation of the EA there was consultation during meetings with the staff of MEP, farmers association, public and private veterinary and quarantine laboratories representatives. The EA has been presented to stakeholders, including NGOs, who had an opportunity to comment on the EA findings and discuss its findings with the team of local consultants involved in the preparation of the project and EA. The final EA will be submitted to the WB InfoShop for general public access.

3.5 Criteria for Impact Assessment

Criteria used for determining the significance of an impact includes severity, extent, duration, frequency, possibility of occurrence, and possibility of reversibility of the impact. The extent of each of the criteria was based on judgment and no numerical ranking or consideration was given.

Project activities will have varying levels of potential impact and for each of these a matrix has been established that describes the potential direct and indirect impacts that can be expected, and the consequences of these impacts. The mitigation action to these impacts are also provided. Each input is given a level of impact significance prior to mitigation and a level of significance (for the residual impact) assuming that mitigation is carried out. All 'levels of significance' ratings (Table 3.3), and other ratings, are relative and subjective.

3.6 Cumulative Effects

An analysis of the cumulative effects has been conducted. Of particular importance is the cumulative effect within individual watersheds where water quality could be significantly affected if a concentration of sub-projects occurs.

Table 3.3: Level of Significance of Potential Impact

Level of Significance	Description
Very High Significance	Potential impact of the enterprise could cause damage to an IEC over a large area affected (e.g. loss of important habitat, loss of biodiversity, loss of large areas of productive land). Mitigation is not possible and the impact is irreversible.
High Significance	Potential impact of the enterprise could cause irreparable damage to a small area (e.g. on site) of an IEC; or, potential impact could cause damage to an IEC over a large area, but the ecosystem can still function (e.g. surface water contamination causing limited aquatic ecosystem damage). The impact is reversible over a long period of time.
Moderate Significance	Potential impact damages an ecosystem over a small area but it is still functional and the damage is reversible over a long period of time. Damage to an ecosystem over a large area, still functional, and the damage is reversible over a relatively short period of time.
Low Significance	Potential impact of the enterprise could cause damage to an IEC over a small area but system still very functional and damage is reversible over a short period.
No Impact	Non measurable impact.

4. THE ENVIRONMENT

The agricultural sector of the country economy exerts the determinative influence on the environmental situation. It surpasses the influence of such environmentally significant industrial sectors as energy, ferrous metallurgy and metal mining industry which impact on the environment has a local character. At the same time agricultural production dependency on the environmental characteristics and weather conditions is immeasurably higher the industrial production sensitivity where the main factors are the availability of natural and energetic resources.

Geographic location features and related severe natural and climatic conditions, low precipitations, sudden temperature regime drop allow referring Kazakhstan to environmentally vulnerable countries. Low percentage of forest lands (3.7%); maldistribution and general lack of water resources aggravate the general environmental status. Low natural productivity of agricultural lands in Kazakhstan defined the pronounced and extensive character of production in agricultural sector during the previous decade due to involvement of increasingly new lands into agricultural cycle.

4.1 Land Resources

Generally, Kazakhstan is a large plain, which slopes from northeast to southwest. The plain is encircled along the east and southeast borders by extensive mountain ranges. The climate is continental with January temperatures averaging -18^0C in the north to -3^0C in the south, and average July temperatures range from 19^0C in the north to 28^0C in the south. The country consists of three broad ecosystems, namely the steppe (grasslands), mountains and foothills, and the deserts. The most extensive ecosystems are those of the arid zones, which account for 55% of the total area. The vegetation of the steppes ranges from forest-steppe to dry grasslands. These ecosystems provide a varied base for rural economic development encompassing agriculture, fishing, hunting, recreation/tourism, extractive industries and the further processing of natural raw materials.

The 12 million ha of high quality soils lie mostly in the north of the country. However, the area of quality soils with normally adequate rainfall for arable farming is probably less. The area suited to rainfed agriculture is also unevenly distributed over the country with a high concentration in the north and the east. In these areas the expectation of adequate rainfall is only one year in three or four. Thus, rainfed arable agricultural activity in Kazakhstan is not only restricted, geographically, but faces high risks from climate uncertainties, which have a decisive impact upon farm management decisions

The major part of northern region is flat steppe, forest-steppe, foothills and semi-deserts. Chestnut soils and ordinary black earth are differed by low permeability, high alkalinity and salinity. In southern regions the stunted soils of saline lands are dominated which are not suitable for agricultural cycle use. Grains, industrial crops, vegetables are grown on the steppe area. Dairy livestock production is dominated. Desert area is oriented to meat farming. Semi-desert area is not suitable for farming but rich with motley grass and favourable for pasture livestock production.

Southern region area is 711,000 square km which is 26% of the republic territory. There are several nature zones on the region territory: deserts (Kzylorda oblast), semi-deserts, desert-steppe (Zhambyl oblast), foothills and alpine and subalpine meadows (Almaty and South Kazakhstan oblast).

The dominant feature of the climate is precipitation levels which vary from around 400mm/year in the north to 100mm/year in the southwest. In the mountains, annual rainfall can be as high as 1500mm/year. The length of the growing season varies from about 140 days in the north to over 200 days in the south.

The agriculture sector is the major land resource use. In the past Kazakhstan has cultivated as much as 35 million ha of land and utilized over 180 million ha of steppe as grazing pastures. As a result of reform the agricultural economy has been opened to international competition. Captured markets in the former Soviet Union (FSU) are no longer available and the sector has suffered a deep financial liquidity crisis. Consequently, the area actually farmed has contracted markedly over the past decade. The area actually cultivated annually is now about 14 million ha and the area of pasture actively managed is about 50 million ha.

The natural resource base provides the opportunity to irrigate substantial areas of reasonable quality soils, which is one way of reducing production risks. In the past, the use of irrigation has extended the cultivable area by as much as 2.3 million ha and provided a measure of stability to growing conditions and opportunities for higher productivity and crop diversification. Despite the relatively small irrigated area, higher productivity on these lands has contributed substantially to the agriculture sector GDP; as much as 35% in the early 1990s. Most of the irrigated area is concentrated in the southern part of the country but in recent years the irrigated area has declined to about 1.2 million ha as a result of water shortages and deteriorating infrastructure.

Permanent pasture (mostly steppe) is the dominant natural vegetation in Kazakhstan and it covers about 90% of the country. Pasture quality varies depending upon soil quality, temperature and rainfall regimes. The foothills of the mountains and parts of northern Kazakhstan support quality pasture but large areas are arid and support only scrub vegetation. The scale and range of quality of the natural grasslands determines that livestock systems must be the dominant form of agriculture over much of the country. These systems are extensive, and their output must be consistent with the availability of markets for domestic and external livestock products. More than 90% of the rural area of Kazakhstan is dependent upon finding markets for livestock based products.

4.2 Natural (agro-ecological) Zones

The country is comprised of eleven natural zones. The Northern Moist Steppe and the Steppe zones are the major rainfed agricultural areas, accounting for almost 70% of all arable land. Three of the zones are dry steppe and desert that account for over 70% of the designated agricultural area. Piedmont zones, amongst the most productive in the country, adjacent to the mountain ranges in East Kazakhstan and along the southern border are important rainfed and irrigated agricultural zones which benefit from spring snowmelt and the perennial mountain streams. The principle river floodplains are the dominant irrigated areas, even though soils and drainage conditions are not ideal for irrigated agriculture and water management requires very careful monitoring to avoid serious environmental impacts.

Geographic location of northern corridor is characterized with large variety of natural conditions. The climate on the greater territory is sharply continental. The climate is relatively soft on the northern part; aridity is increasing southwards. The winter is cold, frosty, windy and stormy; the summer is hot with dust storm and dry wind. Annual precipitation is 200-300 mm.

The climate on the greater southern territory is sharply continental, snow cover is not significant. The summer is hot; dry on the northern part of the region, moderate and damp – south region. Mountain and steppe area of Almaty and South Kazakhstan oblast is more favourable for dry and spray farming. Rich pasture lands are on the desert and semi-desert areas. Alpine zones are used as summer pastures for livestock.

4.3 Water Resources

Water resources are a critical factor throughout Kazakhstan but especially in rural areas. Surface water sources provide an average annual river volume flow of about 101 billion m^3 of which some 55% originate within the country. However, in a dry year the flow may be halved. After allowing for ecological needs, transport, evaporation and seepage, the available annual surface water does not exceed 46 billion m^3 and could be as low as 26 billion m^3 in a dry year. Moreover, river flow is concentrated in the spring and early summer. Therefore surface water sources are characterized by highly variable annual and seasonal flows.

