

CHAPTER 5 OBJECTIVES AND STRATEGY FOR MANGISTAU REGIONAL DEVELOPMENT

5.1 Objectives and Basic Strategy

5.1.1 Problem structure of Mangistau Oblast

As the first step for planning for the development of any region, the existing conditions of the region are analyzed to identify various problems which combined would work as constraints to the regional development. Many of these problems are interrelated to cause undesirable phenomena observed.

A problem structure analysis is a method to clarify these interrelationships in a macroscopic way. The analysis, usually undertaken at an early stage of the planning, would allow maintaining a broad perspective without getting into details to identify the fundamental factors causing a range of problems and the major problems to be alleviated through planned development efforts. The analysis is often used to define development objectives and establish basic strategy for the regional development.

First, problems facing any region are enumerated, and some of them are combined and expressed in generic terms to imply many specific problems in different sectors. Second, causal relationships between these problems are analyzed. Finally, a problem structure is constructed based on the causal relationships identified as more important.

(1) Application to Mangistau Oblast

1) Enumeration of problems

The problem structure analysis is applied to Mangistau Oblast. As the focus of the planned regional development of Mangistau Oblast is the diversification of the regional socio-economy, problems inside the dominant oil and gas industries are not included in the analysis here. First, problems facing Mangistau Oblast are enumerated and more important ones expressed in generic terms. All the problems thus identified may be classified by broad sector as follows.

Economic problems

- 1) Over-reliance on the fossil fuel-based economy
- 2) Small local market
- 3) Dominance of large enterprises having weak linkages with local economy
- 4) Low productivity agriculture
- 5) Decline of fishery production in the Caspian Sea
- 6) Delayed tourism development
- 7) Shortages of highly skilled personnel
- 8) Mismatch of labor demand and supply
- 9) Limited employment opportunities for unskilled labor

- 10) Large inflow of laborers from neighboring countries
- 11) Slow development of small enterprises

Social problems

- 12) Large disparities between urban and rural areas
- 13) Spots of poverty in rural and urban areas
- 14) Small population and dispersed settlements
- 15) Rapid population growth
- 16) Large inflow of immigrants
- 17) High unemployment especially among the youth and immigrants
- 18) High infant and maternal mortality rates
- 19) Increasing health risks

Environmental problems

- 20) Negative environmental heritage from the Soviet era
- 21) Emerging pollution in urban areas
- 22) Inadequate disposal of solid wastes
- 23) Pollution of the Caspian Sea
- 24) Deteriorating living environment
- 25) Soil degradation due to irrational land use
- 26) Insufficient and irregular environmental monitoring
- 27) Disruption of aquifers due to oil exploration

Institutional problems

- 28) Limited capacity of local administrations
- 29) Insufficiency of effective farmers' organizations
- 30) Insufficient information dissemination
- 31) Limited functions/authorities of local administrations on some development issues

Infrastructure problems

- 32) Insufficient artery transport infrastructure
- 33) Inadequate maintenance of existing facilities
- 34) Deteriorating desalinization, water supply and sewerage facilities

Inherent problems

- 35) Dry and arid continental climate
- 36) Limited water resource endowments
- 37) Vast land area of low productivity
- 38) Distance from the capital and the Almaty regions

(2) Construction of the problem structure

A problem structure of Mangistau Oblast is constructed by analyzing the causal relationships between the problems identified. The results are shown in Figure 5.1. The figure shows all the problems identified above and main interrelationships between them.

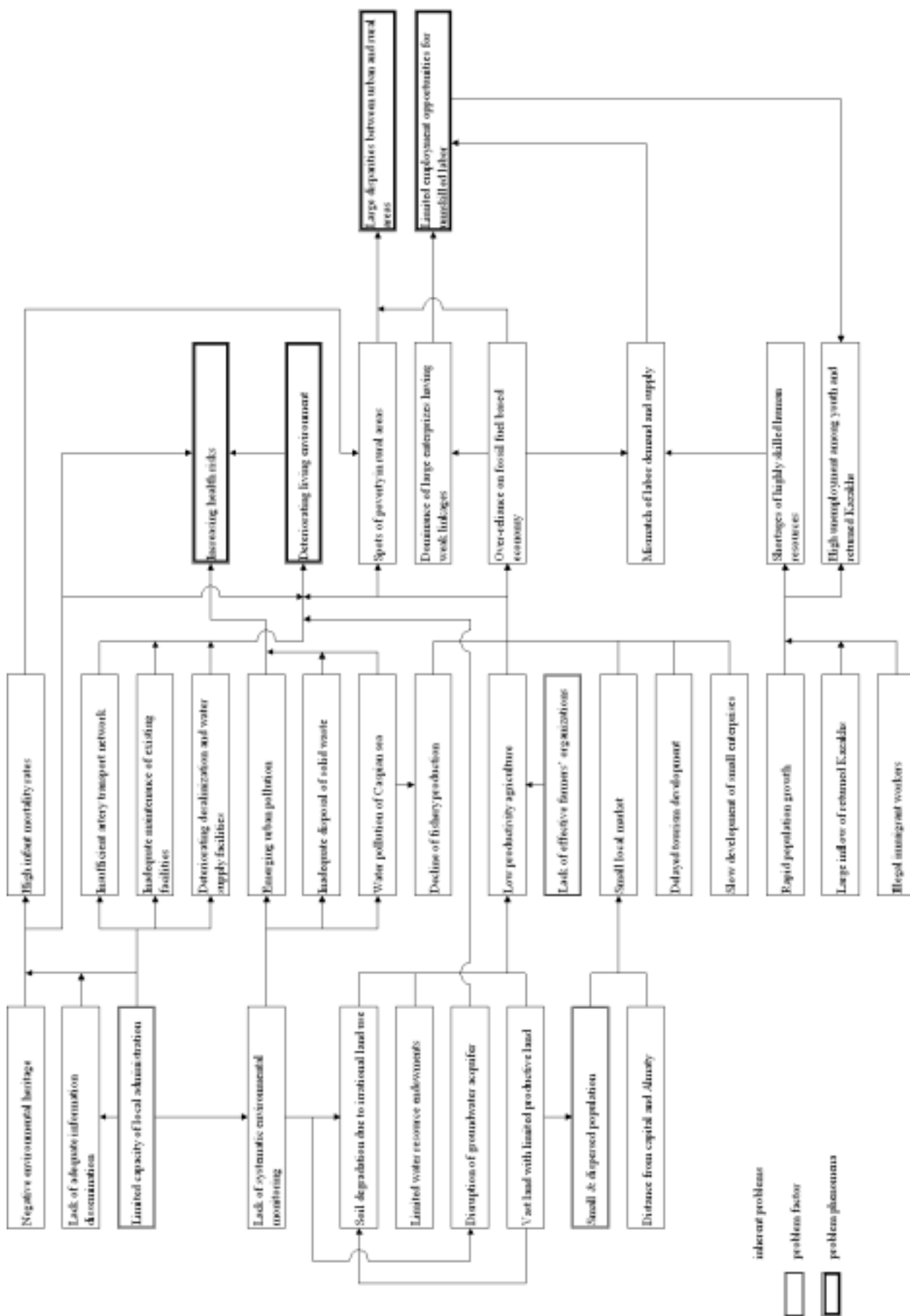


Figure 5.1 Problem Structure of Mangistau Oblast

As shown in Figure 5.1, many problems are rooted in the three inherent problems: limited water resource endowments, vast land of low productivity, and distance from the capital and the Almaty regions. These inherent problems cannot be solved directly by planned development efforts. The limited capacity of local administrations is an institutional problem that can be alleviated by planned efforts by the Government in support of localization as well as other institutional problems such as lack of effective farmers' organizations. The problem of small and dispersed population may be overcome through planned settlement and infrastructure development.

(3) Analysis on the problem structure

1) *Major problem phenomena*

From Figure 5.1, major problem phenomena may be identified in the economic, social and environmental sectors. The main problem of the economic sector is the limited employment opportunities for unskilled labor, caused directly by the dominance of large enterprises having weak links with local economy and the mismatch of labor demand and supply. These, in turn, are due to the over-reliance on the fossil fuel-based economy.

The main problem of the social sector is the large disparities between urban and rural areas in various aspects including income levels, living conditions and social services availability. Again, the over-reliance on the fossil fuel-based economy is responsible as well as the widespread poverty in rural areas due to underdevelopment of agriculture, fishery and small enterprises.

The main problem of the environmental sector is summarized as the deteriorating living environment and the increasing health risks. The former may be a combined outcome of inadequate infrastructure facilities as shown in the problem structure, underdeveloped economic activities as indicated above, and possibly environmental hazard as indicated also in the problem structure. Negative environmental heritage from the Soviet era is at the root of problems.

2) *Fundamental problem factors*

From Figure 5.1, four fundamental factors may be identified at the bottom of various problems in addition to the four inherent problems of dry and arid continental climate, the limited water resource endowments, vast land with limited productive land, and distance from the capital and the Almaty regions. These are the negative environmental heritage, limited capacity of local administrations, small and dispersed population, and lack of effective farmers' organizations.

The negative environmental heritage may be a cause of the high infant mortality rates and the increasing health risks, and certainly a factor for the deteriorating living environment. The limited capacity of local administration shows typically in the insufficient artery transport network, inadequate maintenance of existing facilities, and deteriorating desalinization and water supply facilities, which degraded during the economic crisis in 1995-97 and thereafter. It causes also the insufficient information dissemination and the insufficient and irregular environmental monitoring necessary for early identification of environmental problems.

The problem of small and dispersed population together with the inherent problem of the distance from the capital and the Almaty regions are responsible for the small local market for various goods. As mentioned above, this problem may be overcome to some extent through planned development of urban centers and transport infrastructure.

The land reform and the introduction of market economy following the collapse of the Soviet Union have resulted in the insufficiency of farmers' organizations. Collective farms were divided into individual farms, peasant farms and agricultural enterprise, and the first two categories need to be

further organized.

The planned regional development of Mangistau Oblast would have to address these fundamental problem factors. Increasing the capacity of local administration is most fundamental as it would be a prerequisite for effective urban and infrastructure development necessary to overcome another fundamental problem of the small and dispersed population and resultant small local market. The settlement and infrastructure development is also a key for fostering linkages between various economic activities and between large and small enterprises as well as effective farm organizations. The problems of the negative environmental heritage and the limited water resource endowment should be addressed as a prerequisite to ensure human security and improve the human resource base for the regional development.

5.1.2 Regional development objectives

Based on the problem phenomena identified in the economic, social and environmental sectors, the regional development objectives of Mangistau Oblast may be established as follows, each corresponding to the identified problem phenomenon in the respective sector.

- (1) Objective 1 (Economic): To generate more lucrative employment opportunities for the expanding labor force through converting the regional economic structure away from the fossil fuel-dominant one to more diversified one
- (2) Objective 2 (Social): To reduce the disparities between urban and rural areas, and between different segments of the society and improve the living conditions for all
- (3) Objective 3 (Environmental): To improve the living environment and reduce health risks of people through managing various environmental problems for better human security and improved human resource base for regional development

The regional development of Mangistau Oblast with these objectives would contribute to the ultimate goal of the regional development, which may be expressed as follows.

Goal of Mangistau Oblast regional development:

To realize self-sustained regional development within the global economy and improved urban and rural livelihood for the people in Mangistau Oblast

5.1.3 Basic strategy for regional development

The basic strategy for regional development of Mangistau Oblast may be established based on the fundamental problem factors identified by the problem structure analysis. The basic strategy has the following three components:

- (1) Increasing the capacity of local administrations for more effective management of various environmental problems, better planning, maintenance and management of transport infrastructure and utilities and more adequate social services delivery
- (2) Promoting urban development and strengthening urban functions to improve linkages between the regional and the global economy, and improve social services delivery to rural areas
- (3) Developing industrial clusters through organizing people and small and medium firms and providing integrated supports to them to link their livelihood activities to viable economic activities that are competitive in the global economy

Each component is described below.

(1) Capacity development

Planning capacity

The capacity development for local administrations is most essential in overcoming various problems to realize regional development. The capacity to plan for transport infrastructure and utilities as well as socio-economic development is expected to be enhanced to some extent through the present Study. Also, needs and directions for further capacity development would be clarified through the Study.

Environmental management

An effective environmental monitoring and evaluation system should be established to enhance the capacity for environmental management. Involvement of stakeholders is another essential condition for effective environmental management. As a prerequisite, relevant information should be compiled, disseminated and shared by all the stakeholders throughout the planning process for environmental management.

(2) Urban development

New water sources

The availability of water is a serious constraint to further urban development. While the amount of water for urban use can be technically increased by expanding the capacity of desalinization, it would apply pressure on the environment and also undermine the viability of urban-based economic activities due to high costs. Besides, the exclusive dependence on the single source of water makes the urban life and economy vulnerable. It is desirable, therefore, to establish another source of water. Possibilities include reuse of treated sewage and water transfer from other regions/countries. The latter may take the form of water transfer from the Ural river basin or water shuttles by oil tankers and/or tank lorries returning otherwise empty from oil receiving regions/countries.

Recycle-oriented urban development

Reuse of treated sewage represents recycle-oriented urban development, which should be pursued in the current century as against resource-exploiting urban development in the previous century. Solid waste management with waste separation at sources and recycling/reuse is becoming increasingly the norm in the 21st century urbanization.

Specialization and complementarity

To effectively utilize limited urban centers of small scale, complimentary development of larger urban centers should be pursued, in which each urban center should specialize in different functions. In particular, the triangle linking Aktau city, together with its new city, Zhanaozen city and Beineu may form the core development area of the Oblast, each specialized in different functions centering on logistic functions. Aktau city may specialize as a logistics and/or diversified industrial center, the Aktau New City as a commercial and communication center, Zhanaozen as the inland service base for agriculture, tourism and logistics industry as well as the oil and gas industries, and Beineu as the inland logistics center.

(3) Industrial cluster development

Collective comparative advantage

By the industrial cluster development, a set of economic activities is promoted to establish comparative advantage for these activities collectively. For this purpose, not only these activities encompassing primary production, processing, packaging and transport activities but also support activities should be included in the cluster for marketing, training, R & D and others.

Facilitative measures

Institutional measures may also be introduced to facilitate the establishment of core activities of the cluster such as specialized incentives. Improvement of transport infrastructure as well as urban development would be instrumental to foster linkages between the related activities.

