Building the Sustainable Network of Settlements on the Caspian Sea Region of Kazakhstan

Introduction

The *Ecological Zoning and Identification of Ecological Capacity of Natural and Socio-Economic Potential of Mangystau Region* project was developed by the order of local administration of Mangystau Oblast (region) in 2009.

The overall objective of the project is to contribute to a more equitable decision making tool through the development of Decision Support System (DSS) for better management of natural resources.

This paper relates to the main outcomes of this project, combined with the observations, conclusions and recommendations of the author who has been personally involved in the project. The project implementation was divided into two stages.

Three basic spatial models of ecological macro-zoning were developed as a result of the first stage project implementation. The proposal of macro-zoning models was based on the evaluation of climatic conditions, capacities of natural complexes and socio-economic potentials of the Mangystau territory.

The further preparation of the framework for creation of Decision Support System was implemented during the second stage of the project.

Background Information on Mangystau Region

Mangystau Region is located in the South-West of Kazakhstan. The region's territory can be described as desert zone with sands covering vast areas. The climate is severely continental, extremely drought. The average temperature in January is minus 4 -9° C and in July is plus 25 -29° C. Annual amount of precipitation is about 100 – 150 mm.

Source: GeoData LLC (2009) *The Ecological Zoning and Identification of Ecological Capacity of Natural and Socio-Economic Potential of Mangystau Region*

Mangystau occupies area of 165.6 thousand square km with about 390 thousand inhabitants. It is one of the less populated regions of Kazakhstan with average density of population about 2.3 persons per square meter.

On the one hand, Mangystau represents strategic economic region of the country specialized on exploitation and development of oil and gas, but on the other hand it is environmentally depressive land with number of ecological problems.

A resume of the SWOT analysis, developed during the implementation of the *Ecological Zoning of Mangystau Region* project, provides background information on the current situation. At the same time the analysis shows an existing potential of the region that can be developed in the future.

SWOT- analysis of current socio-economic situation of the Mangystau Region

Strengths	**Opportunities**
• Considerable deposits of natural mineral resources (hydrocarbons mostly); • Establishment of Free Economic Zone (Sea Port "Aktau"); • Strategic specialization on oil and gas sector with production of export oriented products; • Fast development of construction industry; • Positive tendency in development of processing industries like machinery-producing industry and metallurgy; • Favorable geographic location for development of transit international transport corridors (North-Sourth, CAREC and etc.); • Developing tourist and recreational potential; • High level of immigration.	• Available natural resources can be used for comprehensive development of more environmentally friendly High-Tech industries and tourism; • Perspectives of new urban structures development; • Creation of new working places with comfortable facilities and attraction of high level specialists in the region; • Increased income from exploitation of transit transport and logistic systems; • Attraction of investments in new Hich-Tech industries linked to the work of transport and logistic systems, including some initiatives in agriculture development • Improvement of environmental situation via better distribution of investment resources including management of eroded territories out of urban areas
Weaknesses	**Threats**
• Aggressive climatic conditions for development of agriculture; • Spatially isolated system of settlements; • Lack of water resources; • Poor tourism infrastructure; • Lack of high qualified labour; • High level of immigrants; • High level of unemployment in rural areas; • High dependency of local economy on raw materials in oil and gas sector; • Lack decision making opportunities of local administration; • Lack of self-government and public participation possibilities.	• Pollution of the environment near the raw materials exploration sites and land erosion; • Lack of high qualified specialists; • High number of poor people; • Low level of education in the rural areas; • Preservation of raw materials oriented economy and economic collapse in case of absence of oil and gas resources; • Lost of competition in transport and logistic sectors because of the low development of needed basic infrastructure for workable international corridors (North-South, CAREC and etc.); • Extra centralisation of top down decision making system;