The territory of northern corridor is rich in water resources, the major rivers are Irtysh, Yesil, Nura. The region is rich in lakes, e.g. Alakol, Markakol, Bukhtarma reservoir. There are 4,000 lakes on the Akmola oblast. The southern region is also relatively rich in water resources but there are fewer rivers on the desert part. The major rivers are Syrdarya, Ili, Shu, Talas, Aksu, Karatal. The major available lands are concentrated on this area. The quality of water supplies is also variable. Most of the surface water is used for irrigation and industrial purposes and contains varying levels of contaminants, some of which come from outside Kazakhstan.

Accessible groundwater sources have been estimated at an annual 64.3 billion m^3 but a relatively small proportion has been exploited. The confirmed annual availability of fresh groundwater is about 15 billion m^3. The quality of groundwater is variable with significant amounts having a high mineral content. Some sources are at depths exceeding 300m, which makes exploitation very expensive. Groundwater sources are highly problematic over most of the western half of the country.

4.4 Agricultural Production Systems

There are three broad categories of agricultural production systems: i) those dependent upon permanent pasture; ii) those dependent upon precipitation (rain and snowfall), which are essentially cereal dominated systems, and, iii) irrigated arable systems, which have the ability to grow a range of commercial crops.

The transition process has primarily affected the scale of these production systems. Since 1991, livestock numbers (excluding poultry) have declined from almost 49 million to approximately 16 million. Cereal production has declined from an average of 25 million tons/year to 12 million tons/year. The scale of several industrial crops such as sugar beet had also declined. A future vibrant rural economy will depend upon the ability of Kazakhstan producers to diversify their

production systems and compete in world markets under the prevailing and future policies and regulations in both Kazakhstan and the major overseas markets.

4.5 Socio-economic

The rural rayons of Kazakhstan have a population of about 7 million, which includes the so-called urban villages but excludes small towns. Officially, Kazakhstan has a rural population of about 6.5 million or 43% of the total population according to the latest 1999 census. This represents a decline of over 0.5 million people over the past decade, roughly proportionate to the overall population decline. The overall rural population density is low, at less than 6 persons per km^2, consistent with the ability of these areas to support a population.

The rural sector nominally provides employment for about 2.7 million workers or approximately 40% of all those employed. There is a large pool of unemployed and underemployed in the rural areas. About 40% (about 1.1 million people) of the rural workforce is employed full-time. The remaining 60% are self-employed, mostly on their own household plots. This estimate suggests that the average rural unemployment rate is in the range of 35-40%. Average wages in the agricultural sector are well below the national average and at the end of 2001 this was KZT 6962/month or 38% of the national average. The gap between the national average wage and the agricultural sector average continues to widen. The agricultural wage is the lowest of all the sectors and reflects the still widespread availability of labour and low productivity of farming in most rural areas. Inevitably, low earning capacity gives rise to widespread poverty in rural areas. Generally, 38% of the rural population has an income below the minimum subsistence level compared to 20% of the urban population.

The current status of social provisions in rural areas is commonly much worse than in urban areas. Infrastructure such as schools is in a poor state and may not be operational in winter due to lack of heating. Health care centres are now improving but facilities outside rayon centres are very basic. The availability of teachers and health care professionals is much more problematic in rural areas.

Drinking water supplies were largely sourced from groundwater before many of the systems became inoperable. The majority of rural areas no longer have a properly functioning drinking water supply following the disintegration of water supply systems constructed during the previous era. More than half of the rural population is without adequate water supply and where water is adequate, it is often highly mineralized, contains contaminants above recommended levels, or has above standard bacteriological counts. Poor quality drinking water is a major contributing factor to a decline in rural health.

The physical contraction of the agriculture sector and its geographical concentration has naturally had an impact on the sustainability of many rural communities. Many rural areas have reverted to a subsistence form of livelihood and their future as viable settlements remains in the balance. Whilst the short to medium term economic and social impacts have been and remain painful for many communities, in the longer term the required adjustment should be seen as an opportunity to promote alternative and more sustainable uses of natural resources and establish a new economic order in the rural areas.

The natural environment supporting agricultural production systems is fragile and must be protected for future generations. Past inadequate attention to sustainable production practices has resulted in large areas of saline soils, water logging, soil erosion and desertification. The loss of

quality topsoil over the past 30 years is well recognized; parts of the black soil area have lost up to 30% of their humus content. Future agricultural production systems must be designed to mitigate adverse environmental impacts and maintain soil quality. The reinstatement of proven crop rotations and use of appropriate production technologies must be promoted. It is envisaged that public sector investment or support measures will be necessary in certain regions in order to rehabilitate previously environmentally degraded areas, stabilize others, and encourage farmers to preserve quality natural environments.

4.6 Natural Areas Protection

Kazakhstan has a relatively small proportion of its territory designated as natural reserves. Approximately 580,200 ha have been incorporated into 4 national parks in four oblasts of two corridors. There are 7 reserves on the project territory with total area of 655,569 ha. 16 rare species of animals and birds including Arhar, Jeiran, brown Tien Shan bear, flamingo and curly pelican.

These designated areas have a strong emphasis on forested areas, which are themselves in short supply and only comprise about 1,2 % of the total project area.

4.7 Environmental Conditions

Many decades of poor resource management has resulted in a heavily degraded environment. Since transformation, pollution has been decreased but this has probably more to do with the mothballing of many old Soviet era industries than the implementation of environmental standards. However, some credit has to be given to new legislation introduced in the 90s particularly that relating to ecological expertise. Major environmental issues that currently face Kazakhstan include:

. lands deterioration and poor landscape

. soil erosion

. desertification

. lack of water resources

. great quantities of toxic waste formation (over 7 billion tones had been accumulated)

. very high level of atmospheric emissions from industrial development (oil and gas, mining, metallurgy, transport)

. domestic and industrial wastes

. environmental problems of Aral Sea, Balkhash Lake, Semipalatinsk nuclear area

. environmental state deterioration on the territory of Caspian Sea

. poor quality drinking water

. reduction of biodiversity and natural reserve territories

Specific to agriculture, the most important environmental problems are humus depletion in the northern areas, pollution of soil and water from the use of fertilizers and pesticides, and secondary salinization. Most of these problems are holdovers from the Soviet era but after a transition period of 13 years these problems have not been solved and new problems have arisen.

Nearly all of the irrigated areas (2.35 million ha) of Kazakhstan should be considered to be facing a serious risk of salinization. Salinization induced by irrigation is mainly caused by deficient agricultural planning or practices, such as the use of water bearing a high concentration of soluble salts, inappropriate irrigation technologies, the lack of drainage, or poorly drained soils.

Almost 60% of Kazakhstan is considered to be at high risk of suffering the effects of desertification processes. Table 4.1 indicates the causes of desertification and the areas affected.

Table 4.1: Causes of Desertification and Areas Affected

Main Causes of Desertification	Quantification
Agricultural activities	17 million ha affected by soil erosion 1.4 billion tones loss of humus (organic matter)
Irrigation	1.0 million ha risk of secondary salinisation
Mining and industry	194,000 ha of oil polluted areas
Forest fires (1997)	200,000 ha
Overgrazing (1990-1996)	10 million ha of pasture degradation
Desertified areas	66% (179.9 million ha)

5. ENVIRONMENTAL ASSESSMENT

5.1 General

As a whole any significant negative and irreversible changes of the environment as a result of project implementation are not expected. Significant positive effect on the environment is expected when using the natural resources in a right and correct way and as a result of applying the sparing methodologies of nature management. Social and economic conditions in rural area as well as information marketing infrastructure will be improved. Increased food safety, including improved monitoring of pesticide residues, will significantly contribute to reduce negative environmental effects and better enforce existing environmental legislation.

The project will contribute to increase the agricultural intensity, production and safety for agricultural produce. The experience gained as a result of applied research subprojects might positively influence the traditional methods of farming which put the arable area and pastures to deterioration. For instance it is assumed that the subprojects intending to apply the sustainable and environmentally reliable methods of farming will be supported within the project, e.g. Integrated Pest Management or organic agriculture. Thereby the project will contribute to increasing the agricultural sustainability.

The project proposes to adopt the international standards and development of new national standards in the field of production safety. Veterinary and quarantine laboratories upgrading comprises of the international accreditation and introduction of international standard ISO as

well as procurement of new laboratory equipment and construction which will improve a quality and safety of laboratory researches. Laboratory staff training, preventive measures performance provided by the Environmental Manual for Laboratories and creation of additional opportunities to liquidate toxic laboratory wastes (e.g. incinerator set up) will ensure significantly mitigate the environmental risks related to the handling with chemically and biologically hazardous substances.

When implementing the project and selecting the subprojects it is required to take account the insufficient level of environmental monitoring and enforcement in agricultural sector and possibilities for grant recipients, particularly farmers, to address the environmental issues. Sub-projects may lead to increasing application of fertilizers and pesticides. However training and capacity building for project beneficiaries on safe use of chemicals and application of preventive measures and good agricultural practices can significantly decrease the environmental risks of subprojects.