5.2 Strategy by Sector

Under the objectives and the basic strategy established above, more specific strategy is derived by sector. Components of the sector strategy were first presented as working hypotheses be elaborated throughout the Study. Some strategy components have been modified in the process.

5.2.1 Development administration

(1) Clarification of division of responsibilities between administrative levels

At present, even the Aktau city has limited administrative power. It does not have planning capacity and cannot control effectively construction activities within the city jurisdiction. The new Aktau city has been planned and promoted by the Oblast initiative.

For Mangistau Oblast with the relatively small population compared to the large territory, even the administration of its capital city may be highly the Oblast matter rather than the city matter. Then, a question arises as to what administrative responsibilities the city should have. Probably, the city should be primarily responsible for matters more directly related to daily lives of its residents. They include traffic management, solid waste collection and street cleaning, maintenance of utilities supply systems, provision of social services, and environmental monitoring. Planning for medium and long-term city development may be dealt with by the Oblast in line with the development vision and plans for the Oblast as a whole, while the implementation of individual developments remains the city responsibility.

(2) Strengthening of project planning, implementing and managing capabilities

Along the line described above, the planning capacity may rest in the Oblast administration. The implementation of key infrastructure projects is also the Oblast responsibility. The city administrations of Aktau and Zhanaozen would be responsible for implementing and managing local projects serving the city residents, respectively. Given the limited planning capacity, concentrating the capacity development at the Oblast level seems to be a sensible strategy. In strengthening the implementing and managing capacity at the city level, the participation of residents would be essential.

(3) Establishment of environmental monitoring and evaluation system

The participation of residents would be indispensable for monitoring and evaluation of enterprises engaging in industrial production and construction activities. This is discussed further in a

broader context under the environment sector strategy.

(4) Outsourcing of planning and environmental monitoring works

Given the limited administrative and technical capacity, it is reasonable to outsource the planning and environmental monitoring works as much as relevant to local enterprises and experts. A prerequisite is, of course, to ensure proper supervision and control of the outsourced works. In outsourcing the planning works, experts and enterprises in the subject settlements should be mobilized as much as possible. This will help to ensure that the residents of such settlements would be involved in the implementation phase for monitoring and management facilitated by those enterprises and experts.

(5) Development of mechanisms to mobilize the private sector for infrastructure

Many transport infrastructure projects are planned in Mangistau Oblast, and some of them are expected to be implemented by concessions to private enterprises. This is a viable mechanism to mobilize the private sector resources for infrastructure development. Other mechanisms should be developed to enhance the private sector participation in infrastructure development. They may include joint venture arrangements for specialized land development such as industrial estates, and development of rural infrastructure as part of social programs by enterprises undertaking major exploration activities such as oil and gas, and mineral resources. Other mechanisms may also be invented.

5.2.2 Spatial development

(1) Establishment of settlement hierarchy

To provide a wide range of urban and rural services effectively to all the residents in the vast territory of Mangistau Oblast, a hierarchical structure of settlements should be established with functional division among them. In the hierarchy, cities at higher tiers have functions to provide higher-level services for all the Oblast residents, and settlements at lower tiers provide limited services for residents in smaller geographic/administrative areas, respectively. The hierarchy may consist of the Aktau city as the regional center, followed by the Zhanaozen cities and a few other cities as regional sub-centers specialized in different sets of urban functions respectively, several rural service centers to cover the vast Oblast territory effectively, and social service centers to provide basic services for even the remotest areas.

(2) Establishment of regional artery transport network

Within the artery transport network of Kazakhstan, a regional artery transport network should be established in Mangistau Oblast, consisting of primary and secondary arteries. The primary arteries link the existing and future cities at the higher tiers of the hierarchical structure, and constitute a multi-modal transport network in most parts. The secondary arteries provide links from the primary arteries to rural service centers, commonly by roads.

(3) Strengthening of terminal facilities

The artery network of Mangistau Oblast constitutes part of international, inter-modal transport system linking Kazakhstan with neighboring countries. To improve the links between road, rail, air and sea transport within the network, terminal facilities should be much strengthened. In addition to the Aktau port, the Aktau airport and other ports already planned to be

improved/established, other terminal facilities need to be developed or improved.

The railways are and will continue to be the dominant mode for long-haul cargo transportation in Kazakhstan. To develop the long-haul cargo transport, however, local transport demand should be effectively developed by improving the truck transport by road. Thus, a truck terminal, container depot and related facilities and equipment need to be established at key transshipment points in both inland and port areas. Also, an exclusive cargo terminal should be established at the Aktau international airport as planned.

Conversely, passenger terminals should be provided at the existing and future ports planned mainly for cargo transport. The railways in Mangistau will be used increasingly for passengers transport as well, both for commuting and tourism purposes. Major railway stations need to be improved for passengers together with facilities for transport services to and from each station.

(4) Preparation of updated urban development plans

General plans for cities at the upper tiers of the settlement hierarchy should be updated in line with the main functions expected for each according to the Oblast master plan. They apply to the cities of Aktau and Zhanaozen, the future cities of Beineu and Shetpe, and Fort Shevchenko with Bautino for the dual city development.

(5) Creation of core development area linking Aktau, Zhanaozen and Beineu

The Aktau city will continue to serve as the regional capital of Mangistau Oblast. The Zhanaozen city will become the main service center in the inland area to support agriculture, tourism and social services as well as the oil and gas industries. The settlement of Beineu is expected to develop into a major urban center at the crossroads between the north-south and the east-west arteries. For Mangistau Oblast to develop as the major distribution center of Kazakhstan, these urban centers should be much strengthened.

To strengthen these urban centers, links between them should also be strengthened for complementary development of the three centers. Moreover, the area formed by the three centers as nodes may be defined as the logistic triangle for intensive development of various related activities. Agro-related and other resource based processing industries should be located in the logistic triangle as well as warehouses, distribution facilities, and large regional markets.

5.2.3 Social development

(1) Insurance of equal access to basic services

Access to basic and general education is favorable in Mangistau Oblast as in Kazakhstan as a whole, as shown in almost 100% adult literacy rate and very high enrollment rates at primary and secondary education. Access to preventive health services, however, is generally inadequate in Mangistau as represented by high infant and maternal mortality rates. While the health referral system is well established in the Oblast, the availability of clinics and aid posts as most accessible health facilities for residents is biased towards the Aktau city.

As the inflow of returned Kazakh continues for some time, the provision of basic social services will have to continue to be expanded, extending the ongoing efforts. Also, as the demographic structure and settlement patterns change rapidly along with the economic growth, continual efforts need to be made to ensure the equal access to basic social services for all in terms of number and distribution of general education schools, teachers, medical facilities and personnel.

To expand the provision of social services in rural areas, an incentive system would need to be introduced for social service providers serving particularly remote rural areas. Additional benefits may be provided to them both in cash and in kind. More effective would be to improve the provision of basic social and amenity facilities in selected rural service centers having better economic development potentials, and to ensure the access to them by the social service providers.

(2) Expansion of social welfare program

As the economy of Mangistau Oblast develops, opportunities for new businesses and employment expand naturally for the majority of residents. However, the provision should be made for those who cannot make access to such business and employment opportunities due to lack of basic conditions. They include some of the returned Kazakh, especially those coming back outside the quota system, and also some of the out-of-school youth and women who do not have basic skills, and the elderly. A separate program should be developed for them, including the training in basic skill's re-training and re-education as well as guidance and orientation.

(3) Improvement of training programs and curricula

The existing mismatch between what local enterprises demand and what residents can supply needs to be resolved. First, the training in the primary and medium skill levels should be further strengthened to meet the immediate needs of local enterprises. This may be undertaken by existing training institutes to be designated under the Oblast program, but should expand the coverage to include the returned Kazakh. Also, the program to support the on-the-job training by private firms should be strengthened. Second, the curricula at the existing higher education and training institutes should be improved to meet the requirements for higher skill levels. Third, new education and research institutes should be developed for advanced education and research to meet the evolving needs of the coming decades as described below.

(4) Establishment of new education and research institutes

The Caspian State University of Technology and Engineering is planned to be established to meet the technological requirements of the coming decades. In addition to engineering and economic expertise planned to be accommodated at this new institute, more post-industrial era technology and skills should be strengthened. They include broad environmental technology such as genetic engineering, biotechnology and ecology as well as pollution abatement technology. More application-oriented research should also be emphasized such as tissue culture for crops and trees, and genetic engineering for improved livestock and fish species suited to local conditions.

As the Aktau city is expected to pursue more service oriented development, education and research in service support technology need to be strengthened as well. ICT technology is essential for all the services and particularly for logistic services. Also, the Aktau city may be the center for some specialized health care such as radio-therapeutics and biogenetic treatment. For such a function, a separate education and research institute may be established.

(5) Participatory rural development

A fundamental way to solve various social problems in rural areas represented by poverty in a broad sense is to support livelihood activities there and develop them into viable economic activities. To realize this, basic infrastructure should be improved in areas having more favorable potentials, organize rural residents to undertake livelihood/economic activities jointly, and provide a package of support measures for production technology, procurement of production input, management of land, water and financial resources, and marketing of products.

The key to the success of such rural development is the participation of rural residents from the beginning. In fact, rural residents organizing is the most critical step. Participatory rural development projects should be formulated in areas where there already exists a strong farmers' organization or people organizing is easier to undertake. The accessibility from the designated rural service centers is another important condition for the site selection.

5.2.4 Agriculture

(1) Support for farmers' organizations

The agricultural production, both crop production and livestock, declined significantly after the collapse of the Soviet Union, and it has not fully recovered. Some large collective farms effectively maintained their control over the agricultural land to ensure transition to a market economy. Some farmers are locked into the existing farm units, deprived of opportunities to establish independent production, procurement and marketing operations respectively. To enhance agricultural productivity, voluntary associations of farmers should be formed or strengthened, and supported with a package of measures to establish viable production systems.

Support measures will cover the procurement of certified seed, fertilizer and agrochemicals for crop production, concentrate feed and medicament for livestock, technical extension and marketing of products. As the development of independent operators for these services will take time, the Oblast supports will be necessary until the critical production level is reached to justify such operations.

(2) Development of new livestock models

The livestock particularly for sheep and goats in Mangistau have some favorable conditions. It suffers, however, from limited water availability and unfavorable land tenure conditions for individual farmers. At present, individual farmers account for two-thirds of the livestock production in Mangistau, while they do not have much control of the pasture land.

The livestock production in Mangistau can be much increased by developing new production models based on individual farmers. This will involve the improvement in land tenure arrangements between individual farmers and farm enterprises as well as improved water supply. Also, the present practice should be changed so that live animals will go through a fattening process before slaughtering. The carcass yield of off-take can be nearly doubled by intensive grain feeding prior to slaughtering. The efficiency with which feed resource is converted into meat is much higher, and the meat quality is much improved through finishing. As Kazakhstan is a major grain producer/exporter, feed for these new practices is easily available from other regions. Use of concentrate feed and improved pasture management, and provision of adequate veterinary services are other conditions for the new livestock models.

(3) Promotion of fishery, aquaculture and fish processing

Mangistau Oblast used to produce a large amount of fish, which was processed at a plant in Bautino. The fishery industry should be re-activated, following the Oblast policy. As it will be almost a complete re-start, all the related activities should be carefully planned and implemented as a cluster of development. The fishery cluster should consist of both the open sea fishery and aquaculture, and fish processing as well together with all the support facilities and services. The latter include development of fishery ports and fishing fleet, manufacturing of fishing gear and fishmeal, training, cold storage and links with other industries. It may be developed by the public-private partnership.

(4) Enhancement of land productivity

Enhancing land productivity would be essential to ensure the sustainable development of livestock activities throughout the Oblast. The land should be protected from wind erosion as well as over-grazing. For this purpose, vegetation cover should be increased and maintained by pasture management and tree planting. These measures should be undertaken by the Oblast initiative as they will not produce any immediate benefits. The private sector would join the efforts as land tenure arrangements are improved for individual farmers.

(5) Establishment of rural service centers

To support the production increase in the vast pasture land of Mangistau Oblast, service bases need to be established in selected locations having favorable conditions for related procurement and marketing. These locations should be determined based on the hierarchical structure of settlements proposed above.

5.2.5 Oil products transportation

(1) Oil production expansion and transport needs

Oil production in Mangistau would follow the national strategy that dictates some 60 million tons of oil products produced in the western Kazakhstan. Of this total, 38 million tons will be exported from the Caspian seaports in 2015, and 50 million tons in 2020. Infrastructure for oil products transportation needs to be strategically developed.

(2) Oil transport facilities development

The CPC pipeline as the main oil export line is planned to be reinforced by 2011. A new seabed pipeline to Baku is planned by BTC, but no decision has been made as to the starting point: Aktau or Kuryk. A pipeline leading to Iran through Turkmenistan is also planned, but may be difficult to realize in the near future. The pipeline from Uzen to Kuryk is included in the development of the Kuryk port complex. These pipelines and port facilities for oil export are summarized in Table 5.1, and the planned oil pipelines are illustrated in Figure 5.2.