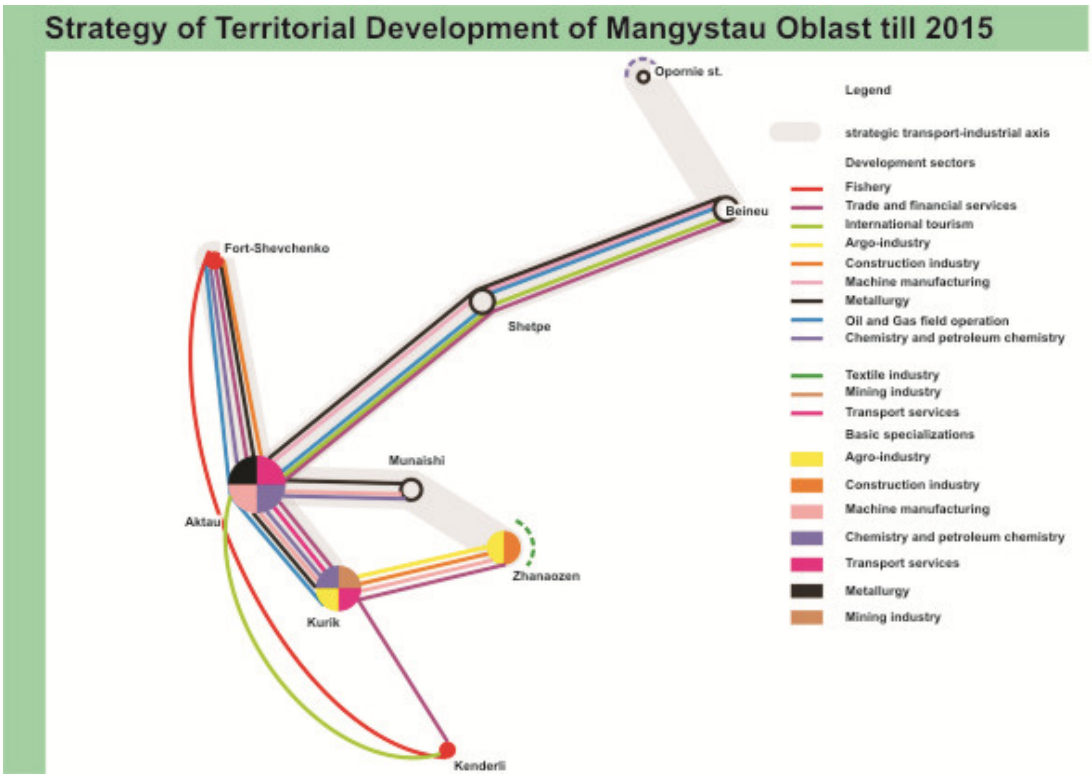
Source: GeoData LLC (2009) *The Ecological Zoning and Identification of Ecological Capacity of Natural and Socio-Economic Potential of Mangystau Region*

Alignment to Approved Development Projects

Several national and regional level programs and projects on spatial development of Mangystau were reviewed and analysed for alignment of the eco-zoning project with already approved national development plans. The main inputs taken from the most ambitious three regional level projects are provided below. These conclusions impacted on development of appropriate approaches on ecological zoning of the Mangystau territory:

- *Strategy of Territorial Development of Mangystau Oblast till 2015, produced by Investment Group ACME Co Ltd:*

Priority Tasks	**Inputs**
Promotion of Mangystau region as a main representative core of Kazakhstan in the Caspian Sea Area with international importance in the development of industry, science and innovations and in the provision of high service for transport, logistic and trade	Concentration of key activities and arrangement of better mobility are needed
Support of balanced socio-economic development of the region	Keeping a balance in development of spatial conditions for environment, society and economy
Enhancement of labour qualification and professionalism	Establishment of better access to the education and training centres for small scale urban settlements and rural areas
Improvement of ecological situation in the region	Environmental capacity has to play key role in spatial development of the region
Optimization of Management System in the region for better decision making and effective use of state budget	Introduction of new up-to-date tools for decision making is needed



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- *Master Plan on Tourism Development of Mangystau till 2015, produced by group of companies including IPK International, Plan&Art, Istanbul Technical University and Carrai Fusco Senserini Associati.*