In order to mitigate the potential environmental risk of the project and improve environmental safety and the subprojects effectiveness it is necessary to take account the criteria which may warn the applications submission having the significant negative impact the mitigation of which could be complicated. Environmental management specialist should be involved in the work of Grant Committee.

5.2 World Bank Safeguard Policies

As an FI category project, World Bank funding will be used to support a variety of agricultural and agricultural related activities (refer to tables 3.1 and 3.2). A number of these activities could have an effect on those areas of concern that are addressed in the Bank's safeguard policies. Table 5.1 provides a brief description of the essence of each of the relevant policies (5 of the 10 policies) and the risk of application on each of these policies as a result of ACP.

5.3 Potential Category A and Category B Sub-projects

The World Bank requires environmental impact assessments to be conducted for any projects that fall into either Category A or Category B. Table 5.2 lists the types of projects that fall within these two categories.

Table 5.1: Relevant World Bank Safeguard Policies and Likelihood of Application

Safeguard Policy	Description	Likelihood of Application
Environmental Assessment	EA to be conducted for all projects that fall into either Category A or Category B	**Moderate:** CGS could support various activities (e.g. use of chemicals for laboratories or agro-processing) that would require Bank quality EAs.
Pest	In Bank-financed agricultural	**Low to Moderate:** CGS will be used in

Management	operations, pest populations are normally controlled through IPM approaches, such as biological control, cultural practices, and the development and use of crop varieties resistant or tolerant to the pest. The Bank may finance the purchase of pesticides when their use is justified under an IPM approach.	many cases for supporting projects of both large and small farms. Some of these sub-projects may include pest management through the purchase and application of pesticides. To support these grant applications each potential borrower should provide an outline of an IPM program that is consistent with Ministry of Agriculture guidelines as well as the MEP and with the World Bank rule that allowed pesticides are only used as a last resort and in combination with non-chemical control.

Table 5.2: World Bank Categories for Environmental Assessment Purposes

Category A Projects (*projects/components which may have diverse and significant impacts – normally require EA)*	**Category B Projects** *(projects/components which may have diverse and significant impacts – more limited environmental analysis appropriate)*
. dams and reservoirs . forestry production projects . industrial plants (large scale) and industrial estates, including major expansion, rehabilitation, or modification . irrigation, drainage and flood control (large scale) . aquaculture . land clearance and leveling . reclamation and new land development . resettlement . river basin development . manufacture, transportation and use of pesticides or other hazardous and/or toxic materials . new constr. or major upgrad. of highways or rural roads	. agro-industries (small scale) . electrical transmission . irrigation and drainage (small scale) . renewable energy . rural electrification . tourism . rural water supply and sanitation . watershed projects (management or rehabilitation) . protected areas and biodiversity conservation . rehabilitation of highways or rural roads . rehabilitation or modification of existing industrial facilities (small scale) . energy efficiency and energy conservation

There are some potential activities (e.g. agro-industries) in ACP that could fall within category B. If a grant application from an existing or newly planned activity falls into this category, it will be incumbent upon the proponent to conduct an EIA in order to meet Bank requirements. In addition, the applicant will need to fulfill this requirement as a result of Kazakhstan environmental regulations. It will be the responsibility of the applicant to ensure that the EIA required under national law also meets the requirements of the Bank.

With some of the other probable sub-projects the main concern will be the cumulative effect that they could have, particularly where a number of grants are being provided in the same watershed. For example, a number of farms within a small watershed could each use their respective grants for purchase of pesticides or chemical fertilizer. The cumulative effect of chemical runoff on a common watercourse could be significant even though the effect of chemical runoff from any one small farm may have little effect.

5.4 Important Environmental Components

A number of broad environmental issues have been identified and these have been used to compile a set of important environmental components (IECs). IECs are those components of the environment which society generally feels are worthy of protection in light of the general activity (e.g. agricultural development) that will occur. Table 5.3 lists the IECs identified.

Table 5.3: Important Environmental Components

Physical Components	Biological Components	Socioeconomic Components
• Soil quality • Soil fertility • Soil erodibility • Soil organic content • Hydrological regime • Groundwater quality • Surface water quality • Topography • Land • Air quality	• Forests • Flora • Fauna • Forest habitat • Aquatic ecosystems • Livestock • Crops • Germplasm	• Culture • Employment • Income • Poverty • Gender • Education • Health • Migration • Waste disposal • Domestic water • Fuelwood • Markets and marketing

5.5 Project Benefits

Project activities are expected to lead to increased incomes of farmers, rural entrepreneurs, and other rural residents. This increase in farmers' income would result from the direct incremental benefits of the competitive funding sub-projects implemented, as well as the spread-over effects in terms of: (i) improved benefit/cost indicators, (ii) lowered production and processing losses and quantities of rejected products, (iii) improved quality of products (including recognized quality of produced commodities that has been ignored due to the absence of laboratory test confirmations), that fetches higher prices on internal and external markets, (iv) improved access to market (infrastructure and information) and related up- and down-stream linkages, that reduces transaction costs and sales and marketing margins, and (v) employment generation,

either as hired labor or as increased household labor requirements for both on-farm and off-farm activities.

At the national level, the improved competitiveness of agricultural and food production would increase the value and volume of rural domestic and export trade and it would contribute to an improved trade balance.

Other potential benefits include: (i) gradual increase of marketable products and export opportunities and linkages; (ii) medium- and long-term effects of sub-projects' positive experience leading to innovations that are beyond the scope and implementation period of the project; (iii) development of a new class of educated scientists; (iv) improved food safety; and (v) improved consumers' confidence in the food system.

The key social development outcome expected from the project is improved access to markets and knowledge for farmers and rural entrepreneurs. The main stakeholders of the social assessment were: (i) owners of small private farms as well as managers/owners of large farms and agricultural enterprises, (ii) farm workers; (iii) managers/owners of small and medium rural non-farm enterprises, (iv) managers of agricultural processing companies; and (v) key village informants.

Table 5.4: Benefits

Broad Category	Benefits
Laboratory/Testing stations	• Improved food safety; • Improved enforcement of environmental legislation • Improved consumers' confidence in the food system; • Obstacles to the production import which is the plants and animals disease carrier; • Contributes to recognition of the Kazakhstani production on the external market, reduces the costs for produce certification
Marketing infrastructure	• Creates jobs and potentially improved incomes; • Improved rural economy. May result in an export market; • Provision of arrangements for large and small farmers to market goods as well as the marketing of manufacturing goods; • Production quality improvement
Agriculture production and processing technologies	• Provision of jobs, incomes, and meeting demand for agricultural related products; • Improved rural socioeconomic conditions; • Development of sustainable agricultural practices; • Creates potential export products resulting in improved balance of payments and increased foreign exchange reserves; • Provides value added to agricultural production.

Traditionally, as economies improve through expansion and growth in all economic sectors, the biophysical environment suffers. Regardless of the number of socioeconomic benefits that may result, they will not offset the biophysical impacts that can be expected. As farmers become wealthier through effective marketing and various farm improvements, an increase in the application of agro-chemicals leading to soil and water contamination can be expected. This ultimately can result in human health problems as well as impacts on aquatic ecosystems and soils. As local socioeconomic conditions improve, including an improved education of the public, it is hoped that the biophysical environment will benefit.

The agricultural sector is importantly differed from other industrial sectors since it is impossible to provide for sustainable growth without taking account of natural component. The main production means and accordingly the main farmer assets is the environment, particularly soils and microorganisms. Experience of applying the sustainable agricultural methods shows that it is possible to reach a high productivity without applying the artificial means and deep tillage.

As the rural economy grows the onus will be on the Government of Kazakhstan to ensure that relevant environmental regulations are in place, maintained and enforced. The economic development of the rural areas must be sustainable, and the very resources that provide the basis for this development must be protected and managed.

Table 5.5: Socioeconomic Benefits

Input	Benefits
Laboratory Testing	Contribution towards national security; Kazakhstan agricultural competitiveness on both internal and external markets
Veterinary services	Healthy livestock, improved production and farm incomes
Seed testing	Increased production; increased farm income; contribution towards national food security
Fertilizer	Increased production; increased farm income; rural economy improved; contribution towards national food security
Pest management/ Pesticides	Increased production; increased farm income; rural economy improved; contribution towards national food security
Plant production technologies	Increased production; improved farm income; rural economy improved; contribution towards national food
Livestock production technologies	Improved farm income; rural economy improved; contribution towards national food
Slaughter houses	Improved quality of meat product for marketplace; improved farm income
Primary Processing	Value added stays in rural areas leading to improved local economy through provision of jobs; improved farm income; reduction in transportation costs and fossil fuel consumption
Storage facilities	Reduce wastage and spoilage of crops and grains leading to improved economic efficiency and higher farm incomes

5.6 Potential Impacts

Potential impacts for each of the three broad sub-project categories are presented in Tables A-1 to A-3 in Annex A. As well, the tables describe the consequences of the impacts and mitigation measures required. A rating for the potential impact, the residual impact and the risk is also provided. A summary of the potential impacts and their level of significance is given in Table 5.6.