Table 5.1 Oil Transport Facilities to Foreign Countries

Facilities	Name of company	Route/Location	Capacity (10 ⁶ t/year)	
			Present	Future
Pipeline	CPC	Uzen – Atyrau – Samara	15	67
	CNP	Uzen – Kuryk	-	5
	BTC	Aktau (kuryk) – Baku – Supsa	-	20
	KTO	Karazhanbas – Kashagan	-	8
Port	Aktau	North of present Aktau Port	10	20
	Bautino	North of Aktau from 140km	-	5
	Kuryk	South of Aktau from 60km	-	10-20
	Sartas	North of Aktau from 170km	-	5
Oil products in west Kazakhstan			20	60
Transport via Caspian Sea			10	38 (2015) 50 (2020)

Source: State-run Program of Development of the Kazakhstan Sector of the Caspian Sea
Hearing survey to ministry of transport

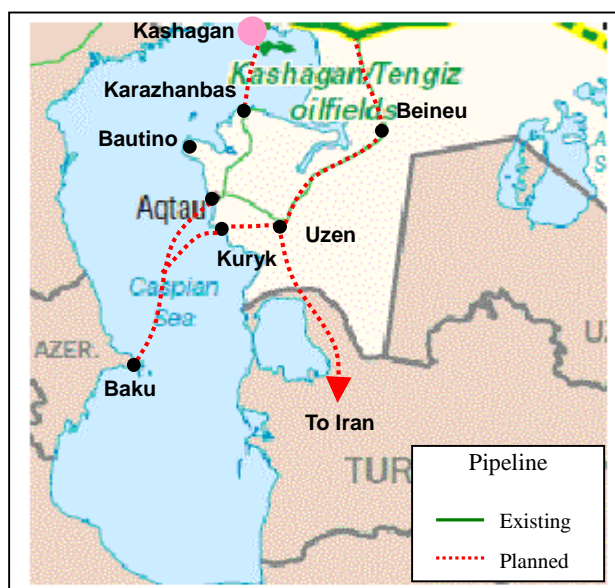


Figure 5.2 Existing and Planned Pipelines

(3) Stage-wise development of oil export facilities

The oil export facilities listed above should be developed in stages (Figure 5.3). The expansion of the Aqtau port is expected to be completed as scheduled to handle increasing amount of oil export. The new port in Kuryk should be developed promptly in parallel with the Aqtau port expansion. Both the Aqtau port for container and other general freight as well as oil products and the Kuryk port exclusively for oil cargoes should be part of the TRACECA corridor.

Private joint ventures are developing a ship maintenance factory near the original Bautino port, and the port expansion for oil shipping is also planned together with rail transport. The Bautino port will be the third port for oil export to complement the Aqtau and the Kuryk ports. A consortium of private companies has prepared a plan to establish a new port in Sarytas near Bautino which was already accepted by the Government. The construction may start in 2008, but the port operation in full scale may be realized after the railway is constructed to transport oil products.

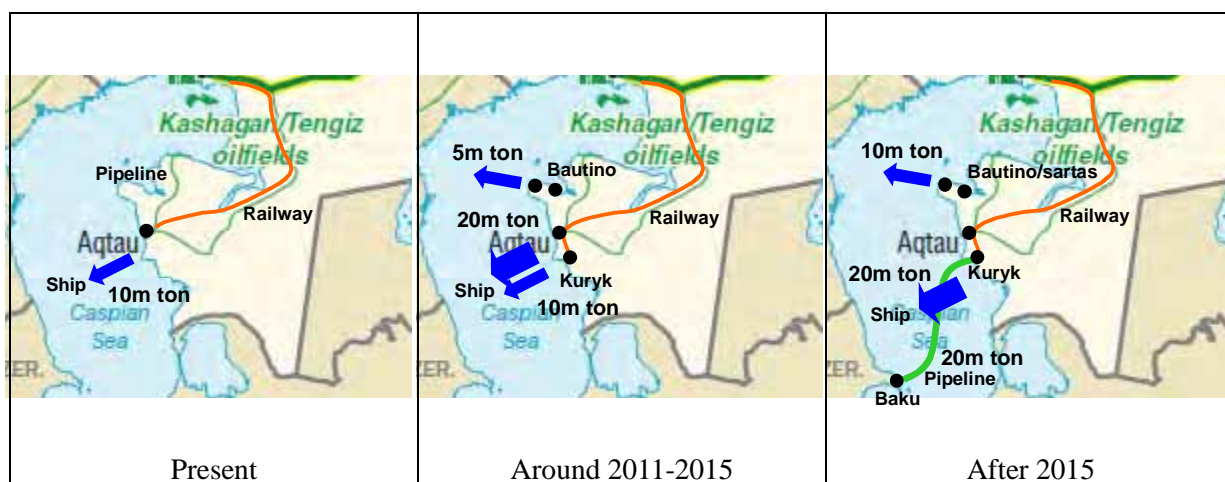


Figure 5.3 Strategy for Oil Development and Transport

5.2.6 Manufacturing industry

(1) Support for training programs of private firms

Large oil companies provide on-the-job training for the new recruits generated by local technical colleges. There is a government program to support training by private firms as well. These training programs should be expanded and streamlined to generate skilled labor required by respective firms. A special program needs to be developed for small and medium sized enterprises (SME's) to equip them with skills for producing parts and equipment required by large firms as part of a comprehensive support package described below.

(2) Development of a comprehensive support package for small enterprises

In Mangistau there exist opportunities for SME's to develop into parts and equipment manufacturers and service providers for the existing oil and gas industries. To encourage these enterprises to develop into local suppliers, size of contract packages and procurement rules may be modified for government procurement.

There is a plan to establish an industrial estate for SME's in the newly created rayon of Munajlinsky. A business incubation center was established recently in Tupkaragan to provide office spaces and associated services for new enterprises. These existing and planned facilities alone, however, may not be effective in fostering SME's. A comprehensive support packages should be introduced exclusively for SME's, including training, credit provision, products development, and business incubation, extending the efforts by the Government and the Oblast. Provision of serviced industrial plots, sometimes including buildings, is another way for the comprehensive supports.

These measures would help to develop also consumer goods industries, which is now confined to construction materials and other construction related commodities manufacturing such as door and window frames, tiles and the similar. An efficient SME program is likely to promote a host of other manufacturing industries in apparel, paper and plastic products, and metal products for local market.

(3) Provision of enabling environment for business

An enabling environment for business should provide first the private sector firms with conditions that are conducive for production and trade. These conditions include the availability of labor force, technical/scientific base, and shared platforms for all stakeholders, and the stability in business environment. They are sometimes called collectively the soft infrastructure. The second factor of the enabling environment is the availability of physical infrastructure. These two factors are generally sufficient for large businesses to establish and operate.

Related to the second factor, efficiency in public investments and management should be improved. This affects the production and trade through the quality of physical infrastructure, but equally important it affects the quality of living environment for inhabitants through social services such as health, education, culture and environmental protection. The latter are recognized increasingly important on the choice of business locations by private firms. Locations that do not provide attractive living conditions for the work force will find it very difficult to attract new investments and keep existing companies.

(4) Support for private firms to comply with environmental standards

Mangistau Oblast would introduce high environmental standards and enforce them strictly to

overcome its unique environmental problems as suggested in the environment sector. To support private firms to comply strictly with such standards, a subsidy scheme may be introduced to facilitate the installation of abatement equipment. The establishment of an eco-industrial park with common treatment facilities may be another way to support the private firms' efforts for pollution abatement.

(5) Streamlining of testing and certification functions

Subcontracting and outsourcing by large firms to SME's are constrained also by quality requirements by the large firms. Another major constraint is lack of standardization. In enacting the national product and process standards, priority may be given to those products important for the oil and gas industries. Similarly, local firms need assistance in certification for product standards and quality. This would be consistent with the government policy on adopting international quality standards.

5.2.7 Logistics industry

(1) Establishment of clear policy and institutions for logistics industry

The logistics industry, unlike conventional industries, is a volatile industry, which does not necessarily have fixed addresses or physical facilities. It may be established if the cost competitiveness is superior but decline as the competitiveness is lost against alternative transport routes. The determination to establish such an industry is a necessary prerequisite that should be expressed by a clear policy. Such a policy should be embodied in institutional measures necessary for successful development of the logistics industry. Bilateral trade arrangements with neighboring countries are important part of the institutions as well as simplified customs procedures at the borders.

(2) Consistent provision of infrastructure

The logistics industry needs to be supported by the development of consistent transport and related infrastructure. The transport infrastructure will have to accommodate for multi-modal transportation with road, rail, sea and air transport. Kazakhstan has an advantage of having an operating railway system, although there exist network deficiencies. Mangistau Oblast has even better advantages with the only international sea port that can be used all the year round as well as road and rail networks and the international airport. Within the conceived transport infrastructure development at the national level, Mangistau should make deliberate efforts to upgrade the transport and related infrastructure to support the logistics industry.

(3) Development of indigenous industries

To ensure the robust development of the logistics industry, various indigenous industries should be developed in the Oblast. They include resource-processing industries to generate large quantities of domestic and export cargoes, import processing and export industries to directly contribute the logistics industry, and ICT and other industries to provide support services for the logistics industry. The latter may include local trading houses and forwarders, and financial institutions.

To encourage the development of these industries, special economic zones (SEZ's) may be established with logistic functions either exclusively or in combination with other industries. In addition to transshipment and warehousing, sorting, labeling, packaging/re-packaging and packaging materials manufacturing are among the functions to be included at the SEZ's. The establishment of border trade centers may also be pursued in cooperation with Uzbekistan and

Turkmenistan.

5.2.8 Services

(1) Promotion of specialized services

At present, many large enterprises tend to internalize various services rather than outsourcing them to small local firms. This is not desirable from the regional development point of view. Certain specialized services should be promoted particularly in relation to the logistics industry. They include various business services, foreign trade, insurance and finance. These services will develop naturally in response to the demand as the economy grows, but small local firms may be encouraged to link up with new industries to develop these services, facilitated by the Oblast.

(2) Development of curricula for specialized services

Whether these specialized services develop within the existing large enterprises or by small local firms, manpower needs to be developed for them. Training curricula for these fields should be developed at the existing training and higher education institutes. These may be also the fields to be covered by the planned Caspian State University of Technology and Engineering.

(3) Service-oriented development of the Aktau city

These specialized services would be naturally located mainly in the Aktau city, which should pursue more service-oriented development. The city should also be equipped with some higher order service functions such as advanced education and research and specialized health care as already mentioned. The Aktau city should establish its fame as the center of excellence in these services to attract visitors from all over the Country and also from neighboring countries.

(4) Development of Zhanaozen as inland service center

Zhanaozen is located on the regional artery and constitutes a node of the logistic triangle defined above. The city should be strengthened as the inland service center for logistics industry, agriculture, and tourism as well as the oil and gas industries. Marketing and distribution facilities should be preferentially located in and around the city. Some resource processing industries should develop further supported by service functions provided by the city.

(5) Development of high-grade services in the Aktau city

The Aktau city should provide higher order service functions for the entire Oblast. They include advanced education and research, specialized health care, international conference and tourism, and others. Subjects for the advanced education and research, and fields of the specialized health care are suggested in the respective sector. The Aktau city should establish its fame as the center of excellence in these specialized services to attract visitors from other regions and countries.

5.2.9 Environment

(1) Establishment of high environmental standards and strict enforcement

The air pollution by dust and emission from industries, including the flare gas emission, is a serious health hazard. Other than possible water pollution by off-shore oil exploration and production discussed below, the wastewater from oil production poses a broad environmental threat. The first

step for the Oblast Akimat to administer the control of air and water pollution is to establish high emission and discharge standards of its own, recognizing the unique climatic and industrial conditions of the Oblast.

The enforcement of the standards involves first the monitoring as discussed below, and the provision of incentive measures for polluting enterprises to take abatement measures. The latter include subsidies for investment by enterprises in abatement equipment or reuse of the waste resources, or provision of an alternative site where control measures can be introduced more easily. The latter may take a form of an eco-industrial park where common treatment facilities are provided for wastewater and abatement facilities can be more easily installed for emission.

To alleviate the dust pollution, buffer zones may be established by tree planting around settlements, considering the dominant wind directions. This may be undertaken by the Oblast initiative, following the successful case of the Senek settlement. For excavation sites, responsible enterprises are required to take the necessary tree planting measures under the guidance of the Oblast.

(2) Protection of water quality of the Caspian Sea

Pollution of the Caspian Sea water would be critical for the Aktau city that depends entirely on the desalinization for its water supply. This is a matter of survival not only for the city residents but also for the city as a whole and Mangistau Oblast as well. The strictest enforcement is necessary to prevent oil spills of any form from the offshore operations.

Equally important is to anticipate accidents and to prepare for them. That is, preventive measures to minimize the effects of oil spills should be built into the oil exploration and production operations. These measures are technologically well established and better measures will continue to be developed. A mechanism should be established to allow collective efforts by related enterprises in cooperation with the Oblast to minimize the risk of oil spills and adverse effects when the accidents occur in terms of information sharing, joint procurement and stock of parts and materials, and arrangements for insurance.

In this context, the program on alternative water supply of Aktau and nearby settlements should be elaborated

(3) Development of water supply capacity

Once the Koshkar-Ata tailing pit is reclaimed, the wastewater currently discharged from the Aktau city into the pit to cover the radioactive wastes can be used for other purposes. The wastewater can be easily used to water roadside trees. It may be transported to a depression that would work as an aeration lagoon for further treatment. The lagoon would facilitate the recharge of groundwater if its location is carefully selected, and the water can be taken from the lagoon for agricultural production by drip irrigation.

In rural areas of Mangistau Oblast, there are many wells that have been neglected after the collapse of the Soviet Union. Some of them can be restored immediately to support rural people and activities. The selection of wells to be restored would present opportunities to determine rural settlements to be strengthened for livestock and related activities. Those having more organized people should be selected to plan and implement the well restoration and livelihood development by participatory approach.

(4) Solid waste management and recycling

The solid waste management system in Mangistau is not well established. Landfill sites are not

planned and managed properly. No regulations are enforced for transfer, storage and disposal of wastes by enterprises, and unauthorized waste dumping is commonly practiced. The solid waste management system should be re-structured from the beginning of waste generation and discharge. Waste separation at sources should be experimented first by a pilot project for households in selected districts in the Aktau and/or the Zhanaozen cities. This would be the first step to establish waste recycling and reuse industries by the private sector.

(5) Establishment of participatory monitoring and evaluation system

To enforce the environmental standards, monitoring and evaluation need to be undertaken. Also, to minimize adverse effects of discharges and emissions of hazardous materials, early detection is vitally important. Given the limited administrative capacity and resources on the public side, the monitoring should be undertaken with the wide participation of stakeholders. The participatory monitoring and evaluation represent also the method to raise the awareness of enterprises and people for environmental quality and value as increasingly recognized world wide.

To provide a momentum for the establishment of participatory monitoring and evaluation, environmental database development may be initiated by the Oblast. The database should cover land, sea and air, and be made open to the public as a matter of principle for sharing by all the stakeholders. It would provide a common base for discussion on critical environmental issues and their cooperative resolution. Such database may make a precedent of the comprehensive database for the Caspian Sea region for the cross-border management of its resources.