Priority Tasks	**Inputs**
Establishment of internationally competitive recreation system on Kazakh shore of Caspian Sea	Urban areas have to play main role in development of recreation system on Kazakh shore of Caspian Sea
Development of touristic routes covering the most interesting natural, cultural and historical sites of the Mangystau	Preference has to be given to eco-tourism with preservation of sensible natural areas and especially Caspian seals' islands
Promotion of Aktau as an international business meeting and conference centre oriented on serving of all Caspian Sea countries	Aktau has to become mobilization core of other networked urban areas
Development of tourism cluster linked with improvement of other social services	Territorial conditions for better concentration of economic potential and active interaction can serve as a good basement for clusters development

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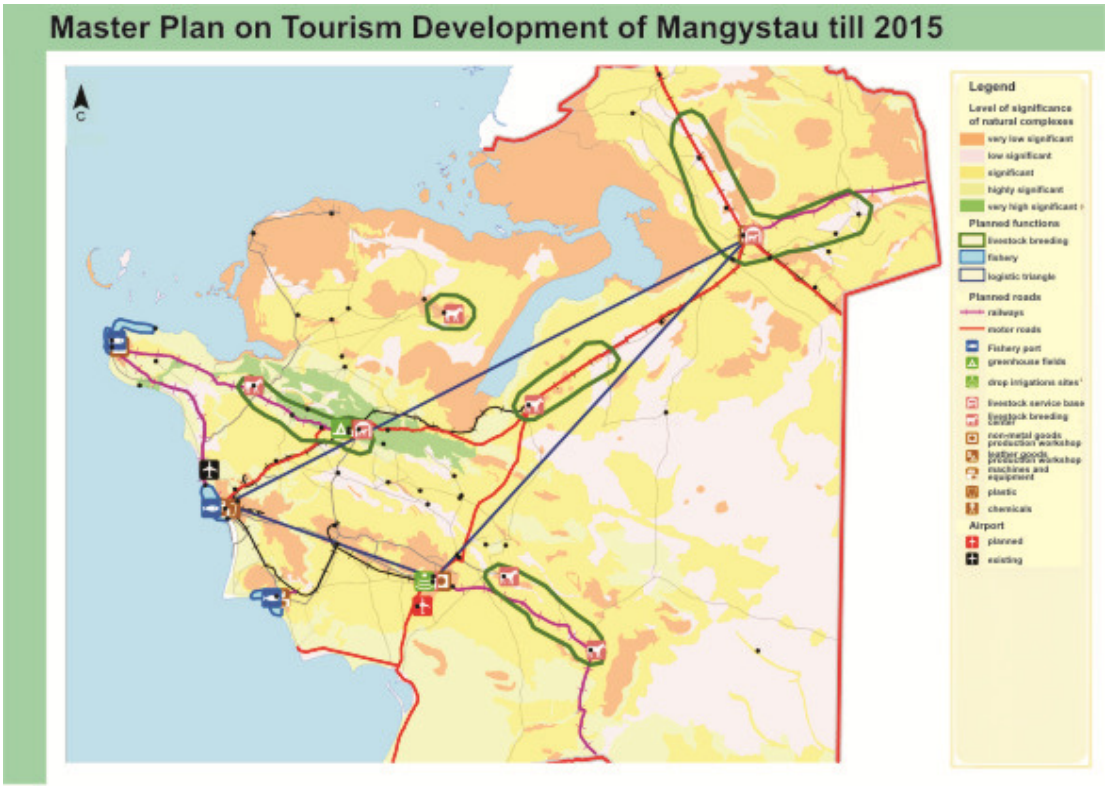
- *Master Plan Study on Integrated Regional Development for Mangystau Oblast, produced by Japan International Cooperation Agency*

Priority Tasks	**Inputs**
Creation of better conditions for employment through the diversification of the local economy	Oil and gas sector has to be main basement of economic diversification
Improvement of living standards both in urban and rural areas	Current dependence of rural areas on urban areas has to be overcome

Priority Tasks	**Inputs**
Enhancement of living conditions and population health by means of better environmental management and improvement of human resources security	Better management needs to be supported by appropriate decision making tools



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From Eco-zoning to Decision Support System for Introduction of Networked Urban Systems Model

Alignment step was followed up by addressing of the project proposal to the current local needs. Therefore arrangement of an open dialogue with local stakeholders (local administration, NGOs, private companies, local population and etc) played key role in identifying project development strategy. All above listed inputs were re-evaluated and included into the draft project implementation program, which was then presented to local stakeholders during the first public consultation.