The major potential impacts associated with the three sub-project categories include water and soil contamination, air quality deterioration, loss of biodiversity and impacts on biophysical resources, including soil erosion. Of the three categories, agriculture production and processing technologies will contribute to the most significant impacts if mitigation measures are not taken into consideration. The production and processing sectors generally produce a wide range of wastes that are disposed of in the form of effluents that flow into surface watercourses, seepage into groundwater, emission gases that are released into the atmosphere and solid wastes that are disposed of in municipal and unorganized dumps. Such wastes pose a threat to groundwater supplies, air quality, aquatic ecosystems, and ultimately to human health.

A special attention requires the issues on toxic substances application for veterinary and quarantine laboratories activities as well as when implementing the subprojects contemplating to apply pesticides and fertilizers. Weakly developed infrastructure on utilizing the toxic wastes represents a high risk for the environment.

Table 5.6: Summary of Potential Major Environmental Impacts – broad project categories

Broad category	Potential negative Impacts	Level of Significance
Laboratory/Testing stations	③ Air pollution ③ Water pollution ③ Land pollution	Low Moderate Moderate-High
Marketing infrastructure	③ Water pollution ③ Land pollution	Moderate Low
Agriculture production and processing technologies	③ Water pollution ③ Land degradation ③ Air pollution ③ Biodiversity loss ③ Aquatic ecology altered ③ GHG emission	Moderate-High Low-Moderate Low-Moderate Low-Moderate Moderate Low-Moderate

Although Table 5.6 indicates a large number of Low-Moderate potential impacts, through mitigation and common sense practices most of these can be reduced to low or moderate residual impacts, as indicated in the tables in Annex A.

Impacts for each of the 10 potential subprojects are presented in Tables B-1 to B-10 in Annex B. As well, the tables describe the consequences of the impacts and mitigation measures required. A rating for the potential impact, the residual impact and the risk is also provided. A summary of the potential impacts and their level of significance is given in Table 5.7.

Table 5.7: Summary of Potential Major Environmental Impacts - subprojects

Project Input	Potential Negative Impacts	Level of Significance
Laboratory Testing	Water pollution through chemical inputs; Air pollution. Land contamination through hazardous wastes disposal	Moderate-High
Veterinary services	Chemical inputs; Hormones and chemicals in meat and animal products	Moderate
Seed testing	Water pollution	Low-Moderate
Fertilizer	Water pollution	Moderate
Pest management/ Pesticides	Ground and surface water pollution; Soil contamination	Moderate-High
Plant production technologies	Soil erosion; Water pollution and Soil contamination; Water extraction and salinisation	Moderate-High
Livestock production technologies	Overgrazing; Loss of biodiversity; GHG emission	Moderate
Slaughter houses	Water and soil pollution	Moderate
Primary Processing	Surface water contamination	Moderate
Storage facilities (collection and cooling)	Reduction in productive land; high energy use	Low

The major potential negative impacts associated with the 10 potential sub-project types relate to water and soil quality, soil erosion and contamination.

Increasing of laboratory researches number which could be expected as the project output will lead to increase of hazardous wastes and waste water formation. Hazardous waste disposal might lead to leakage to the ground water sources and drinking water pollution/contamination.

Increasing pesticide applications can lead to pesticide residue (including heavy metals) build up in the soil. Pesticides and fertilizers can migrate to both surface waters and groundwater resulting in contamination of these two sources and leading to damaged aquatic ecosystems and threatened health to downstream users. Land preparation can promote erosion, particularly if tractors are too heavy and cause soil compaction, and if fields are ploughed (with or without the contour) and left a longtime before the sowing period. As well, erosion risks may be increased, particularly on steep sites.

Livestock rearing in closed conditions, both on the small farm holding and the large commercial farm, results in a concentration of animal waste that can contaminate both groundwater and surface waters. In the case of the former, public health is at risk, in the case of the latter, aquatic ecosystems and, possibly public health, are both at risk. Livestock expansion, particular for farms in the hills and near the mountains, can lead to pressure on common public lands including forests. Loss of biodiversity and soil erosion can occur if livestock and pastureland is not managed effectively and if livestock numbers are not controlled.

A system of ex-ante environmental screening of subprojects has been developed and will be implemented to decide if and which mitigation measure is required.

5.7 Mitigation

For agricultural activities mitigation should not necessarily entail expensive inputs and much can be achieved towards the minimizing of residual impacts through applying appropriate, efficient and safe farming techniques. For instance when implementing the subprojects directed to pest management, the PRP will require to recommend the application of Integrated Pest Management practices. That would allow mitigating not only impact on the environment but significantly reduce costs for plants treatment since the major quantity of pesticides is quite often consumed with no need and does not contribute to gain the required output.

Legislative requirements fulfillment should be the obligatory provision; this allows mitigating the potential subprojects impact on the environment. The Ministry of Agriculture is in a position to advise farmers on the proper handling and application of pesticides and fertilizers, including application rates and timely application. Application of those permitted pesticides is also significant. The same substances included in the list of forbidden pesticides of the UN are forbidden for application in Kazakhstan.

MoA can also advise on effective cultivation techniques (including the size of tractors and the type of equipment to be engaged) that will reduce the threat of soil erosion. The advanced agricultural practice will contribute to the additional mitigation of impact (e.g. organic farming or zero tillage) which would have on only environmental advantages but allow growing with the lowest costs and get the environmentally clean products. These methods do not cause wind erosion and on the contrary contribute to increase the natural soil fertility. Application of driven livestock methods will allow significantly reduce the impact of livestock pasturing on soil and increase the pasture productivity.

Adherence to national water and air quality standards will be monitored by local environmental agencies to ensure that these environmental components are protected. Techniques to be used in extraction and manufacturing sectors are often a matter of choice, albeit mostly economic. The environmental requirement will have to be considered when such choices are made. Such consideration will be the responsibility of the proponent and he/she will be required to absorb the economic cost of the consideration. The proponent may have no choice if the laws governing environmental protection are to be respected. Suggested mitigation for the various potential impacts is provided in Annexes A and B.

5.8 Potential Cumulative Impacts

Assuming that all mitigation is carried out on all projects for which grants are provided, there will still be residual effects, that when considered in total, could have an overall significant positive or negative effect on the environment. The major environmental concerns, as described in Section 5.6 and 5.7 are water pollution, waste generation, soil erosion and the consequences and secondary effects that erosion will cause.

Considering the small size of most projects, it would be easy to dismiss the negative effects that each project might have on the environment. For instance, subprojects applying new technology for cotton production («two seeds technology») may use polyethylene as insulating material to create the required that will not pose a threat within the frameworks of small research project.

But at the extension stage that may lead to large quantities of waste which are hardly processed particularly in the rural area.

Cumulative effect is important in spatial terms, as indicated above, and also over time. Small grant for seed testing in itself has no negative impact, and in fact, has much the opposite with an increased production and return to the farmer. However, the same grant provided for more than two years in a row could promote poor crop and land management and disrupt a relatively current good agricultural management system characterized by long rotations. By avoiding an appropriate crop rotation program the farmer can deplete the fertility of his soil and further promote soil erosion. Over time there would be a cumulative effect.

Farmers should not be denied grants on the basis of their location, but if patterns appear to show concentrations of grants (e.g. fertilizers) in one watershed, the responsible grant officers should alert the local DEE office for special monitoring of the situation. Likewise, if a group of large commercial farms in one particular watershed is taking advantage of the grant program, DEE should focus on monitoring the cumulative effects on water quality and soil erosion.

In a comprehensive examination of cumulative effects, analysis would be made of all of the other various activities taking place that have impacts. For instance, other programs that could be providing agricultural lines of credit, forestry programs that could be contributing to soil erosion, and in the same vein, road construction activities and other general construction that could add to the soil erosion problem. Although this project can not be concerned about the effects of other projects, it is important to place the project and the effects that it does have on the environment within the context of the overall development picture.

In order to prevent the risk of adverse cumulative environmental effects, a brief analysis of the portfolio relative to cumulative effects should be conducted annually and reported to the DEE.

5.9 Potential Residual Impacts

Residual impacts are those impacts that remain once all mitigation has taken place. These are the trade-offs for the benefits to be gained through the project. Assuming that full mitigation is carried out, residual effects could still be significant, particularly when considering the cumulative effect. A summary of residual effects is provided in Tables 5.8 and 5.9.