(6) Environmental education and awareness

Mangistau Oblast should overcome current difficulties in environmental management and become the center of advanced environmental management in the Caspian Sea region. Such a function should be supported by the residents. The environmental awareness of the people should be enhanced through their involvement in environmental monitoring, and other activities such as waste separation and recycling, tree planting and oil waste cleaning. Environmental education curricula should be expanded at existing general schools emphasizing field works and participation in social works. The planned Caspian State University for Technology and Engineering should have a strong program for environmental education and research.

CHAPTER 6 DEVELOPMENT ALTERNATIVES, FRAMEWORKS AND SCENARIO FOR REGIONAL DEVELOPMENT OF MANGISTAU OBLAST

6.1 Development Alternatives

Development alternatives for the regional development of Mangistau Oblast are examined in order to formulate the most desirable yet realistic development plan under the regional development objectives established in Section 5.1. First, implications of the regional development objectives are clarified to set up points of view to examine development alternatives. Second, development prospects are described by sector based on the analysis on existing conditions and constraints examined in previous chapters to clarify main directions of development and to identify areas for more concentrated efforts. Third, development alternatives are presented by taking the identified directions of development and assessed from several viewpoints.

6.1.1 Implications of the regional development objectives

The regional development of Mangistau Oblast would have to reconcile two seemingly contradictory requirements. One is to convert the regional economic structure away from the oil and gas dominant one to a more diversified one so that a variety of lucrative employment opportunities would be generated for the expanding labor force in urban and rural areas as expressed by the economic objective of the Mangistau regional development. The attainment of this objective would contribute also to the reduction of disparities between urban and rural areas and between different segments of the society expressed by the social objective.

The other requirement is to utilize the oil and gas industries as the driving force of the regional growth for the foreseeable future. The oil and gas industries may contribute to the diversification of regional economy under the economic objective if they induce the development of related local industries and services. The latter will contribute to the attainment of the social objectives as well. Care needs to be taken, however, of possible side effects of these developments that may undermine the attainment of the environmental objective.

The provision of comfortable and attractive living environment expressed in the environmental objective is considered increasingly important as the condition to determine business locations by private firms. Locations that do not provide attractive living environment for the work force will find it very difficult to attract new investments. The economic and the social objectives would also have implication to the improved living environment through generation of lucrative employment opportunities and reduction of disparities. The development of small and medium enterprises would help to attain these objectives as well as the provision of amenities and social infrastructure.

6.1.2 Development prospects by sector

(1) Agriculture

Agriculture in Mangistau is insignificant at present. Its contribution to the GRDP is almost negligible estimated to be only 0.37% in 2007. A question arises whether or not the sector deserves any effort for development at all. The answer is clearly “yes.” For social reasons, livestock activities are and will continue to be important for the Kazakh people who are originally nomads. Moreover, it has been found out that sheep and goat raising in Mangistau has some favorable characteristics. Improved management of pastureland and tree planting, particularly in the reserved land, would contribute to enhancing the land productivity in the long run not only for livestock but possibly also for crop cultivation.

For crop cultivation, greenhouse agriculture and drip irrigation should be promoted for three reasons. First, they are potentially the most water saving forms of crop production. Second, fresh vegetables, some fruits and tree seedlings have immediate local markets. Third, they may induce some manufacturing of materials and equipment such as vinyl sheets, aluminum products, PVC pipes, rubber tubes, small water pumps and water meters.

(2) Mining

Mining in Mangistau is too dominant due to the strong oil and gas industries to cause a very biased economic structure as clarified in Section 3.1. There is no doubt that mining will continue to be the driving force for the Mangistau regional development in the foreseeable future. A meaning question is how to utilize mining to develop other socio-economic activities. There are at least two directions to pursue.

One is to encourage local procurement of parts and equipment by oil and gas enterprises by introducing incentive measures. The other is to facilitate the increase in value added of the oil and gas industries by improving their efficiency. Increasing the local procurement may be a way to realize this, and thus these two methods may be complementary. Through improving the efficiency, income levels of workers engaging in the oil and gas enterprises can be increased without much increasing the production. The higher income, in turn, will increase the demand for consumer goods and services, thus contributing to the diversification of the regional economy.

(3) Manufacturing

Manufacturing in Mangistau at present is too small in its scale, but some diversification of sub-sector industries is observed in Aktau. Important questions are whether any sub-sectors can be identified that may attain significant growth in the medium term, and how can they start growing in the near future. The priority sub-sector industries have been identified by the location quotient analysis. They are: machinery and equipment, and engineering as the first priority; plastic products, and other non-metallic products as the second priority; and chemicals and leather products as the third priority.

These selected priority industries can be developed initially by import processing type manufacturing. This type of manufacturing processes import materials into final products for domestic markets. Most promising and readily available domestic markets are the oil and gas industries and the construction industry. This type of manufacturing includes import of synthetic resins to manufacture various household goods, manufacturing of building materials from wood chips and metals in combination with plastics, import of clinker for cement manufacturing, and fertilizer, agro-chemicals and medicament manufacturing from import goods as well as manufacturing of small equipment and tools based on import materials.

Another possible area for major manufacturing development is related to downstream industries of the oil and gas industries. While a major petrochemical complex is developing in Atyrau, opportunities in Mangistau may be related to natural gas chemistry, which has not much developed in Kazakhstan.

(4) Utilities

Utilities in Mangistau are well established. The heat-energy complex of MAEK-Kazatomprom in the Aktau city supplies 70% of fresh water used in Mangistau Oblast, including the supply of distilled and hot water to the surroundings, and also sea water to nearby rayons. It has the power generating capacity in excess of the total demand of the entire Oblast for the foreseeable future. Many facilities of MAEK including the desalinization plants, however, are over-aged and need rehabilitation. The efficiency of water and energy generation and use needs to be much improved. The planned introduction of a new gas turbine power generation plant may provide an opportunity to establish co-generation for the combined heat-power plant.

(5) Services

Services in Mangistau are least developed and least specialized. In particular, the Oblast is least specialized in the trade and the transport and communications, relying almost exclusively on the oil and gas industries. As these are demand responsive services, they are expected to develop as other economic activities develop. The roles of the public sector for these services are 1) to improve the transport and related infrastructure to facilitate their development, and 2) to ensure the sufficient workforce to be generated and available when necessary. Therefore, the efficient public investments into these infrastructure facilities need to be planned, and the training program should be supported in anticipation of expected changes in demand. The provision of specialized land area with proper infrastructure is a way to realize the efficient public investment for these services.

Another prospect identified through the analysis on potentials and constraints is for the Aktau city to become a center of excellence for some high-grade services. These services may include financial center, international trade, international conference and tourism, environmental and maritime research, and specialized health care. Some of these are demand responsive services, but the public sector may facilitate their development by generating human resources to support them. For other resource-based services, typically tourism, a strategic approach would be effective for their development through deliberate efforts by the public-private partnership.

6.1.3 Development alternatives

(1) Definition of alternatives

From the foregoing analysis, three main directions for the Mangistau regional development have emerged as follows:

- 1) Improvement of efficiency of the oil and gas industries that will induce the development of local enterprises supplying parts and equipment, and related services to them and increase the demand for consumer goods and services through enhancing income levels
- 2) Inducement of services at high level by efficient public investments into related infrastructure, and support in human resources development, both for demand responsive services, and also by the strategic approach to tourism development
- 3) Development of agriculture, SME's and small services for social purposes, and also to induce related manufacturing and services

Corresponding to these directions, three development alternatives are defined as follows:

- Alternative 1: Oil and gas based development
- Alternative 2: High services based development
- Alternative 3: Equity-oriented development

These are conceptually distinct alternatives, but not mutually exclusive. As realistic alternatives, they share most common elements.

The difference between the three alternatives may reflect varying emphasis placed on the three regional development objectives. The first two alternatives emphasize the economic objective and represent different ways to attain the diversity of the regional economy. Alternative 3 emphasizes the social objective. Alternative 2 appears to contribute better to the attainment of the environmental objective than Alternative 1.

(2) Assessment of alternatives

1) *Growth implications*

Alternative 1 and Alternative 2 are both growth-oriented, while Alternative 3 is equity-oriented. To compare the possible growth performance of the first two alternatives, it is assumed that the GRDP growth at 10% per annum should be attained to the year 2015. The GRDP will grow to KZT 1,418 billion in 2015. If this should be attained by Alternative 1, the mining sector will have to at least maintain the present share. If this should be attained by Alternative 2, the services sector will have to increase its share at least to 50%, resulting in the mining share reduced to smaller than 45%. These possibilities are compared in Table 6.1.

Table 6.1 Comparison on Growth Performance under Alternative 1 and Alternative 2

Alt.	Sector	GRDP share (%)		Growth rate, 2007-15 (% p.a.)	Assessment
		2007	2015		
1	Mining	65	65	9.9	Very difficult to attain
	Services	31	<30%	<9.5	Rather modest
2	Mining	65	<45%	<5.0	More likely
	Services	31	50	16.7	Difficult but possible

As shown in Table 6.1, Alternative 1 requires the very high growth rate for mining, which is difficult to attain. The growth rate for services under Alternative 1 appears rather modest. Alternative 2 requires the very high growth rate for services. This level of growth, however, is possible to attain for services, especially when the size of this sector is very small at present. The growth of mining under Alternative 2 is more plausible and likely to be attained.

Alternative 3 is not growth-oriented, but expects growth rates for mining and services somewhere between the two extremes, respectively. It places more emphasis on agriculture, SME's and small services. These sectors are expected to grow at high rates, but their effects on the overall growth will not be significant due to their very small shares in the GRDP.

2) *Other implications*

Other implications of the three alternatives are summarized in Table 6.2. The table has been prepared to highlight the differences between the alternatives. More important policy instruments are shown for each alternative. In reality, the three alternatives should have many common elements to be realistic.

Table 6.2 Comparison of Three Alternatives for Policy Instruments

Policy instruments	Alternative 1 Oil & gas based	Alternative 2 High service based	Alternative 3 Equity-oriented
Infrastructure	- Kuryk port complex - Bautino port - Economic infrastructure	Aktau port and airport for trade	Aktau airport for tourism
Land development	Industrial sites with complete infrastructure	Urban zoning in Aktau city/new city for trade, finance etc.	- Industrial site for SME's - Land productivity enhancement
Training	Training for ICT and high technology	- Training for ICT and office and hotel administration - Language training	- Support OJT by firms - Skill training - Technical extension for agriculture
Spatial development	Road and rail links to sea ports	Road links between Aktau city and secondary cities	- Establishment of rural service centers - Access roads to hinterland
Regulatory measures	- Industrial standards, testing and certification - Incentives to increase local value added contents	Service quality control Custom services	- Subsidies and other supports for business development - PPP for pilot implementation

(3) Definition of the best alternative

Based on the assessment of the three alternatives, the most desirable yet realistic alternative is defined. The growth rates of such alternative should be 5.0-9.9% for mining, and 9.5-16.7% for services, annually on the average, respectively as examined above for Alternative 1 and Alternative 2. The growth of agriculture, SME's and small services under Alternative 3 will increase the overall growth marginally to attain the maximum growth, while better equity will also be ensured.

6.1.4 Overall impact of the planned regional development

Mangistau Oblast faces serious problems such as monoculture industry, rapid increase of population by returning Kazakhs, wide discrepancy of income among citizens and vulnerable marine environment threatened by oil excavation activities as identified by the problem analysis (Section 5.1). These problems would only get worse unless proper measures are taken to change the directions of economic and social development together with proper environmental protection mechanisms.

The zero option or the without-project conditions may be characterized, among others, by the following:

- 1) The overall economy would face a severe depression when the volume of oil excavation reaches its total deposit.
- 2) The on-going mega projects would be implemented without enhancing linkages to the local SME's and other economic activities.
- 3) The livelihood in those left-behind rural areas would further worsen by deteriorating natural environment.
- 4) The quality of life in the cities would be threatened by sharp depression of property values of aging soviet-type apartments.
- 5) Water supply would be further threatened by pollution of the Caspian Sea.

The Master Plan has been formulated to avoid these major unfavorable phenomena. The Master

Plan contains the measures to transform the industrial development pattern of the Oblast to diversify its industries and improve livelihood in the rural areas. Some negative impact may be associated with some proposed projects, but they may be mitigated by careful project development and construction activities as described above. All the proposed projects and programs would collectively contribute to the creation of the Mangistau Oblast characterized by economic efficiency, human security, and sound environment as they have been formulated under these planning concepts.

6.2 Development Frameworks for Mangistau Regional Development

6.2.1 Socio-economic framework

(1) GRDP projection by sector

The GRDP in 2007 was estimated by sector/sub-sector based on the available data for 2006. Taking 2007 as the base year, the GRDP is projected to the year 2015 by sector. The projection corresponds to the development alternative defined in the previous sub-section. That is, the annual average growth should not much exceed 5.0% for mining, and should be lower than 16.7% for services. The maximum plausible growth rates are assumed for agriculture, related manufacturing and services.

The agricultural value added is projected by crop production, livestock and others. The crop value added is projected by assuming the irrigated area may increase to 1,500ha by 2015, increasing at 150ha per year more or less. The livestock value added may double by 2015 as the livestock population exceeds the pre-independence levels and the production efficiency improves especially for sheep and goats. Other sub-sector value added will increase significantly supported by the fishery cluster development. The agricultural value added is projected to increase from KZT 2,458 billion in 2007 to KZT 5,318 billion in 2015 at the annual average rate of 10.1%.

The production value of mining will increase at modest rates during Phase 1 as indicated in the previous section, but its value added may increase at higher rates due to consistent technological innovation. The mining value added will continue to increase at lower rates during Phase 2. The average growth rate of the mining GRDP is assumed to be 6% per annum. The manufacturing value added will increase at high rates based mainly on the priority sub-sectors identified above. The average annual growth rate may be easily up to 20% in Phase 1 and even higher over 25% in Phase 2. The average annual growth rate is thus assumed to be 25% up to 2015. The utilities value added growth will follow the overall growth of the Oblast economy, and 10% is assumed as the annual average growth. The industry GRDP is projected to increase from KZT 453.2 billion in 2007 to KZT 767.2 billion in 2015 at the annual average rate of 6.8%.

The trade and the transport and communications sub-sectors will grow at the highest rates in the services sector, and the annual average growth at 25% for trade and 20% for transport and communications is assumed. The construction sub-sector will grow more or less in line with the overall growth of the Oblast economy, and the annual average growth at 10% is assumed. The other services sub-sector may grow at 15% per annum on the average. The services GRDP is thus projected to grow from KZT 205.8 billion in 2007 to KZT 681.2 billion in 2015 at the annual average rate of 16.1%.