The public consultation results helped to switch from problem-oriented planning approach (typical for old eco-zoning projects) to long-term strategic planning. Participants' feedbacks were useful to understand a new role of ecological zoning map that has to be converted into a workable management tool for better decision making. More over this consultation became a good basement for establishment of three main tasks of new eco-zoning map requested from local stakeholders:

(i) to keep a liveable balance between the built up area and open space;

(ii) to guide investors on their possible profitable activities in areas of intensive human activities or in areas of distinctive nature sensitivity;

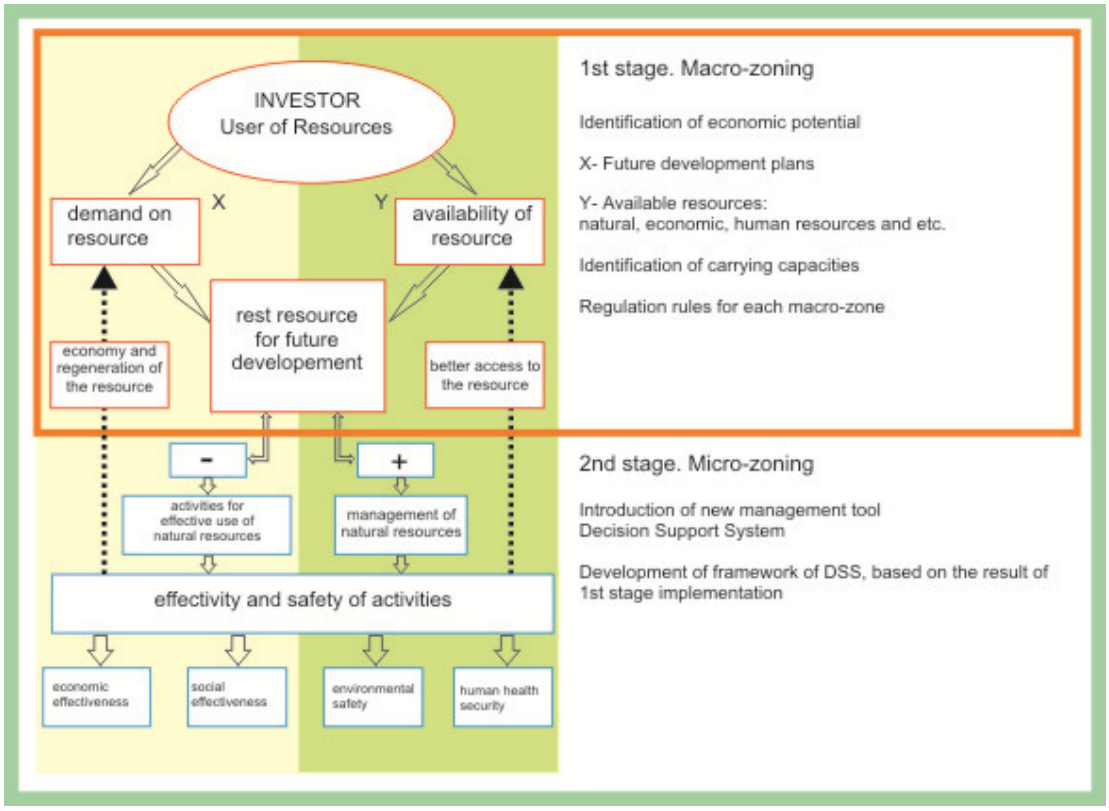
(iii) to increase quality of local population's life.

All three given tasks could be integrated in a main requirement of establishment a model for effective interrelations between "user" and "natural resources". However it is better to consider not user, but an investor who is also able put own resources for development of a new ones. At the same time investors could be different players depending on project scale and management tasks. Mangystau eco-zoning project is oriented to three central investors:

(i) urban-systems;

(ii) private companies;

(iii) local population.