Table 5.8: Summary of Probable Residual Effects – broad project categories

Broad category	Probable Residual Effects	Significance
Laboratory/Testing stations	Water pollution	Low
Marketing infrastructure	None	None
Agriculture production and processing technologies	Water pollution, soil degradation	Low-mod

Assuming that all mitigation is carried out, the residual effects will be minimal. Although ratings are subjective, and only relative to one another, this analysis indicates that only one activities, agriculture production and processing, receive residual effects ratings above LOW-MOD.

5.10 Environmental Risk

Overall, the risk of any of the identified potential impacts is moderate. The main issue is the capacity to effectively enforcing existing regulations. If enforcement is carried out in an effective and efficient manner, the environmental risks associated with the various activities to be supported through the project would be low. Risks for those activities that would lead to impacts which can be governed by specific pieces of legal instrumentation would be low, given that enforcement is implemented. Risks for which there is no effective legal instrument would vary, depending upon the nature and level of impact, and the cost of mitigation.

Of particular concern would be for those activities resulting in water and air pollution, and soil erosion. They include application of pesticides and fertilizers. Only limited list of pesticides and herbicides is allowed for application in Kazakhstan.

Table 5.9: Summary of Probable Residual Effects – subprojects

Subproject	Probable Residual Effects	Significance
Laboratory Testing	Water pollution from hazardous wastes	Low-Moderate
Veterinary services	Some chemical residuals in meat and animal products	Low
Seed testing	Water pollution from chemical inputs	Low
Fertilizer	Water pollution from chemical inputs	Low
Pest management/ Pesticides	Water and soil pollution	Low-Mod
Plant production technologies	Water pollution and soil erosion	Low-Moderate
Livestock production technologies	Reduced biodiversity; soil erosion	Low
Slaughter houses	Water pollution from wastes	Low
Primary Processing	Water pollution	Low
Storage facilities	Loss of productive land	Low

5.11 Analysis of Alternatives

During project preparation it was decided that, given the size of the country, it would be preferable to target project actions geographically rather than covering the whole country. Instead of concentrating on a pilot region, the project preparation team decided to focus most project activities in two of the nation's primary economic corridors, a Northern corridor and a Southern corridor, where labor, transportation, ancillary services, and industries are most abundant. This facilitates implementation, increases spillovers, and makes project results more visible. The corridors were selected to reach a significant share of agricultural activities conducted on a limited covered land area. As it is shown in the map and graph below, the two economic corridors comprise almost 90% of agricultural GDP in less than 40% of the country's area.

During the design of the ACP several minor variations relating to competitive grants delivery mechanisms were examined but these would have no effect on the type of projects to be delivered to farmers and agricultural related entrepreneurs. The only other alternative to consider would be the “no project” alternative.

The “no project” alternative would certainly avoid the negative environmental impacts that have been identified with ACP but would also avoid the positive environmental effects of the project. The benefits of this project, mainly the increased agricultural productivity and improvement of rural socio-economic conditions, and improved enforcement of environmental legislation, far outweigh the few negative impacts to be expected from the project. There will be the potential for cumulative impacts on watersheds and over large areas as the use of agricultural chemical inputs increase. Project monitors will have to pay attention to how this impact develops. However, it is highly unlikely that the project will result in cumulative impacts that will be significant except in the very rare situation where a great number of grants for chemical input purchase occur in one small watershed. Limiting the number and nature of grants to such areas can control this.

6. ENVIRONMENTAL MANAGEMENT GUIDELINES

6.1 General

This environmental review does not require an environmental management plan, however, a series of guidelines are provided to ensure that World Bank requirements regarding the environmental aspects of the Project are met. Kazakhstan has environmental legislation but it lacks some by-laws and full capacity for enforcement and monitoring. The institutional capacity for enforcing the legislation is moderate at best.

The World Bank's main concern is with sub-projects that fall into Category B. These will require the greatest attention of the CC and DEE. This document and an accompanying user friendly manual will assist these groups in the identification of such sub-projects. All other sub-projects will require only a set of guidelines as per the matrices in Annexes A and B and monitoring on a sampling basis.

No category A sub-project will be financed under the project.

6.2 Category B Sub-projects

A number of agriculture and agriculture related activities (e.g. livestock management, agro-processing, use of pesticides or other hazardous materials) could fall within World Bank Category B requiring an environmental assessment. In such cases, the rigor of the EA that the proponent would carry out on these projects must meet World Bank standards. The Environmental assessment needs to be carried out for such subprojects according to the Ministry of Environment requirements developed taking the OP 4.01 of the World Bank and the European Union Directives into account. It will be important that the grant officers have sufficient knowledge to recognize the significance of any impacts that may occur for a project that is being assessed for a grant.

6.3 Management

The Coordination Center will be responsible for the whole project implementation. The PRP responsible for the selection of proposals should include a member with an environmental academic background or with environmental management experience to ensure that project activities being financed are not ones that would unduly affect the environment. The PRP should be able to recognize an activity, for which a grant is being sought, that may fall into Category B of the World Bank and ensure that the sub-project receives an EA that will meet World Bank and MEP requirements. The Grant application form shall include section of the potential environmental impact due to implementation of a subproject.

Mitigation of any environmental effects will be the responsibility of the sub-project proponent. However, it will also be the responsibility of CC and the DEE to ensure that mitigation is carried out successfully. This responsibility will be reflected in an effective monitoring system. Suggested mitigation requirements are provided in Annexes A and B. Tables 6.1 provide suggestions of good laboratory and agricultural practices. If these are followed, many of the potential impacts will be prevented from occurring.

6.4 Monitoring and evaluation

The Coordination Center, with technical assistance from local and international experts, will monitor the outcome of the project. Environmental monitoring of category B sub-projects will be important part of the project monitoring. The purpose of environmental monitoring is two fold: i) to ensure that mitigation as indicated in EAs for all Category B sub-projects is implemented effectively and that the residual impacts are acceptable; ii) to ensure that no unforeseen and any cumulative impacts occur as a result of the research and extension sub-projects and other project activities, and iii) to ensure that research sub-project experience is taken into account during extension phase.

Monitoring on a sampling basis for all other sub-projects (non-Category B) will be conducted to ensure that no unforeseen impacts occur and that precautionary measures have been taken in the design and implementation of the sub-projects to ensure that impacts are avoided. As well, monitoring will consider potential cumulative effects of sub-projects during extension phase.

The CC should involve environmental specialist (recommended above) in sub-projects monitoring including environmental monitoring. Monitoring would be regular and comprehensive for any sub-projects that are Category B and would be conducted on a sample basis for all other sub-projects. The CC will also have a monitoring function. Although CC monitoring will focus on financial and economic aspects, they will have a responsibility for ensuring that sub-projects for which they provide funding do not result in unacceptable environmental impacts. The monitoring responsibility could be shared with the CC and an arrangement between the two bodies should be negotiated to avoid unnecessary duplication. In practical terms, it would be more efficient to designate the CC as the environmental monitor since the CC could appoint one specialist for the task, rather than several CC each providing an environmental monitoring specialist. The CC should also establish a strong working relationship with DEE at both the field and head office levels, for purposes of monitoring.

The World Bank conducts regular supervision on all projects and environmental monitoring should be an integral part of project supervision. It is recommended that the Bank include an environmental specialist in its supervision missions and that environmental monitoring be conducted at least on an annual basis. World Bank environmental monitoring should be thorough for sub-projects that are Category B and should be done on sample basis for all other sub-projects. Table 6.3 provides a schedule for environmental monitoring, indicating responsibilities and required resources. This table assumes that there would be a CC environmental monitor in place. The Bank environmental monitor would also consider the contribution that sub-projects make to the cumulative impact of development.

Table 6.4 provides a preliminary set of indicators that would be used for different types of sub-projects. These indicators can only be finalized once sub-projects are well defined and a monitor has been designated. It is important that indicators be practical and can be measured objectively wherever possible, particularly for sub-projects that are Category B. For all other sub-projects, some objective measurement may be required but most monitoring will rely on professional judgment based on observations and interviews.

Any monitoring will result in a monitoring report with recommendations. The monitoring report will be submitted to the CC, which will implement the recommendations. The Bank environmental monitoring specialist who will also review monitoring procedures would also review monitoring reports.

Monitoring results will be used when annual evaluation of the overall project takes place since majority of subprojects will have an applied nature directed to get the competitive advantages. The aggregate evaluation of all financed subprojects shall be carried out to record the gained experience on the following grant programmes. Specialists of the CC and World Bank will jointly carry out the evaluation.

The evaluation findings will be forwarded to the Governing Board to make decisions regarding expediency and advancement of applied researches in the existing programmes. To carry out the project evaluation it is necessary to hire independent reviewers for the projects and programmes.