Based on the GRDP projection by sector, the GRDP of Mangistau Oblast is projected to increase from KZT 661.6 billion in 2007 to KZT 1,453.7 billion in 2015, representing the annual average growth at 10.3% in real terms (Table 6.3). The GRDP structure in 2015 will be 0.37% agriculture, 52.8% industry and 46.9% services. The share of the mining sub-sector is calculated to be 47.3% in 2015.

Table 6.3 Projection of GRDP by Sector/Sub-sector, 2007-15

Sector/sub-sector	GRDP in 2007 (KZT 10 ⁹)	Growth rate in 2007-15 (% p.a.)	GRDP in 2015 (KZT 10 ⁹)	GRDP share in 2007 (%)
Agriculture	2.46	10.1	5.32	0.37
- Crop cultivation	0.12	18.9	0.48	0.03
- Livestock	2.24	9.1	4.48	0.31
- Fishery & others	0.1	17.4	0.36	0.02
Industry	453.2	6.8	767.2	52.8
- Mining	431.6	6.0	687.9	47.3
- Manufacturing	8.7	25.0	51.9	3.6
- Utilities	12.8	10.0	27.4	1.9
Services	205.8	16.1	681.2	46.9
- Construction	44	10.0	94.3	6.5
- Trade	16.1	25.0	96.0	6.6
- Trans. & comm.	36.4	20.0	156.5	10.8
- Other services	109.3	15.0	334.4	23.0
Total	661.6	10.3	1,453.7	100

Source: Projection by the JICA Study Team

(2) Population and per capita GRDP

The population of Mangistau Oblast increased from 314,000 in 1998 to 374,400 in 2005 at the annual average rate of 2.55%. The population growth had consistently accelerated from 2.82% in 2001, 3.14% in 2002, 3.31% in 2003 and 3.46% in 2004, to 3.48% in 2005, due to both the booming oil economy and the return of oralmans. The growth is expected to be decelerating, and the Oblast estimates the 2007 population at 397,600, representing the annual average growth at 3.05% in 2005-07. For the long term planning purposes, the population is projected at 3.0% per annum in 2007-15. The population in 2015 is thus calculated to be 503,700. The per capita GRDP is projected to increase from KZT 1,664,000 in 2007 to KZT 2,886,000 in 2015, representing the annual average increase at 7.1%.

6.2.2 Spatial development framework

(1) Existing distribution of settlements

Existing distribution pattern of rural and urban settlements was first examined, mostly using the data in Village Monitoring 2006 issued by Mangistau Oblast. There were no data available in the Village Monitoring for settlements of Aktau, Zhanaozen, Bautino, Fort Shevchenko, Zhetybai, and Munaishy as they are classified to be cities. As it is considered that these cities have higher functions, they are classified into higher tiers in the hierarchy of settlements: Aktau as the regional center, and the other five as second rank cities. No data was available for Tenge settlement also, because it was recently separated from Zhanaozen. Based on the results of the analysis, settlements were ranked by score as shown in Table 6.4, and then classified into five categories as shown in Table 6.5. The results of the classification for the existing settlements are depicted in Figure 6.1.

(2) Future hierarchical settlement system

Based the results on the classification of existing settlements, hierarchical distribution system of settlements was planned for target year of 2015. All the 57 settlements were classified into 5 tiers according to the functional hierarchy: regional center, upper regional sub-centers, secondary centers, rural service centers, and other settlements. Expected roles and functions of these hierarchical tiers are summarized in Table 6.6.

Table 6.4 Results of Settlement Analysis by Score

Settlement	Village/rural district	Rayon	Total score	Classification
Beineu	Beineu	Beineu	45	2
Shetpe	Shetpe	Mangistau	43	2
Kurik	Kurik	Karakiya	39	2
Mangistau	Mangistau	Aktau	38	2
Ushtagan	Aktobe	Mangistau	37	3
Senek	Senek	Karakiya	36	3
Borankul (st. Opornaya)	Borankul	Beineu	36	3
Kizan	Kizan	Mangistau	35	3
Singirlau	Singirlau	Beineu	34	3
Sarga	Sarga	Beineu	34	3
Umirzak	Umirzak	Aktau	34	3
Ondy	Ondy	Mangistau	33	3
Shair	Shair	Mangistau	33	3
Kulandy	Kulandy	Karakiya	32	4
Bostan	Bostan	Karakiya	32	4
Zhingildy	Zhingildy	Mangistau	32	4
Akzhigit	Akzhigit	Beineu	32	4
Akshimirau	Akshimirau	Mangistau	31	4
Zharmish	Zharmish	Mangistau	31	4
Tushikudik	Tushikudik	Mangistau	31	4
Saiotes	Saiotes	Mangistau	31	4
Kizilozen	Kizilozen	Tupkaragan	29	4
Kiziltobe	Kiziltobe	Aktau	29	4
Tolep	Kulandy	Karakiya	27	4
Akshukur	Akshukur	Tupkaragan	27	4
Shebir	Shebir	Mangistau	26	4
Tolep (crossing point 4-)	Tolep	Beineu	26	4
Tasmurin	Shair	Mangistau	25	5
Taushik	Taushik	Tupkaragan	25	5
Station 15	Zhingildy	Mangistau	24	5
Zharma	Aktobe	Mangistau	24	5
Baskuduk	Ondy	Mangistau	24	5
Turish	Turish	Beineu	24	5
Kzil-Asker	Sam	Beineu	24	5
Sayin	Akshukur	Tupkaragan	24	5
Bayandy	Bayandy	Aktau	24	5
Kizilsai	Kizilsai	Zhanauzen	24	5
Sazdy	Aktobe	Mangistau	23	5
Beki	Ondi	Mangistau	23	5
Korkol (Eset)	Eset	Beineu	22	5
Kizilsu	Bostan	Karakiya	21	5
Kiyakty	Tushikudik	Mangistau	21	5
Akkudik	Senek	Karakiya	21	5
Bostankum	Bostan	Karakiya	20	5
Nogaity	Nogaity	Beineu	20	5
Tushibek	Zhingildy	Mangistau	20	5
Daulet	Kiziltobe	Aktau	20	5
Birlik	Kiziltobe	Aktau	20	5
Tigen	Shair	Mangistau	19	5
Bozdak	Saiotes	Mangistau	18	5
Tazhen	Akzhigit	Beineu	16	5

Table 6.5 Criteria for Classification of Existing Settlements

Tier	No. of settlements	Description	Note
Rank A	(1)	Regional center	Aktau city
Rank B	(9)	Candidates for upper regional sub-centers	Score ≥ 38 including Zhanaozen, Fort-Shevchenko & 3 urban-type settlements
Rank C	(9)	Candidates for secondary centers	Score 33-37
Rank D	(14)	Candidates for rural service centers	Score 26-32
Rank E	(24)	Candidates for ordinary settlements	Score ≤ 25

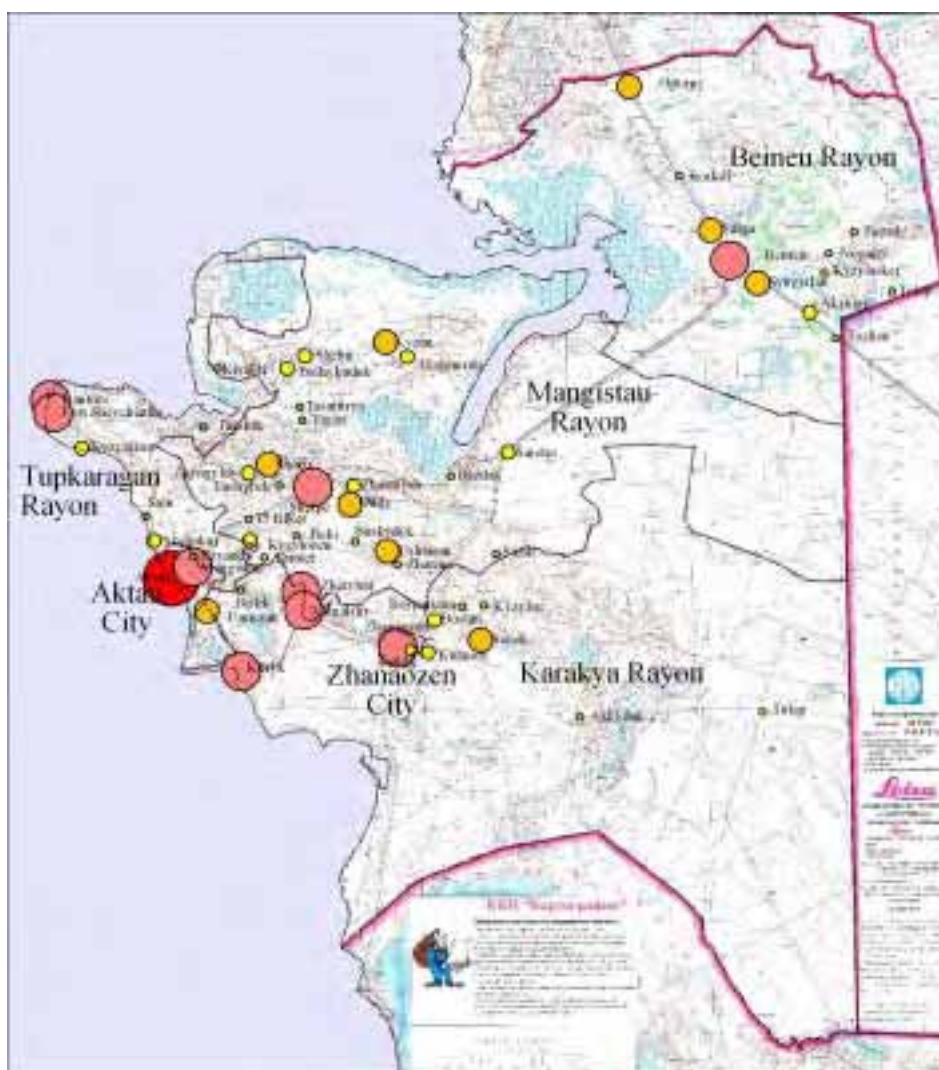


Figure 6.1 Current Distribution of Settlements by Five Classes

Table 6.6 Functions of Tiers for Hierarchical Settlement System

Tier	Name	Functions
I	Regional Center	<ul style="list-style-type: none"> • International and inter-regional gateway to the Oblast • Business center for international services • Trade center for regional and international commodities • Manufacturing center for export and other goods • Highest referral hospital for entire oblast area • Higher education with international recognition • Cultural center representing the Oblast

Tier	Name	Functions
II	Upper regional sub-centers	<ul style="list-style-type: none"> • Tourism base with overnight stay capability • Government services for specialized purposes • Education for specialized fields • Sub-region level medical services
III	Secondary centers	<ul style="list-style-type: none"> • Rural production centers (livestock, fishery, and agro-industry) • Emergency medical care capability • Tourist service points
IV	Rural service centers	<ul style="list-style-type: none"> • Financial service for rural production • Basic social services
V	Other settlements	<ul style="list-style-type: none"> • General education • Communal medical care • Basic government services

Factors taken in to account for the planning include:

- Potential for economic development, such as distribution and logistics, manufacturing and processing industry, tourism, agriculture and livestock, fishery, and agro-processing,
- Future transport network,
- Location of the settlement in the spatial distribution balance in the region, and
- Availability of water for expansion of population size.

Adopting these criteria, six settlements were identified, which should be raised from their current tiers to the upper ones, as shown in Table 6.7. Figure 6.2 shows the planned hierarchical structure of settlements.

Table 6.7 Settlements with Higher Functional Expectations

Location	Settlement	Present tier	Future tier	Remark
Mangistau	Zhyngyldy	IV	III	Potential for agro-industry and livestock production
	Saiotes	IV	III	Strategic location for logistics industry
Karakya	Akkuduk	V	IV	New railway connection and strategic location for tourism support
	Kenderli	-	III	New development of beach resort complex with residential areas for workers
Tupkaragan	Kyzyluzen	IV	III	Potential for fishery
	Taushik	V	IV	Potential for agro-industry and livestock production

(3) Transport network

The transport network in the region consists of land (roads and railways), sea, and sky. Connecting from the international and inter-regional transport nodes formed by airports and seaports, the railway network is formulated linking to other oblasts in the Country as well as to Uzbekistan and Turkmenistan. The road network will be planned in a hierarchical manner, with three categories seeking different roles respectively. These functions by the hierarchy of the road categories are summarized in Table 6.8. The future transport network of Mangistau Oblast is depicted in Figure 6.3.