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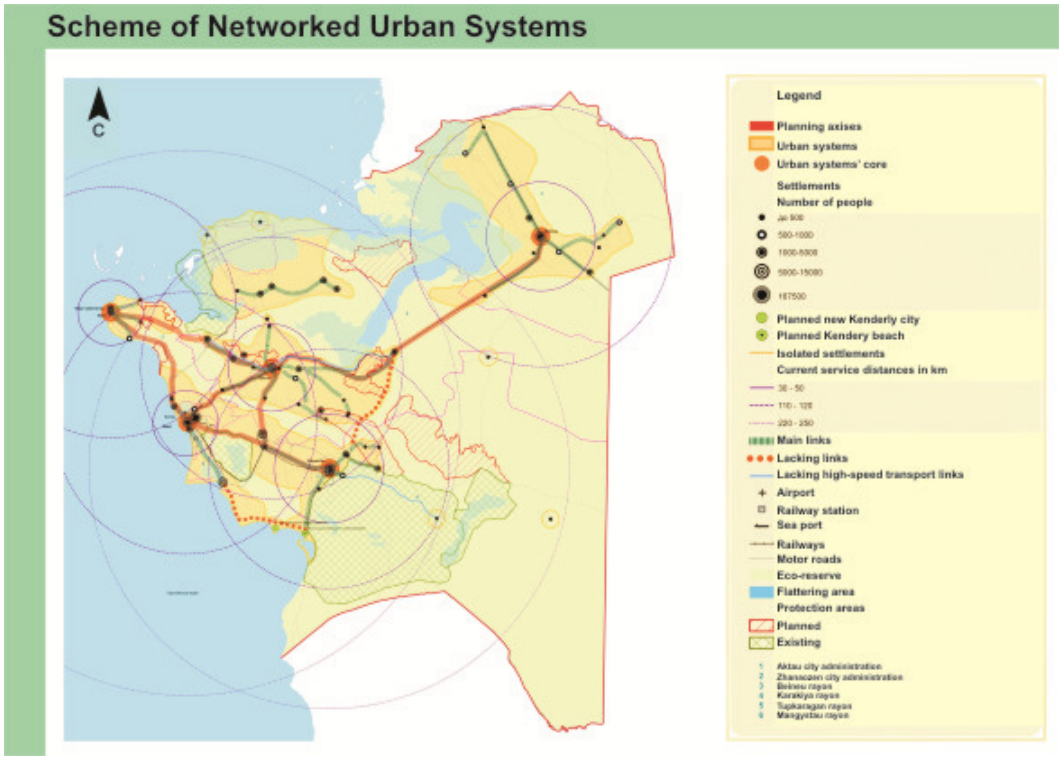
Urban system is a new proposed term describing urban areas that must be considered as an integral complex for better management of natural resources. Urban-systems were introduced as far as current administrative units, serving as a key management objects, no longer can be used for sustainable development of Mangystau region. Commonly used administrative units represent important objects for local administration, but current administrative borders become an obstacle for effective territorial management, especially, when it comes to management of environmental, economic and social cross-cutting issues.

Boundaries of the urban systems were identified during the first stage of the eco-zoing project implementation through the comprehensive analysis of environmental, economic and social factors. The whole territory of Mangystau region was sub-divided into two levels of macro-zones:

(i) impacted by human activities – urban systems;

(ii) natural free spaces.

This division was made in order to establish different management frameworks for two different categories of lands. Natural areas were planned to save as a future reserves and recreational territories could be used for eco-tourism development. The impacted areas were integrated into large complexes so called “urban systems”. The urban systems sometimes comprise not only settlements, but some industrial and exploration sites operating for a long time with highly polluted environment. Comprehensive assessment of environmental, economic and social ingredients let us to identify five urban systems in the territory of Mangystau region: Aktau, Zhanaozen, Shetpe, Fort-Shevchenko and Beineu.



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Relative low developed and spatially isolated settled areas together with aggressive climatic conditions of Mangystau impacted on necessity of territorial integration of urban systems in one regional network. The building of networked urban systems was planned to establish through development of the simulation model framework. At this stage the project team was joined by IT specialist who assisted in formation of logical framework of new management tool representing a Decision Support System (DSS) totally based on the idea of creation spatially and territorially networked urban systems. Each urban system is supplied with specific development regulating rules and information on investment possibilities. At the same time each urban system is linked to integrated network via virtual environmental, economic and social linkages that can be helpful for better location of new developments depending on their purpose, scale and environmental impact.