Table 6.1: Some Good Agricultural and Laboratory Practices – Towards a Protected Environment and Sustainable Agriculture

Activity	Good Practices
Laboratory testing	. safe handling, sampling, and storage of chemicals . proper conditions for the storage, housing, handling and care of biological test systems . appropriate labeling of chemicals . neutralization of acids . recycling and/or re-use of solvents . selection of energy efficient equipment . selection of equipment that uses less toxic reagents . safe work environment
Veterinary services	. zero use of hormones and minimal use of drugs . alternative medicine
Seed testing	. selection of seed with lowest agro-chemical input requirements to achieve high yields . selection of seed with minimal level of pest and disease vulnerability . rigorous sanitation facilities and procedures for imported seed . rigorous sanitation facilities and procedures for exported seed . extension services provide advice on appropriate fertilizer and pesticide applications . wherever possible, extension service to promote sustainable agricultural practices including IPM, minimum tillage, contour ploughing, crop rotations, and green manuring
Fertilizers	. selection of best fertilizers for crop and prevailing soil conditions . application levels as per recommended by manufacturer and extension service
Pest management/Pesticides	. IPM is a priority and pesticides to be applied sparingly and only where absolutely necessary . careful handling of pesticides; . protective clothing and equipment to be used . safe storage of chemicals . safe disposal of pesticide containers

	. applying of alternative and natural methods for pests management, e.g. setting up the insects catcher and insectivorous birds population support.
Plant production technologies	. implements suitable for minimal tillage . organic farming methods . selective planting to avoid sensitive areas, adverse aesthetics . zero-tillage . contour ploughing . grassed waterways . crop rotation
Livestock production technologies	. manure handling facilities . application of biogas digesters . pasture management
Slaughter houses	. wastes handling facilities designed to ensure zero runoff . blood recovery . incineration of wastes
Primary Processing	. high efficiency equipment including low emission fuels (e.g. gas, biogas, solar)
Storage facilities	. location of buildings where least disturbance of resources required . energy efficient building design including heating, ventilation . energy efficient equipment . building design to minimize materials and use of environmentally friendly materials . passive ventilation systems

Table 6.2: Schedule of Monitoring Activities

Monitoring Activity	Responsibility	Schedule
Identification of indicators and description of measurements to be made	Coordination Center environmental monitoring specialist (CC EMS)	Once sub-project has been approved for funding
Preparation of detailed monitoring plan including checklist and indicators	CC EMS	Once sub-project has been approved for funding
Liaise with MEP monitoring officers to arrange for baseline measurements where sub-projects are either Category B; and for follow-up indicator measurements	CC EMS	Once sub-project has been approved for funding
For Category B sub-projects, collect baseline data (e.g. water quality and air quality)	MEP field staff in cooperation with CC EMS	Once sub-project has been approved for funding and before sub-project is initiated
For all other non-Category B sub-projects, identify indicators that will be assessed	CC EMS	Once sub-project has been approved for funding and before sub-project is initiated

on the basis of professional judgement		
Conduct monitoring	CC EMS but in some cases simple measurements required (e.g. BOD load) could be conducted by locally chosen laboratory with simple appropriate equipment. In addition, CC should also have simple equipment for testing of water and soil quality.	Frequency will vary depending on the nature of the sub-project (e.g. for agro-processing, water quality tests downstream of the plant may require weekly sampling; for large numbers of livestock, water quality of nearby streams or domestic wells may have to be tested weekly or monthly)
Prepare monitoring report with recommendations	CC EMS	Immediately upon finalization of monitoring field work
Act upon monitoring recommendations	CC and sub-project proponents	Immediately upon receipt of monitoring report recommendations
Review content and effectiveness of monitoring program	World Bank environmental specialist	Annual
Conduct selective monitoring, particularly on Category B sub-projects	World Bank environmental specialist	Annual
Conduct project evaluation	Coordination Center and Governing board	Annual

Table 6.3: Preliminary Selection of Monitoring Indicators

Sub- project	Indicator	Baseline
Laboratory Testing	Quality of waste water Amounts of disposed wastes Safety and health of record of employees	Current level of chemical inputs Current waste generation data
Veterinary services	Amounts of chemical inputs	Current level of chemical inputs
Seed testing	Water consumption per production unit	Current level of water consumption per unit
Fertilizer	Water quality Soil quality	Current surface water quality Current soil quality
Pest management/ Pesticides	Water quality	Current surface water quality Current level of pesticides application
Plant production technologies	Soil productivity Water quality	Current soil productivity Current surface and groundwater quality
Livestock production technologies	Water quality Pasture productivity	Current surface water quality Current pasture productivity
Slaughter houses	Quality of waste water	Existing standards
Primary Processing	Energy rate	Current energy rate
Storage facilities	Use of fumigants	Current level of chemical inputs

6.5 Capacity Building

It is most unlikely that the members of the PRP and CC have any training in environmental matters. At the minimum, PRP and CC should attend a two day environmental awareness workshop that will demonstrate how sub-projects financed by project can affect the environment and the steps to be taken to avoid impacts. In addition, CC and PRP should include environmental specialist in a team.

The Peer Reviewing Panel will be responsible for the selection of proposals submitted for the (i) private laboratories, (ii) market driven infrastructure and (iii) competitive funding scheme. PRP should have the capacity to recognize, in a general way, potential environmental risk of certain investments, in order that they are able to report potential problems to the DEE. Key personnel from the MOA should attend an environmental awareness workshop and members of PRP should attend an environmental analysis workshop.

It is not known at this stage whether or not any of the organizations (DEE, CC) and their staff has experience or training in general monitoring techniques and project evaluation. If monitoring and evaluation are to play a key role in the management of the projects, particularly for the environment, it will be important that those officers responsible for monitoring and evaluation possess knowledge of basic monitoring and evaluation techniques. Assuming that training in monitoring will be required, this has been included in Table 6.3.

A user friendly environmental review manual would be helpful in providing grant officers with a quick step by step procedure for the environmental review of project applications. Table 6.4 summarizes the environmental capacity building requirements for the ACP.

Table 6.4: Summary of Environmental Capacity Building Requirements

Target Audience	Type of Capacity Building and Purpose	Description	Inputs Required
1. CC and PRP members	Environmental analysis. A general workshop to make all members of CC and PRP aware of importance of the environment.	Two day workshop. Beyond environmental awareness with emphasis on impacts and their consequences, and mitigation.	Four days of external consultant time
2. CC environmental officer Officers of DEE may wish to participate to learn more of the WB requirements	Environmental impact assessment. Provide basic knowledge to PRP. Provide CC with basis for analyzing sub-project proposals from an environmental viewpoint.	Four day workshop on environmental impact assessment with emphasis on identification of potential environmental problems and their consequences. Field studies will be included.	Eight days of external consultant time for first group of 12 officers; five days of consultant time for each additional group of 12
3. PRP	User friendly manual	A manual describing step by step procedures for identifying projects with significant impacts and how to mitigate such impacts	Ten days of manual preparation plus cost of manual production
4. CC environmental specialist and field members of DEE	Basic environmental monitoring techniques	Four day workshop on monitoring techniques and systems and to include field examination.	Ten days of external consultant time
5. The National Centre of Agricultural Expertise Managers and Veterinary and Quarantine laboratories Heads	To develop the quality and environment management systems. Manual for environmental management for the laboratories	Three days workshops of ISO 17025 and ISO 14001 introduction for laboratory management and staff.	The Consultants to work during 20 days in the field of quality and environmental management. Certification to be carried out by the third party.

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Materials of High-level Pan-European Conference on Agriculture and Biodiversity: a) The impact of agricultural policies on biological diversity and landscape; b) Sustainable Agriculture Initiative (SAI)

Annex A

Impacts, Consequences and Mitigation for Agriculture Related Enterprises

Table A1

Laboratory/Testing stations: World Bank will not support projects that propose use of hazardous substances that are not managed safely. Major concerns for laboratory activities include use of broad variety of hazardous substances and as a result of it a generation of hazardous wastes and wastewater. The project should deliver training for laboratory personnel in quality assurance and environmental management for further accreditation in accordance to ISO standards and provide support for the installation of state-of-the-art incinerators for regional laboratories.				
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**Residual Impacts to be Expected**
Air pollution	. GHG emission . Respiratory and allergic diseases of staff . Plants damage	. Ozone layer depletion . Working days loss . Social costs	. Effective ventilation system in the buildings . safety requirements fulfillment when working with liquid and volatile substances . Staff to use protective facilities	None
Water pollution	. Biological variety decrease; . Domestic water supply pollution	. aquatic ecosystems altered; . Human and animal diseases	. Safe handling with toxic materials . Chemicals reuse and recycling . spent chemicals decontamination . Waste water treatment up to the fixed norms	Small residual impact
Soil pollution when placing the toxic wastes on testing areas	. leakage of toxic wastes into surface and ground water	. ground drinking water sources pollution; . high costs for waste disposal	. safe handling with toxic materials; . waste minimization; . incineration of toxic wastes	A leakage is possible when placing toxic waste on testing areas

	Biodiversity loss	**Air Pollution**	**Aquatic ecology**
Overall potential impact	Moderate	Low	Moderate-High
Residual impact	None	None	Low
Level of risk	Moderate	Low	Moderate

Table A2

Marketing infrastructure: The major environmental effects of the marketing infrastructure will be related to effluents and emissions.