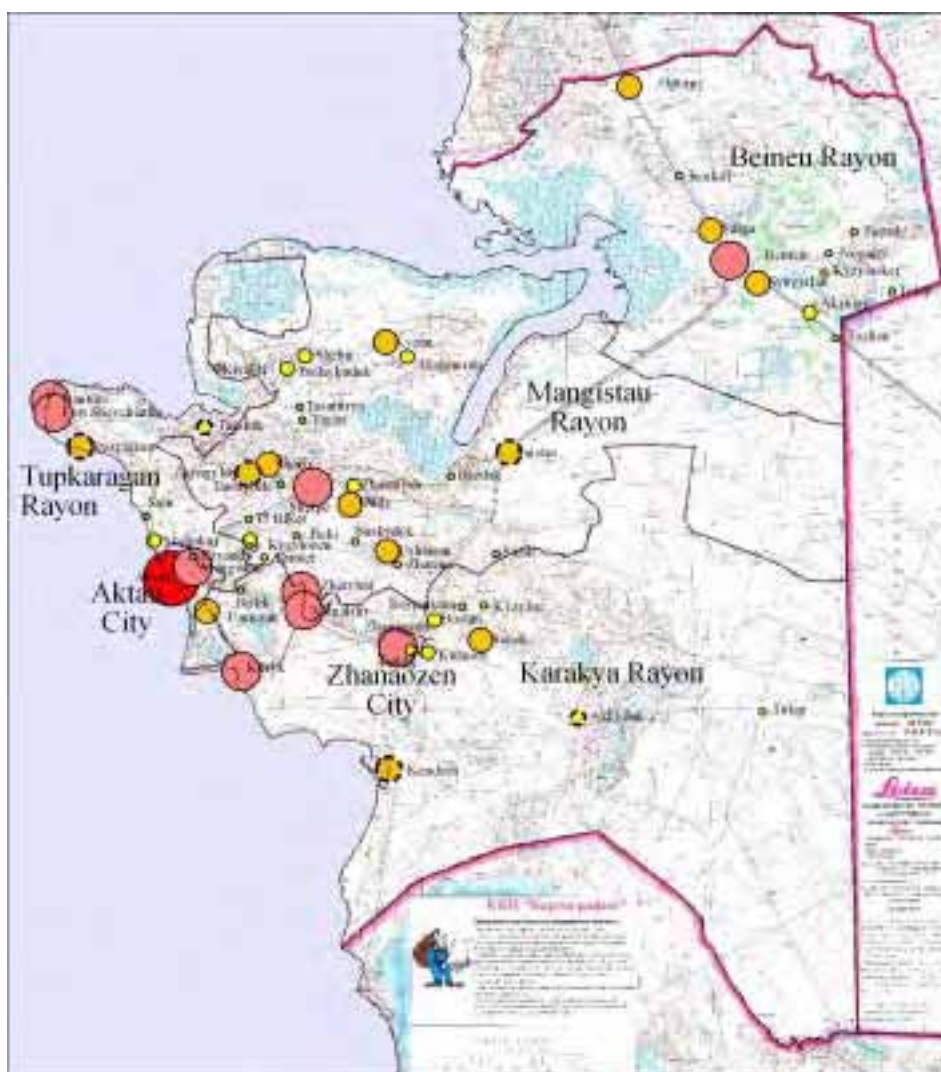


Figure 6.2 Future Hierarchical Structure of Settlements

Table 6.8 Functions of Roads by Category

Category	Functions
Arterial road	<ul style="list-style-type: none"> • International/inter-regional links • Connection between international logistic facilities (airport, seaports) • Connection between regional center and regional sub-centers
Secondary arterial road	<ul style="list-style-type: none"> • Intra-regional links • Connection between upper-regional sub-centers and secondary centers
Tertiary arterial roads	<ul style="list-style-type: none"> • Access to major rural settlements • Connection between secondary centers and regional centers



Figure 6.3 Future Transport Network

6.3 Development Scenario for Mangistau Regional Development

6.3.1 Application of cluster strategy to Mangistau regional development

(1) Conceptual background

The regional development of Mangistau Oblast is to be pursued with the four industrial clusters. The industrial cluster is a concept popularized recently by Michael Porter of the Harvard Business School, and used now as a technical term. The proposed industrial clusters do not necessarily conform to the technical definition but used here as a convenient term. A set of related activities are proposed as a cluster for the following reasons:

- 1) To increase and internalize value-added, while minimizing wastes and leakages
- 2) To allow the Government to take effective measures for economic development without direct interventions
- 3) To motivate local people to produce for larger markets including export markets by making linkages between related activities visible

The first reason is common to the cluster strategy as well. The second and the third reasons are pragmatic, representing the planning strategy.

(2) Cluster strategy in the context of Mangistau regional development

The concept of industrial clusters may facilitate the ideas behind the proposed clusters. The four key determinants of industrial competitiveness identified by Michael Porter are:

- 1) factor conditions – availability and quality of production factors such as resources, infrastructure and capital;
- 2) home demand conditions – existence of domestic market responsive to such high quality products that may be demanded in the international market as well;
- 3) related and supporting industries;
- 4) industry strategy, structure and competitiveness.

The existing conditions of these determinants are not all favorable in Mangistau Oblast. The Mangistau regional development may be seen as a process to cause favorable changes to these determinants to enhance competitiveness of the regional economy. In particular, the planned expansion of the Aktau port and the special economic zone (SEZ) may be instrumental in changing these conditions. Main changes expected in Mangistau Oblast with respect to each determinant are as follows.

Determinant of competitiveness	Expected changes in Mangistau Oblast
1) Factor conditions	Increased availability of raw materials and intermediate goods through import; improved port and related infrastructure; inflow of capital and technology
2) Home demand conditions	Increased demand for high quality products supplying to the oil and gas industries and their employees; growing urban market
3) Related and supporting industries	Establishment of port-oriented industries in SEZ; development of indigenous industries linked to SEZ
4) Industry strategy, structure and competitiveness	Coherent industrial strategy centering on the oil and gas industries; diversification of industrial structure; establishment of collective competitiveness for a set of related industries

(3) Applicability of cluster strategy to Mangistau regional development

The success of any industrial cluster depends on effective utilization of external economy due to the agglomeration of industries. Such agglomeration effects may be promoted by means of some joint actions of inter-related industries in the competitive environment. For this to be possible, the cluster needs some depth to allow the division of works, accumulation of technologies, and intensive information flow between the industries. It is well known, however, that those industries to locate in SEZ do not develop initially strong linkages with indigenous industries. This means that the determinant 3) above would not improve much with the expansion of the Aktau port and the SEZ alone.

There are different ways to apply the cluster strategy to economic development of any country or region. A typical way is to take a primary good that has the competitive advantage and promote related economic activities with forward and backward linkages to internalize and increase value-added and strengthen the competitive advantage for a whole set of goods involved in the chain of economic activities. This may not be applicable to Mangistau, where few goods have competitive advantage other than oil products.

Those sub-sector industries identified in Mangistau as priority have relatively low competitive advantage at present. However, if other related industries are promoted together in the form of a chain of activities to increase value-added, a whole set of activities may establish comparative advantage. Two directions should be pursued to establish comparative advantage of primary and processed goods, each having low competitive advantage.

First, the oil and gas industries should be effectively utilized as linking factors to induce the development of a wider range of economic activities. Second, indigenous industries should be promoted to add depth to the clusters. This would effectively extend the cluster strategy beyond a horizontal cluster of a single economic activity or a simple vertical cluster centering on a single primary good. A whole set of interrelated economic activities should be promoted, encompassing both horizontal and vertical clusters. As Michael Porter recommends, all clusters in both traditional and nontraditional industries should be encouraged to participate in the development process rather than focusing only on specific clusters.

6.3.2 Mangistau regional development with four clusters

The scenario for regional development of Mangistau Oblast is conceived with four industrial clusters identified as promising other than the oil and gas industries. These are:

- (1) Logistic cluster,
- (2) Linkage industries cluster,
- (3) Derivative industries cluster, and
- (4) Tourism cluster.

Each of them is examined with respect to the conditions justifying the promotion, possible components included, and locations of core functions to be established.

(1) Logistic cluster

1) Justification

The Government designates Mangistau Oblast as the western gateway of Kazakhstan due to its strategic location and existing infrastructure, particularly the Aktau port as the only international port of the Country that can be utilized all the year round. Both the main north-south and the east-west arteries pass through the Oblast. In addition to the Aktau city as the nodal point of land, air and sea transport as widely discussed, the Beineu settlement is at the crossroad between the north-south and the east-west transport, linked also to Uzbekistan. Zhanaozen, the second largest city in Mangistau, is located along the north-south highway linking Russia, through the Oblast to Turkmenistan.

2) Components

The logistic cluster has two essential components. One is “entrepot” or distribution center for cargoes, especially containerized cargoes, linking East Asia through Central Asia and Caucasus to Europe. The other is “transport hub”, linking major cities in the pan-Caspian Economic Zone, which may encompass China in the east and the Western Europe.

The Aktau city is already in the process of development with both of these functions under the “Land, Sea and Sky” program. The land component includes the development of roads and railways to facilitate the cargo transport. The sea component includes the upgrading of the Aktau port to be specialized in container and general cargoes, and the development of the Kuryk port mainly for oil and gas export. The air component includes the upgrading of the Aktau

international airport with the construction of freight terminal and runway for cargo air vessels. Also, the existing special economic zone (SEZ) will be expanded to accommodate a logistic center as well, and the Caspian State University of Technology and Engineering will be established to support related technological development, including ICT technologies vital for effective logistic functions.

The Beineu settlement should be developed into a major urban center to serve the vast rural hinterland. It should be equipped with a dry port with inland container depot, truck terminal and related facilities and services. It would function as a transshipment center for cargoes from Uzbekistan as well as the central part of Kazakhstan for distribution to Mangistau and neighboring oblasts. Conversely, goods from these areas as well as rural hinterlands of Beineu would be transshipped to distant destinations.

3) *Core development areas*

As indicated above, the Aktau city will be the logistic center, and the future Beineu city the inland logistic sub-center. Production input necessary for livestock and crop production, and supplies for tourism in the future would be procured along the transport arteries. Some livestock products and fresh agricultural produce may also be marketed in areas along the arteries. As the center of livestock, crop production and inland tourism, Zhanaozen will be another inland logistic sub-center providing support services to these production activities.

With these three logistic center and sub-centers, the area linking them may be called the logistic triangle (Figure 6.4). Physical links between these cities should be much strengthened by both roads and railways. Various logistic facilities, including some resources processing facilities should be located in these cities or along the arteries linking them.

(2) Linkage industries cluster

1) *Justification*

Industrial structure of Mangistau Oblast

The mining sector accounts for 95% of the GRDP of Mangistau Oblast, dominated by oil and gas production. At present, crude oil is totally exported without processing, and part of natural gas is consumed as energy in the Oblast. Including related engineering companies and transport companies, there are 74 oil and gas related companies registered in the Oblast. They employ 12,000 persons as of April 2007, accounting for some 35% of the total industrial employment. Supporting industries include machinery industry manufacturing drilling machine, rigs, oil and gas separators and tools, engineering business performing maintenance of a plant or a pipeline, energy industry for electric power and gas production and supply, and transportation business for crude oil and natural gas.

Of the supporting industries, the machinery industry is comparatively less developed. The supply of machinery and equipment in Mangistau relies heavily on import accounting for about a half of the total import value including vessels, US\$2,270 million in 2006, of which oil imports accounted for US\$1,090 million. The machinery related export value, US\$86 million in 2006, accounts only for less than 10% of the total export value, US\$1,180 million. The machinery and equipment sub-sector is dominated by five or six large companies including two manufacturing glass-fiber pipes.



Figure 6.4 Logistic Triangle Linking Aktau, Zhanaozen and Beineu

Oilfield equipment and machinery market in Kazakhstan

The oilfield equipment and machinery industry in Kazakhstan with some 100 companies manufactures hardware ranging from drilling rigs to components such as steel pipes (Kazyna, Market Size of the Oilfield Equipment and Machinery in Kazakhstan). The market size was US\$2.07 billion in 2003, of which domestic production made up only US\$65 million or a 3.1% market share. The domestic production increased steadily from US\$22.1 million in 1999 to US\$55 million in 2002, while the market size increased by 116% during 1997-2002.

In Kazakhstan, this market is expected to grow at around 10% annually for the next three years due to the expected procurement of equipment for the new offshore oil exploration in the Caspian Sea. The capital spending in the oil and gas sector in Kazakhstan is projected to triple by 2012 with significant growth in services and equipment. The report states that employment in the oil and gas industry is projected to nearly double in the next four years with the growth concentrated on manufacturing, construction/fabrication and logistics.

Prospects in Mangistau Oblast

No large oil production increase is planned within Mangistau Oblast. As many equipment and

machines operated in the oilfields are old, however, there exists a significant replacement demand. The related engineering and construction industries need also to be strengthened for better maintenance of equipment, pipelines and other field activities. Some of them would find the special economic zone (SEZ) as the location for expansion, and those supplying parts and components to them may be established in the SME's industrial estate to be newly created. Therefore, all of these industries are included in the linkage industries cluster.

2) *Components*

Machinery and equipment

The machinery and equipment industry, despite its less developed status, has the location quotient larger than 1.0. It should be promoted together with mechanical engineering industry as they have the strongest inducing power for other industries. Other than the few large firms supplying the oil and gas industries, the existing industries in this sub-sector are based on imported parts and processed materials to produce final products such as small pumps and equipment for domestic market. This is a typical form of import processing, which is considered most promising type of industries in the immediate future. Products may be diversified to supply more widely the oil and gas industries, readily accessible domestic market, partly substituting the existing import machinery and equipment.

Other non-metallic industries

This sub-sector has the location quotient larger than 1.0, supported at present by construction materials such as those produced from shell limestone, bricks and tiles, and pressed boards made of wood chips and plastics. The production can be increased and the products diversified as the supply of raw materials can be easily expanded. It is constrained only by the size of the market, which at present is confined to the local market, dominantly the oil and gas related. Some products of higher value added may expand their markets to neighboring regions and countries. Possibility exists to import clinker for cement manufacturing in combination with local limestone as another form of import processing.

Linkage development with SEZ

In addition to the oil and gas industries and the priority manufacturing industries, there is possibility to develop supporting industries such as service industry for plant maintenance engineering, goods transportation and distribution, packing and packaging industries, and raw materials and parts supply industry subcontracting with the leading and the core industries. These industries may locate in the special economic zone (SEZ). The "Morport Aktau" was created as a special economic zone (SEZ) to attract foreign direct investments by the Presidential decree of 1 January 2003. The territory of the SEZ has been expanded by the Presidential decree of 7 February 2007 from 227.1ha to 982.3ha.

SME's industrial estate development

The Government has established the Small Entrepreneurship Development Fund and the Sustainable Development Fund Kazyna to support small and medium sized enterprises (SME's) and innovative activities in industry. In Mangistau Oblast, the Mangistau Business Association (Atameken) has been established for SME's promotion and incubation activities in the private sector, and now has the membership with about 500 enterprises. Atameken has launched the project to develop an industrial estate for SME's with approximately 200ha land located 6km to the south of the Aktau city. An initial 40ha of the estate is to be completed in 2008.

3) *Core development areas*

The SEZ of the “Morport Aktau” is located in the Aktau city, where the machinery and equipment industries and other supporting industries for the oil and gas industries are expected to be located. The SME’s industrial estate is located in the Munaylinsky rayon, where industries supplying parts and components to those industries in the Morport Aktau may be located. The machinery and equipment industries will locate also in the Kurk port complex. The other non-metallic industries will locate mainly in Bautino-Fort Shevchenko, Beineu, and Zhanaozen.

(3) Derivative industries cluster

1) *Scope of derivative industries*

Derivative industries are defined here as the entire streams of inter-related industries derived from the oil and gas industry. They are broadly divided into oil refineries and petrochemical industries, and gas based industries. The scope of the derivative industries is illustrated in Figure 6.5.