DSS shall become an ideal tool for:

- integration of up-to-date information adopted to supply wide range of decision making tasks;
- improvement of cooperation across sectors on implementation of state program and projects;

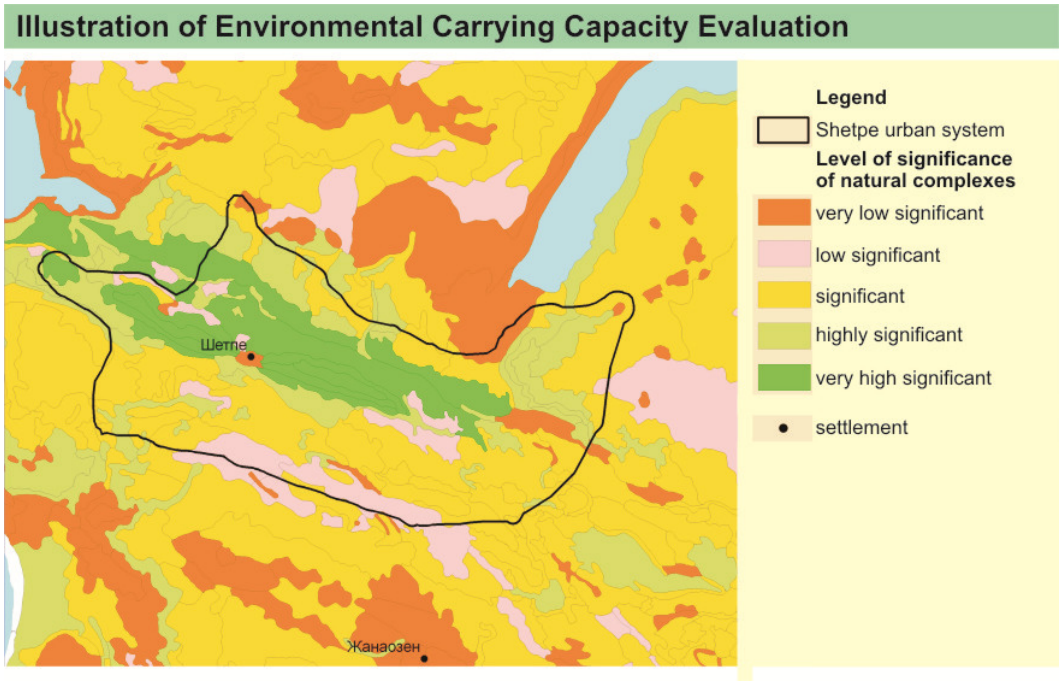
- enhanced cooperation between local administration, private companies and civil society.

Networking concept was based on following key principles corresponding with inputs taken from approved strategic projects on regional development:

- equal development rights for all settlements;
- economic integration and high regional mobility;
- keeping a balance between settled and free lands.

All planning and decision making steps have to consider an issue of keeping a balance between different categories: (i) economic profit and environmental impact; (i) economic and social benefits; (iii) developed land and natural free territories and etc. The issue of keeping balance was solved in eco-zoning project via integration in DSS different analytical modules.

One of the main analytical modules aims evaluation of carrying capacities of main macro-zones influenced by economic, environmental and social conditions. Carrying capacity theory widely used by environmentalists was successfully adopted for planning of networked urban systems model. It is very useful for assessment of new development project and in some cases let's implements urgent feasibility studies.



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DSS is also supplied with an urban systems' development module that formed as an instrument for the assessment of state policy, development of settlements, taking of decisions and planning of the future. The module ensures that the information regarding territorial development and development perspective is precise, in time and accessible for the both, the state administration and the society.

A set of indicators characterizing an urban system from the most different aspects is necessary in order the development assessment would be sufficiently comprehensive. Environmental, economic and social aspects of the development shall be included in the indicators system of the assessment. The development can be evaluated from the point of view of the level of achieved and also positive or negative changes taking place.