Potential Direct negative Impacts	Potential Indirect negative Impacts	Consequences	Mitigation Required	Residual Impacts to be Expected
Contaminated surface and ground water from effluents	. Aquatic ecosystem losses; . biodiversity losses; . contaminated domestic water supplies	. Health costs and loss of potable water supply	. Appropriate wastewater treatment to meet national standards; . adoption of holding facilities and recycling; . Alternative processes. **Mitigation easy if regulations enforced.**	None
Land pollution	. Loss of productive land and land for other uses through solid waste disposal . Vegetation damage; . Biodiversity losses	. Food production losses	. Ensure that waste disposal occurs in environmentally safe and designated areas; . Recycling; . Incineration of wastes **Mitigation easy if regulations enforced.**	None

	Effluents	Biodiversity
Overall potential impact	Moderate	Low
Residual impact	None	None
Level of risk	Moderate	Low

Table A3

Agriculture production and processing technologies: this category comprises of wide variety of subprojects intending to apply the advanced technologies for plant cultivation, livestock production, and primary processing of agricultural produce.				
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**Residual Impacts to be Expected**
Contaminated surface and ground water	. Increased use of pesticides and chemical fertilizers; . Aquatic ecosystem altered; . eutrophication of water bodies . biodiversity losses; . contaminated domestic water supplies	Ill health leading to societal costs; lost work days	. adopt organic farming; . Appropriate waste water treatment to meet national standards; . adoption of holding facilities and recycling; . alternative processes. **Mitigation easy if regulations enforced.**	
Land degradation	. Biodiversity losses; . Loss of productive land and land for other uses through solid waste disposal . overgrazing . soil erosion . desertification	. loss of productivity . loss of soil moisture . aquatic ecosystem modified . loss of water holding capacity	. consider pasture management . organic agricultural practices adopted (e.g. minimum tilling, contour ploughing)	
Air pollution	. Vegetation damage . GHG emission		. manure as fertilisers . biogas facilities	None

	Effluents	**Health**	**Biodiversity**
Overall potential impact	Moderate - High	Moderate	Moderate
Residual impact	Moderate	Low	Low
Level of risk	Moderate	Moderate	Moderate

Annex B

Impacts, Consequences and Mitigation measures

Table B1 - Laboratory Testing

Significance of Overall Potential Impact: MODERATE - HIGH			
Residual Impact Assuming Full Mitigation: LOW-MOD			**RISK: MODERATE - HIGH**
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**
Pollution of surface and ground waters by waste water	.Biodiversity of aquatic ecosystem decrease; . Domestic water supply contamination . Human and animal diseases	Biodiversity of aquatic ecosystem decrease	. Staff training on handling with toxic materials. S chemicals decontamination . Application of less toxic reagents when laborato researches are carried out . Application of analysis and equipment requiring use of chemical reagents . Local facility for waste water treatment up to th fixed norms
Atmosphere and air pollution in the working area	. Respiratory and allergic diseases of staff . Plants damage	. Indisposition . Working days loss . Social costs	. Effective ventilation system in the buildings . Safety requirements fulfillment working with li and volatile substances. . Protective facilities use by staff
Toxic wastes contamination of the environment as well as human health impact.	. Toxic substances impact on the human health; . soil and water sources pollution .Biodiversity decrease	. Human diseases . Social costs . Payments for wastes placement	. effective system for storing, collecting, transpor and disposal токсичных материалов и субстан . wastes separation, e.g. separate collection of biological waste, use of containers and chemical glassware for the following utilization. . Incinerator for wastes burning (temperature at le 1000º C) equipped with the additional chamber f burning and gas control.

Table B2 - Veterinary services

Significance of Overall Potential Impacts: MODERATE				
Residual Impact Assuming Full Mitigation: LOW			**Risk: LOW-MODERATE**	
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Potential Consequences**	**Mitigation Required**	**Re**
Meat and animal products containing hormones and other chemicals		Human illness	. Proper awareness and training of farmers and animal health workers; . Organic methods of livestock husbandry could be used; . minimal application of only necessary drugs; . Alternative medicine	On an use co ter eff
Soil and water contamination with insecticides used in dip tanks		. Contaminated soil and water not useable for cultivation or potable water; or water for irrigation; . Affected downstream aquatic ecosystems	Proper disposal of diptank liquids to avoid soil and water contamination **Mitigation will be easy.**	

Table B3 - Seed testing

Overall Potential Impact: LOW-MODERATE				
Residual Impact Assuming Full Mitigation: LOW			**Risk: LOW - MODERATE**	
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**Rem**
Water contamination	. increased use of pesticides (e.g. Round-Up ready genetically modified crops) and chemical fertilizers	. development of pesticide resistant weeds . long term dependence on high yielding varieties (HYV) requiring continual high level inputs; could be costly to the farmer	. determination and application of optimum quantities and scheduling for fertilizers and other inputs; . use of only those pesticides approved by UN agencies . adoption of organic farming techniques . introduction of an integrated pest management program (IPM). **Mitigation will be moderately difficult without support of an active extension service.**	. in g yield (HYV input expe speci woul exam case . orga techn pract of th these
. introduction of genetically modified plant seed		. genetic drift into other areas where GMOs are not wanted;	. policies and legislation to prevent import of GMO plant seeds	Gove decid gains outw

Table B4 - Fertilizer

Overall Potential Impact: MODERATE				
Residual Impact Assuming Full Mitigation: LOW			**Risk: MODERATE**	
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**Re**
. reduction in soil organic content	. modified soil structure and reduction in soil moisture holding capacity	. in the long run, possible loss of productivity as a result of insufficient soil moisture; . loss of soil's natural fertility	. fertilizer application in conjunction with crop rotation practices. . further reduce chemical fertilizer use through incorporation of various organic cultivation practices. **Mitigation moderately easy since chemical fertilizer costs are high**	. e sh wi ap be cr
. nutrient enrichment of water bodies	. eutrophication of water bodies . contaminated potable water sources	. modified aquatic ecosystems . loss of household water supply; . must search for new source	. organic farming; . crop rotation . optimum fertilizer quantities and application schedules should be planned and implemented **Mitigation moderately easy since fertilizer costs are high**	. v ex de cr . p in
. emission of greenhouse gases from chemical fertilizers	. contribution to global warming	. climate change	. optimum fertilizer quantities and application schedules should be planned and implemented **Mitigation moderately easy since fertilizer costs are high**	

Table B5 - Pest Management/Pesticides

Significance of Overall Potential Impact: MODERATE - HIGH				
Residual Impact Assuming Full Mitigation: LOW-MODERATE			**RISK: MODERATE-HIGH**	
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**R**

Impaired health of handlers including those who store, sell, transport and apply pesticides		. increased health costs; . lost family income; . insurance costs	. training in the proper handling and use of pesticides; . Introduce an IPM (integrated pest management program).	M de ce It M IP
Possible impaired health of food consumers		. increased health costs; . lost work time; . lost family income	. health warnings to wash foods; . use of appropriate chemicals that minimize residue and are least harmful to consumers; . consider organic farming . use of only those pesticides approved by sanitary and epidemiologic authorities and UN agencies . insects catcher, . insectivorous bird population support	Pu re do th sh M IP
Soil contamination	. long term loss . altered soil microfauna important to soil . biodiversity loss	. eventual loss of soil productivity	. Use of appropriate pesticides that do not have residuals or in which residuals do no harm to soil; . Prevent back siphoning or overfilling of sprayer tanks	Di ag pr an fa ad ch
Ground and surface water contamination due to: . Leakage of stored concentrate or discarding unrinsed 'empty' containers in or near to a water supply . spray drift under windy conditions or application too close to open water.	. movement of pesticide from treated land by heavy rains and runoff waters . spills that leak to groundwater and move laterally in aquifers	. impaired health of local and downstream water consumers . biodiversity losses . aquatic ecosystems damaged	. Use optimal (recommended) amount of pesticides . Consider planting across the slope . Make sure pesticides storage areas are away from water supplies and above high water flood levels. . Cover wells if spray operations are to be carried out in their vicinity. . Do not spraying when winds exceed 11 km/hr.	