To develop these industries in Kazakhstan, the following basic conditions need to be satisfied:

- i) High productivity for price competitive products in the international market
- ii) High demand growth expected for the products in the medium term (5-10 years)
- iii) Balanced mix of export products for neighboring markets

Related to the third point, promising markets may be parts of China and Europe as well as neighboring countries, for which the transportation costs would be modest. To satisfy these conditions, the total marketing strategy is indispensable.

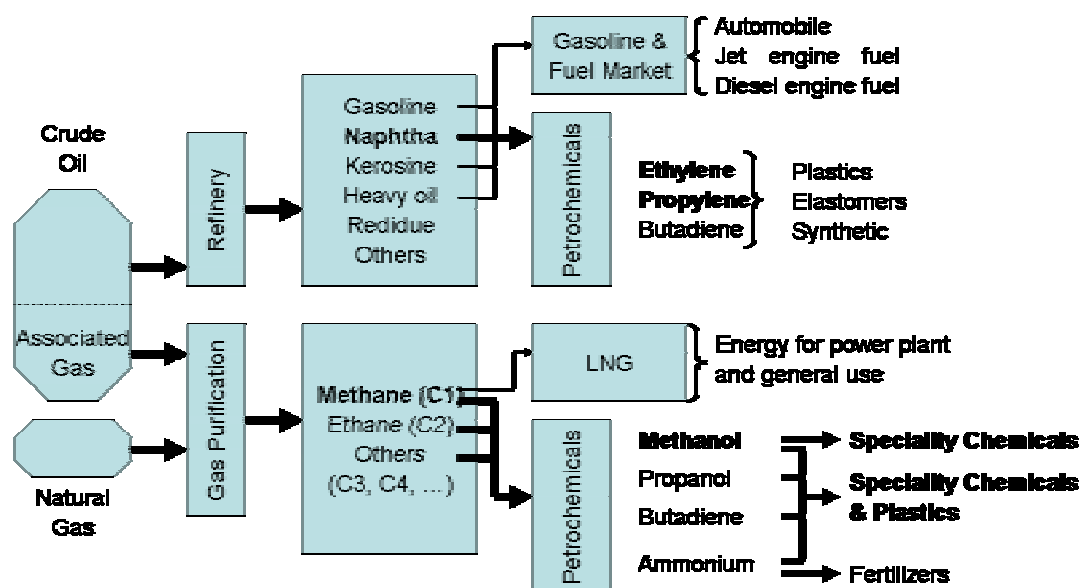


Figure 6.5 Products Derived from Oil and Gas Industry

2) *Prospects for derivative industries*

Oil refining and petrochemical industries

Oil refining is commonly to produce mainly gasoline, naphtha, and kerosene. High quality products are demanded, especially for gasoline to comply with stringent environmental standards in

developed countries. To ensure profitability, it is now a common practice to establish a petrochemical plant next to the refinery to form a petrochemical complex (*kombinat*).

Of the products produced from naphtha, 60% of ethylene and 70% of propylene are used to produce plastics such as polyethylene and polypropylene. These products are further processed or transformed into various consumer goods. These lines of production for commodities in the world are characterized by very large-scale production to reduce costs and to produce high quality products, and the market is highly competitive.

Gas chemistry products

A typical production line based on natural gas is to separate methane and use it to produce methanol and ammonium. The latter is further processed into fertilizer such as ammonium nitrate and ammonium sulfate. Methane and ammonium are utilized also to produce various chemicals and chemical intermediates, and special plastics such as PMMA (Figure 6.6).

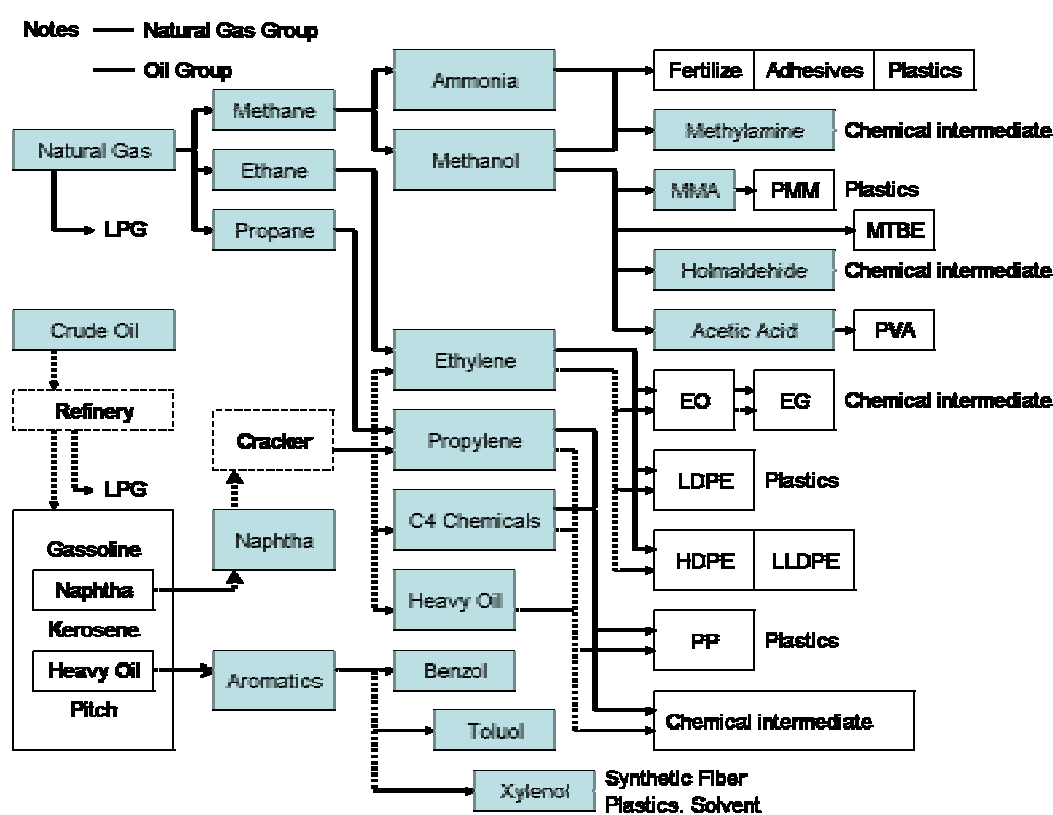
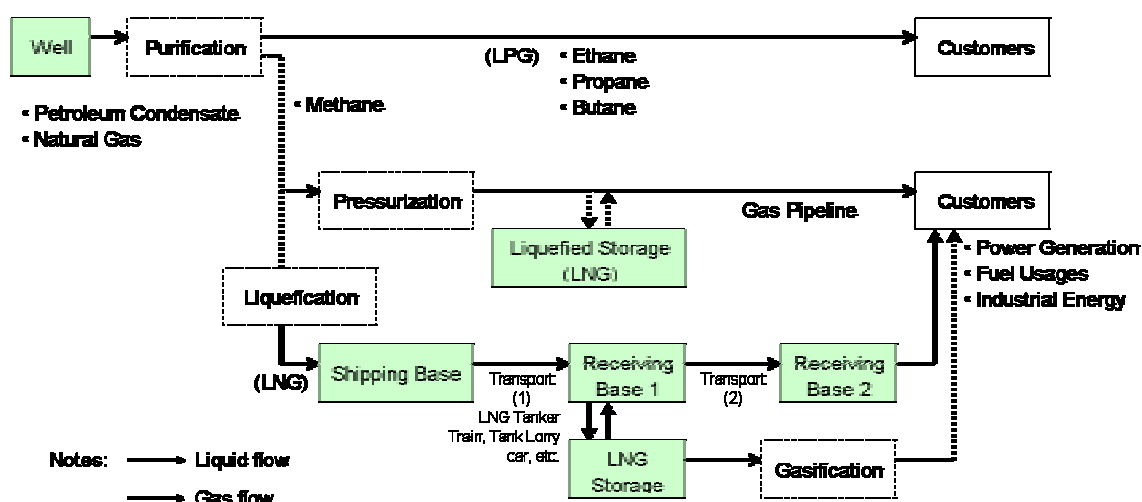


Figure 6.6 Product Flow of Natural Gas and Oil Refinery

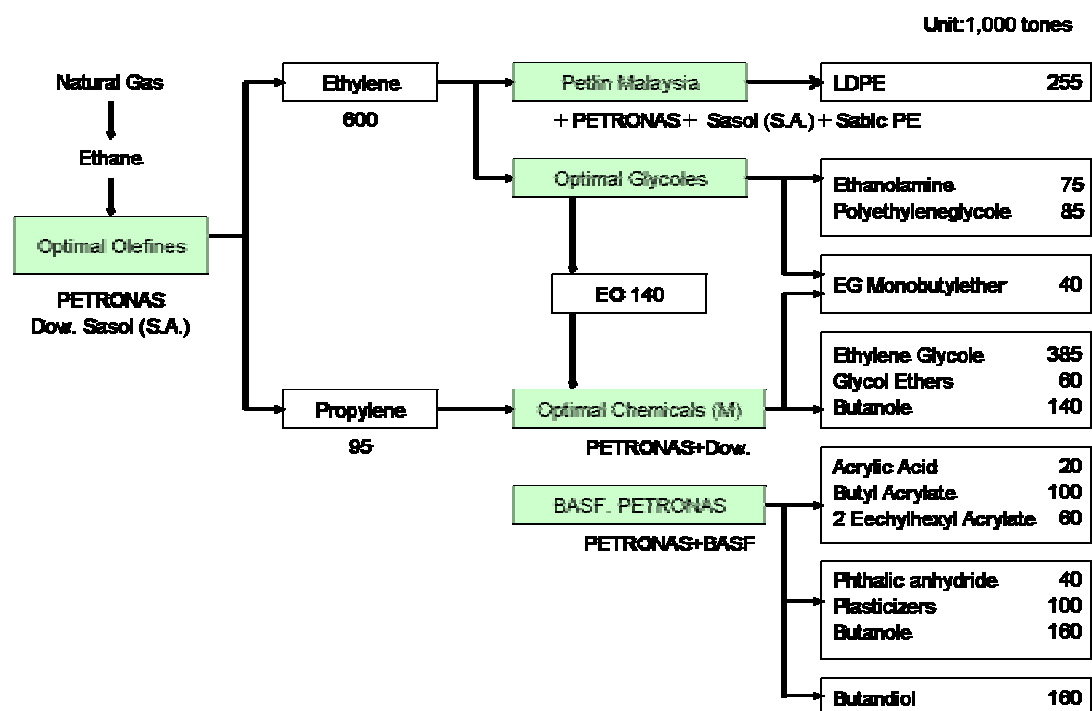
Another line of natural gas based production is to produce liquefied petroleum gas (LNG) by compressing ethane, propane, butane and other products derived from refining and associated condensate (Figure 6.7). In Kazakhstan, gases having larger molecule size than methane are separated and consumed locally as LPG gas or sold as tank gas since gas chemistry has not been much developed.



Source: Chemical Handbook by Chem. Soc. of Japan (modified by the JICA Study Team)

Figure 6.7 Natural Gas Flow from LPG Production to Consumption

The natural gas based gas chemistry utilizes methane, ethane and propane separated from the natural gas to produce methanol, ethylene and propylene, which are further processed into various derivatives. Final products are either high value-added materials for chemical industry as in the case of Malaysia (Figure 6.8), or common products such as polyethylene in the case of Thailand (Figure 6.9). Important factors to determine product lines are contents of methane and ethane in the gas as well as the gas reserves.

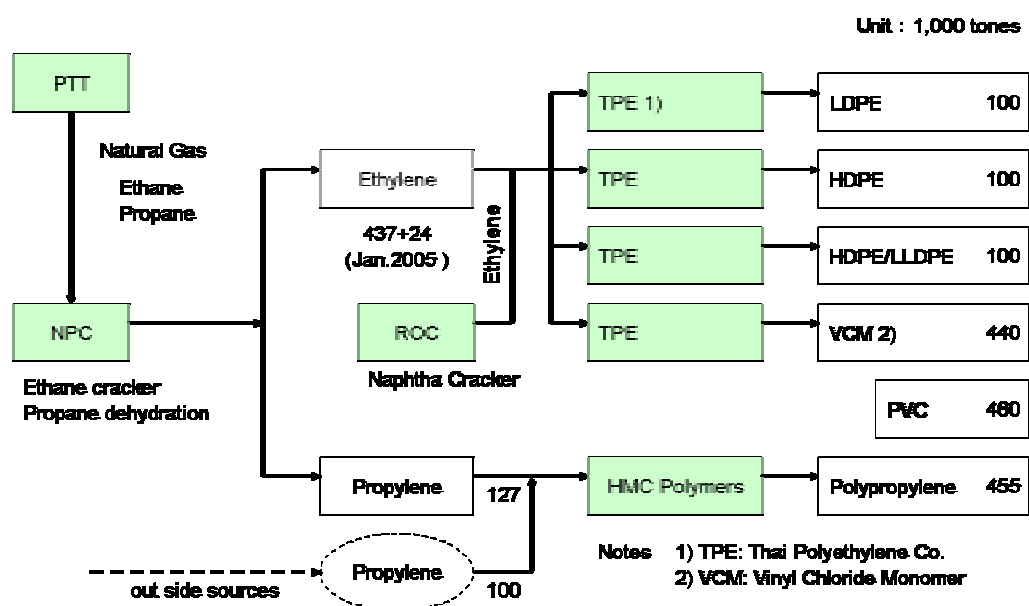


Source: Information 1), 2) modified by Study Team.

1) <http://Kaznak.web.infoseek.co.jp/Petronas/>

2) "Major Petrochemical Center in Asia" published by Chemical Industry Communications of Japan.

Figure 6.8 Optimal Olefines Complex in Kertih Region in Malaysia



Source: Information 1) modified by The JICA Study Team.
1) "Major Petrochemical Center in Asia" published by Chemical Industry Communications of Japan.

Figure 6.9 NPC-1 Complex on Map Tha Put Region in Thailand

Use of associated gas

The natural gas produced in Kazakhstan is mostly in the form of associated gas produced with crude oil. Flare processing of the associated gas is now forbidden in Kazakhstan, except in emergency cases, by the legal revision in 2004. In Mangistau, the part of associated gas has been used as LPG. The associated gas can be utilized as fuels for industrial and home uses and also raw materials for various products.