In order to assess the development of urban systems, new indicators based on systematic approach were developed for the urban systems' development module. This module is also useful for further monitoring of urban systems development.

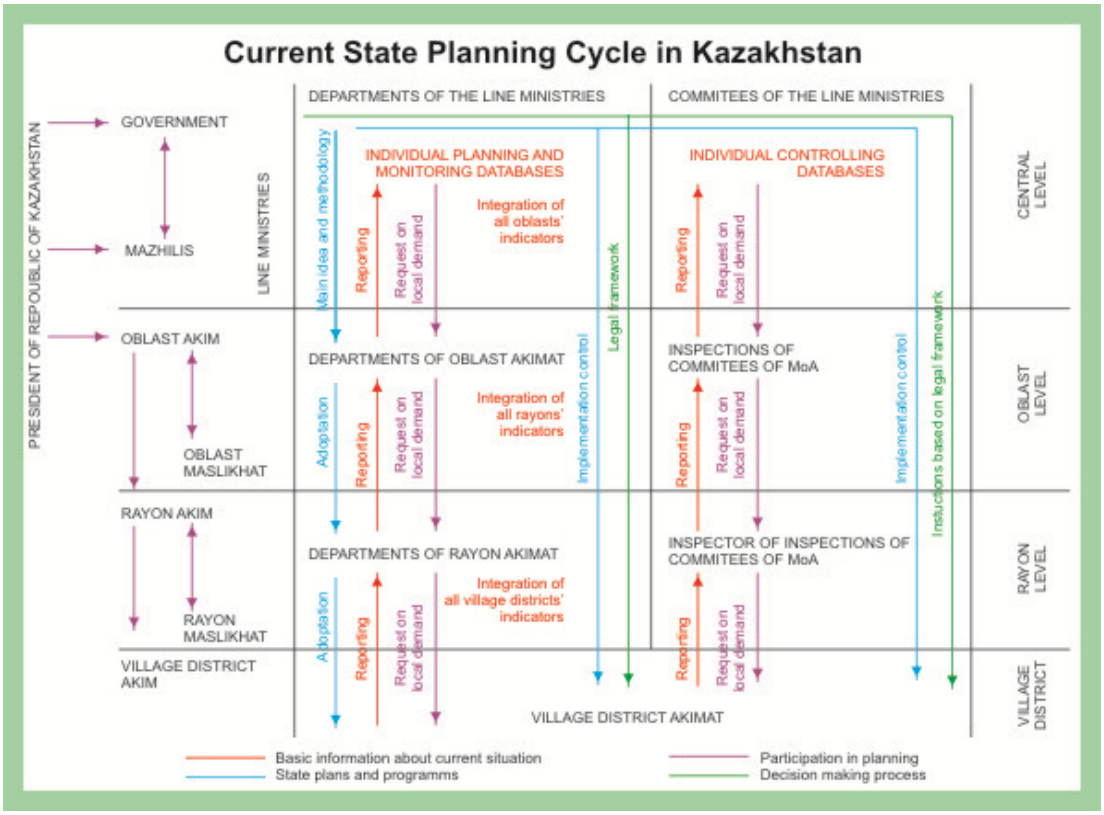
Conclusion and lessons learnt

The eco-zoning project of Mangystau serves as a good example of comprehensive decision making tool that can help linking main tasks of sustainable development, like:

- effective use of natural environmental, economic and social resources;
- better orientation of investment activities;
- public participation in all stages of planning from development to monitoring of implementation results.

However the eco-zoning of Mangystau region is one of the many well-developed, but not implemented projects of Kazakhstan aiming improvement of local level self-management of natural resources and sustainable spatial development. Despite the fact that eco-zoning project was successfully provided to and approved by local administration of Mangystau region in 2009, the introduction of DSS hasn't been started yet. It is mostly connected with the some key issues were considered as project implementation risks, like:

- lack of local administration capacity for implementation of the project;
- lack of local budget for development and installation of GIS for DSS and provision of access for all relevant stakeholders ;
- lack of power of local level decision makers (regions still too depend on central level decisions).



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Madina Junussova, Individual Consultant, Kazakhstan