Table B6 - Plant production technologies

Potential Overall Impact: MODERATE - HIGH				
Residual Impact Assuming Full Mitigation: LOW – MODERATE		**Risk: MODERATE - HIGH**		
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**Rem**
Deep cultivation contributes to soil erosion	Loss of soil productivity and stream sedimentation	Water regulation losses; modified aquatic ecosystems	Practices other than deep ploughing (e.g. direct seed drilling without disturbing the soil, or shallow tilling). **Mitigation will be difficult**	Diffic Agric will b traini demo

Soil erosion	. stream sedimentation . modified hydrological regime . desertification	. loss of productivity . loss of soil moisture . aquatic ecosystem modified . flooding and drought conditions increased	. contour ploughing required . optimal ploughing schedules to ensure minimal time for exposed soil. . organic agricultural practices adopted (e.g. shallow tilling) **Mitigation will be difficult.**	. shou conju husba inclu cropp burni . coor exten
Reduction of groundwater; extraction of surface water	. biodiversity loss . desertification	. loss of water to other current and potential users	Water sharing plan to ensure equitable distribution. Water saving techniques **Mitigation very difficult.**	Wate challe imple
Salinization; waterlogging	. desertification	. loss of productive land	Appropriate drainage system. **Mitigation relatively easy.**	
Water contamination as a result of application of fertilizers and pesticides	. eutrophication of water bodies . contaminated potable water sources	. modified aquatic ecosystems	. optimum fertilizer quantities and application schedules should be planned and implemented . use optimal (recommended) amount of pesticides . consider planting across the slope . adopt organic farming . use Integrated Pest Management methods	Train and II durin

Table B7 - Livestock production technologies

Significance of Overall Potential Impacts: MODERATE				
Residual Impact Assuming Full Mitigation: LOW			**RISK: MODERATE**	
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	
Overgrazing	. loss of ground cover . soil erosion . loss of water holding capacity	. reduced productivity . loss of soil . sedimentation . hydrological regime modified resulting in flooding and drought conditions	. consider pasture management . ensure that pasture carrying capacities are not exceeded.	. w agr ser
In high altitude areas stock may threaten forested or other protected areas	. reduced vegetation cover . soil erosion . loss of water holding capacity	. loss of soil . sedimentation . hydrological regime modified resulting in flooding and drought conditions . reduced biodiversity	. ensure that grazing does not occur in protected or other important areas.	. w agr ser . re
Livestock in a confined area – concentration of manure	. close confinement can result in animal diseases	. high nutrient loading in runoff waters leading to poor water quality and threat to human health	. manure use as fertilisers; . biogas facilities use . alternative to confined	

		. loss of stock and income	quarters.	

Table B8 – Slaughter houses

Significance of Overall Potential Impact: MODERATE				
Residual Impact Assuming Full Mitigation: LOW		**RISK: MODERATE**		
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**	**Re**
Surface water contamination from effluent discharge	. human and animal diseases . loss of potable water supply; . damaged aquatic ecosystems . BOD_5 level increase	.increased health costs . biodiversity loss	. design suitable blood collection facilities and allowing sufficient time for bleeding, typically seven minutes; . Fit drains with screens and/or traps to prevent solid materials from entering the effluent system.	Sla firs int lik (M Di (D (B ess sup the cro a c ani
Soil contamination		. Reduction in the amount of land available for food production . income loss	. slaughterhouse wastes can be used as inputs to feeds for the poultry, fish and pets like dogs and cats; . incineration of infected animals remains and carcasses	Ne the the rec

Table B9 - Primary processing

Significance of Overall Potential Impacts: MODERATE				
Residual Impact Assuming Full Mitigation: LOW		**Risk: MODERATE**		
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Potential Consequences**	**Mitigation Required**	**Re**
Surface water contamination from effluent discharge (e.g. blood from meat processing)	.impaired health of downstream users; . loss of potable water supply; . damaged aquatic	.increased health costs, . lost work days and family income; . alternative source of potable water must be	.assurance that effluents are treated before discharge; . alternative ways of handling effluents (e.g.	Ea op for be pro

	ecosystems	found; . reduced biodiversity	recycling); . good housekeeping to prevent product and by-product losses; . blood recovery; . serum use as animal fodder or new milk products output	sul mo rec Mi co of ag
High level of water and energy consumption	. air pollution from boilers	. lost income	. Use high pressure rather than high volume for cleaning surfaces; . Maintain optimal combustion efficiencies on boilers. . Improve insulation on heating and cooling systems and piping.	
Injury and illness as a result of poor working conditions		. injuries and illness; . lost work time; . lost family incomes	. provision of appropriate safety features and protective clothing; . training on the use of equipment; . awareness of dangers **Mitigation relatively difficult.**	Th an to

Table B10 - Storage facilities

Potential Overall Impact: LOW			
Residual Impact Assuming Full Mitigation: LOW		**Risk: LOW**	
Potential Direct Negative Impacts	**Potential Indirect Negative Impacts**	**Consequences**	**Mitigation Required**
Reduction in the amount of land available for food production		Reduced income from lower total crop production.	. Efficient design to minimize space required. . Accurate selection of site for storage construction **Mitigation easy.**
CFC emissions from compressors	Ozone layer depletion	Global warming	. replace CFC-based refrigerants by less hazardous HCFCs or preferably, by ammonia; . closed circuit systems and leak prevention

			. consider passive ventilation methods
Leakage of fuel and chemicals into surface and groundwater		Pollution of ground and surface water leading to contaminated drinking water and irrigation water as well as affecting aquatic ecosystems	Construction to include impermeable flooring. **Mitigation easy.**

Annex C
MINUTES of a meeting of the Environment Expert Group

MINUTES
of a meeting of the Environment Expert Group of the Agricultural Competitiveness Project, a joined project of the Ministry of Agriculture of Kazakhstan and The World Bank Group.

Astana City
June 29 2004

Place: Conference Hall, Ministry of Agriculture
Time: 3 PM

Attending representatives of:
Phytosanitaria, a public enterprise,
The National Animal Health Laboratory, a public enterprise,
The National Centre of Testing Methodology in Veterinary Medicine,
The Quarantine Laboratory;
F.A. Usmanova, Project Manager, ACP, Kazakhstan Economic Research Institute (KERA);
Z. Balgabayeva, Project Coordinator, ACP, Kazakhstan Economic Research Institute (KERA);
Z. Zharmagambetova, quality consultant, ACP, Kazakhstan Economic Research Institute (KERA); N. Iskendirov, an environment consultant, Central Asia Regional Environmental Center (CAREC);
T. Urazov, a World Bank consultant.

AGENDA:

1. Synopses of the Agricultural Competitiveness Project; F.A. Usmanova.
2. Environmental Management of Laboratories; N. Iskendirov.
3. Discussion

The discussion was focused on the following points:

- Waste management continues to be a problem; empirical evidence shows that the optimal way to deal with laboratory waste would be through installing incinerators. However, individual laboratories cannot and will not be able to afford installing incinerators on their own; therefore ideally, several laboratories should be encouraged to pool their resources to obtain a waste incinerator which they would share.
- Presently, in Kazakhstan there are no sites for burial of toxic and hazardous waste.
- Private laboratories are regulated by 10-15 government agencies, a fact which creates confusions and impedes effective operations.
- The environmental part of laboratory management is of relevance in Kazakhstan, and the Project Preparation Group has been justified to raise this time-sensitive issue in a high-profile manner.
- The stipulation that any imported laboratory apparatus be registered by KazInMetr, a public enterprise, and entered into the National Registry of Laboratory Equipment, continues to present a major hurdle for the efficient use of laboratory apparatuses by increasing equipment costs by as much as one third of its pre-import price.

Having discussed the material presented, the Environment Expert Group has made the following **DECISIONS**:

1. Approve draft Guidelines for the Environmental Management of Laboratories.
2. Make the minutes and all the other relevant material the discussion has produced with respect to environmental issues available to all other participants of the ACP roundtable.
3. Evaluate the possibility of streamlining and simplifying, under the Agricultural Competitiveness Project, the process of registration of laboratory equipment by KazInMetr.

List of Participants, Environmental Workshop, June 29 2004, 3 PM

No	Name of Participant	Place of Work, Position	Phone No/E-mail
1.	V. A. Pashentsev	Head, Toxicology and Biochemistry Laboratory, The National Centre of Testing Methodology in Veterinary Medicine	39-00-04
2.	Z.O. Baizhanova	The National Centre of Testing Methodology in Veterinary Medicine	39-00-04
3.	B.R. Kaliyev	Deputy Director General of Phytosanitaria, a public plant health enterprise	
4.	E. M. Batrak	Director, Certification Unit, Trade Guild Ltd.	32-78-93
5.	V. E. Kambulin	Director, Testing and Information Centre, Phytosanitaria	39-76-49 PLANT_PROT_INF@MAIL.RU
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7.	B. Koparov	Head of a department, The National Animal Health Laboratory.	