Composition of associated gas from the Dolinnoe oil field owned by BMB-MUNAY is summarized in Table 6.9. As seen from the table, the associated gas contains 62% methane, 14% ethane and 8% propane. Gas from oil fields around Zhanaozen does not contain hydrogen-sulfide (H₂S), and therefore sulfur removal is not necessary during gas purification, methane separation and gas chemistry operation, resulting in cost reduction.

Use of associated gas has not been much developed in Kazakhstan. This is due to the low gas prices, insufficient gas transport infrastructure, and limited capacity of gas refining facilities. Responding to the ban on flare processing of associated gas, effective uses of the associated gas are pursued by oil companies. Most companies, however, are planning to recharge the gas into the underground rather than using it for productive purposes.

3) Existing conditions of gas production and processing in Kazakhstan

Kazakhstan has three gas refining plants, of which one is located in Zhanaozen (Table 6.9). The total refining capacity is 16.2 billion m³/year. Oil and gas reserves and production in the oil fields around Zhanaozen are summarized in Table 6.10.

Table 6.9 Existing Gas Refining Plants in Kazakhstan

1. Kazkh Refining Plant		
Location	Zhanaozen	Merit: sulfur free gas
Capacity		2.9 billion m ³ /yr, modernized in 1979
Gas source	Associated Gas	Uzen field (Uzen East, Tenge West) Zhetibai field (Zhetibai South, Tasbulat, Aktas, Normaul East)
2. Tengis Refining Plant in Atyrau (Planned)		
Location	Tengis	Feature: high hydrogensulfide contents
Capacity		2.55 billion m ³ /yr
Gas source	Associated Gas	Tengis field
3. Zhanazhol Refining Plant		
Location	Zhanazhol	
Capacity	First Plant was upgraded	9 billion m ³ /yr, built in 2000
	Second Plant	1.4 billion m ³ /yr, started in 2003
Gas source	Associated Gas	Tengis field
Total capacity	About 16 billion m ³ /yr	Actual capacity: 6.9 billion m ³ /yr (43%)

Table 6.10 Oil and Gas Reserves and Production in Mangistau

Field	Owner	Estimated reserved oil (10 ⁶ t)	Reserved gas (10 ⁹ m ³)	Associated gas intake (10 ⁶ m ³ /yr)	Oil production (10 ⁶ t/yr)	Gas production (10 ⁶ m ³ /yr)
Aksas	RBM MUNAI		5.0			
Dolinnoe	RBM MUNAI	8	4.5			
Emir	RBM MUNAI	10	2.0			
Zetybay	Mangistau Munai Gas			21		
Uzen	Uzenmunaigaz	20			5.61	3.07
North Buzachi	CNPC/Nelson R	200			0.33	
Total		238	11.5			

A study was carried out recently on the enforcement of power generation and development of new industries using the associated gas in Kazakhstan (Japan External Trade Organization; JETRO). The study covered a comparatively large oilfields (Aksaz, Dolinnoe and Emir oilfields) located 50km east of the Aktau city. A development plan has been formulated for a 100MW power generation, production of LPG at some 33,000t and condensate at 18,000t annually, and possible manufacturing of sulfur pre-cast concrete.

To proceed with gas chemistry operation, the expansion of gas production is necessary. At present, no definite plan exists to expand the gas production in Mangistau.

In Aktau, the project to produce 1,500t ammonia, 1,700t carbamide and 440t ammonium nitrate has started to be constructed for completion in 2009. The fertilizer to be produced will substitute the import. The production of carbamide represents the value-added processing as carbamide is the basic chemical for the production of urethane, which has a wide range of uses including urethane rubber, urethane binding agent, additive to dynamite, combustion control agent and intermediates for medicines.

4) *Related initiatives in neighboring regions and countries*

The Kazakh government has identified the petrochemical industry as a priority in diversifying the Kazakh economy, and provides tax incentives for companies planning to set up petrochemical plants. These and other initiatives are outlined.

KazMunayGaz (KMG) and the Arab International Petroleum Investment Company (IPIC) have signed a memorandum of understanding on the IPIC's potential involvement in the project of constructing the first integrated gas chemical facilities in Atyrau in the western Kazakhstan. IPIC

and KMG will exchange technology and experience if the memorandum of understanding is fulfilled. The cost of constructing the facility is US\$5.3 billion. Its design capacity is 800,000t of polyethylene and 400,000t of polypropylene a year. The project is expected to be completed in 2013 (*Central Asia Investment Bulletin*, December 2007 & February 2008).

Petrochemical complex in Atyrau

The renovation of the existing oil refinery in Atyrau was completed, and a new refinery and petrochemical plant based on naphtha are planned. The Kazakh government was to hold a tender to choose a foreign partner to build the petrochemical plant in May 2008. The plant is expected to produce 400,000t of polyethylene of high and low density, 400,000t of linear polyethylene of low density and 400,000t of polypropylene a year (“Kazakhstan Economic Report by Institute for Economic Strategy”, Central Asia: January–February 2008).

Large refinery and petrochemical complex in Tengis

A large refinery is planned in Tengis in the southeast of Atyrau. Associated with it, a petrochemical plant is also conceived based on naphtha (JICA Study on Capacity Development on Pollution Prevention and Control in the Petroleum Industry in the Caspian Sea and Its coastal Areas, August 2006).

Renovation of oil refinery in Turkmenistan

The renovation of the existing oil refinery in Turkmenbash near the border with Mangistau is proceeding at the cost of US\$1.2 billion together with the construction of related facilities. It aims at the production increase of polypropylene for export. Also, the Government plans to establish the second refinery in Seidi near the border with Uzbekistan to process 32 millions ton crude oil, and is now seeking foreign investors for the refinery and ancillary facilities.

5) *Derivative industries cluster in Mangistau*

Methanol based production line

It is not advisable to establish gas chemistry operation in Mangistau aiming at the production of common commodities such as polyethylene and polypropylene. The gas chemistry in Mangistau should aim at selected commodities and high value-added specialty products. In particular, the production of methanol and other products of its downstream production line should be pursued.

Selection of specific production line and product set should be carefully examined in view of the access to markets, price competitiveness, and comparative advantage of Kazakhstan as well as the demand-supply situations of various potential products.

Greenhouse and industrial agriculture

Another way to utilize the gas energy in a small scale is to practice large-scale greenhouse agriculture or industrial agriculture. Greenhouse agriculture by using gas and drip irrigation are already practiced in Kazakhstan. To establish these as economically viable undertakings, however, state-of-art technology needs to be introduced and experiences gained through pilot or experimental projects.

There exist alternative methods of greenhouse agriculture, and their applicability varies depending on climatic conditions, energy sources and materials for greenhouses among others. Promising products generally include fresh vegetables, berries, flowers and office plants. In Mangistau, tree seedlings may also deserve consideration in view of reforestation needs.

Environmental considerations

The production of fresh vegetables and berries by greenhouse or industrial agriculture would contribute to the improvement of diet for the local people. These and other products would supply to the growing tourism market as well. The development of green business would symbolize the Mangistau regional development, which the residents can be proud of. Together with tree planting supported by seedlings produced by greenhouse or industrial agriculture, residents in Mangistau would enjoy more pleasant living environment.

Possible negative effects of the development of derivative industries should also be noted. As the petrochemical industry and gas chemistry operation develop, plastic transforming plants will be established as downstream production. In fact, consumption of plastics tends to increase as the income levels increase. This may result in serious littering of plastic bags and films, PET bottles and other plastic products. Countermeasures should be formulated together with the planning for derivative industries. The cluster approach would be effective in utilizing wastes and byproducts to minimize the overall wastes. The introduction of plastic recycling business and environmental education should be planned as part of the planning for the derivative industries cluster.

(4) Tourism cluster

1) Justification

Mangistau Oblast will continue to be a popular destination for domestic tourists attracted to the unique opportunities offered by the Caspian Sea. In addition to beach resorts, Mangistau abounds in various potential tourism resources, reported to be accounting for more than 30% of all the potential tourism sites identified in Kazakhstan. They include natural, historical and cultural resources. Most cultural heritage and natural landscape with fauna and flora are found in inland areas.

Tourism is potentially important industry for Mangistau, where the major constraint to the development is water. Tourism as an industry is not water intensive as drinking water for tourists may be brought in bottles from almost anywhere. Tourism development is constrained more by poor access to tourism sites, lack of adequate accommodations and other facilities, and lack of wide recognition on the attractiveness of tourism objects including diversity of opportunities that can be offered. Therefore, a strategic approach is essential for successful tourism development, given the existence of potentially attractive tourism objects as a necessary condition.

2) Components

The Kendyrli tourism complex has been planned and is well publicized. It combines the beach resort and various man-made attractions to enhance its attractiveness. The man-made attractions planned include golf courses and other sporting facilities, and shopping and amusement facilities. Another tourism complex is perceived in Bautino, centering on the historical heritage, including the Bautino port with its historical district and some old architecture.

The potential tourism resources in the inland areas should be effectively utilized to diversify the tourism industry in Mangistau in the medium to long term. They include three nature reserves: 1) Karagiye-Karakosky state zoological reserve, 2) Kendyrli-Karasanskoye state reserve zone, and 3) Ustyurt state reserve; several heritage areas; and the sacred Biketata site for the Moslem pilgrimage. These resources may be combined with varied topography and landscape. The central and eastern parts of Karakiya would offer opportunities for experience/action-oriented tourism.

Tourism bases need to be developed, where comfortable accommodations and services, urban

amenities and possibly also additional attractions are offered. The Aktau city is naturally the gateway for tourism in Mangistau, where high-grade urban amenities and social services should be provided. Zhanaozen would become an inland tourism base as it is located on the main arteries, and water availability is more favorable with the water transfer from the Volga river and local groundwater. The drip irrigation recently established is expected to develop to supply fresh vegetables to tourists. Shetpe may develop into another inland base for the nature eco-tourism center around the Karatau Mountains.

3) Core development areas

As indicated above, the Aktau city is the tourism gateway and base, and Zhanaozen the inland tourism base. The access should be improved from these bases to the Bautino and the Kendyrli tourism complexes, and the tourism sites in Karakiya circuit. The coastal area from the Aktau city, through Kuryk to Kendyrli may form a coastal tourism belt. To facilitate the formation of various tour itineraries responding to a wide range of demand, the access between tourism sites should also be improved. The tourism network conceived for Mangistau Oblast is illustrated in Figure 6.10.

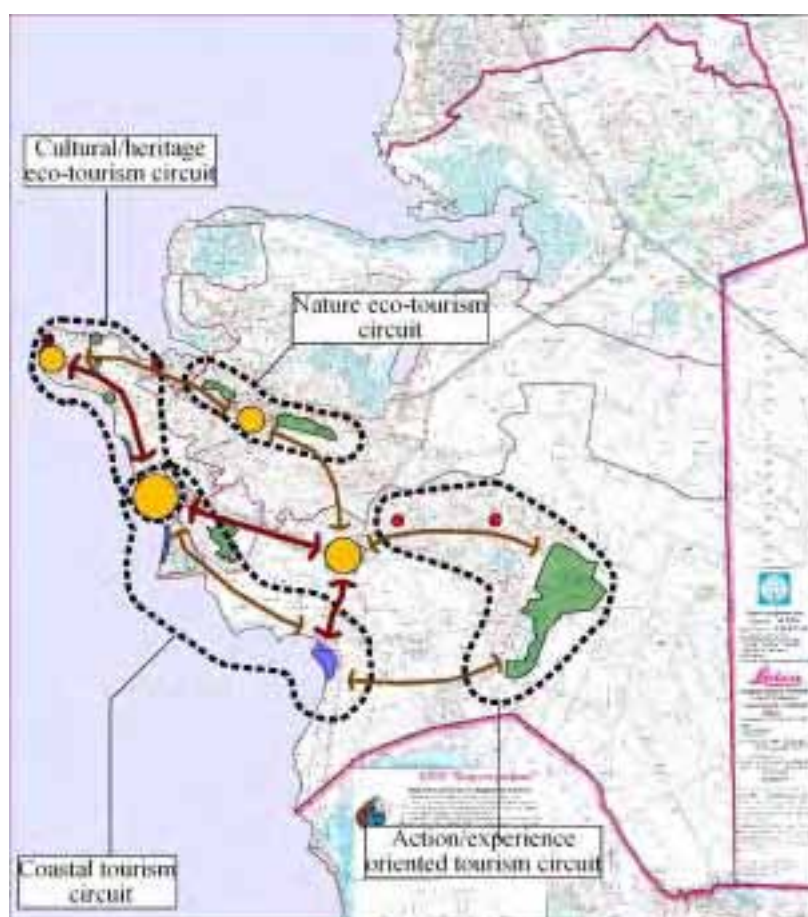


Figure 6.10 Tourism Circuits and Network

6.3.3 Development phasing and scenario

A development scenario for any region is a descriptive presentation of a series of actions to be taken and events to take place over the planning period. For the planning purposes, the planning period is divided broadly into three phases: Phase 1 for 2008-11, Phase 2 for 2012-15, and Phase 3 beyond 2016. The expected performance of socio-economic and spatial development of

Mangistau Oblast is outlined for each phase.

(1) Phase 1: 2008-11

During this phase, deliberate efforts will be initiated by the Oblast to diversify the Oblast economy away from the over-dominance by the oil and gas industries through promoting agriculture, manufacturing and services. To do this under the stable macro socio-economic conditions, high economic growth rates should be maintained. Therefore, the production of the oil and gas industries should at least maintain a modest growth throughout the phase. As the oil and gas prices have been at high levels for some time, it is reasonable to assume that they will decline in the coming years. Thus, the oil and gas production will have to increase considerably to maintain the similar levels of production value increase.

The linkage industries as conceived in the previous section are expected to develop steadily during this phase, taking initially the form of import processing. Such development would be encouraged by some facilitative measures by the Oblast. For instance, some incentive measures may be introduced to provide tax reduction proportional to domestic value added contents of this type manufacturing. Existing resource processing type industries will continue to develop as the domestic demand increases along with the booming regional economy such as construction materials based on limestone and plastics, and some consumer goods industries. Initial arrangements may be made to allow local processing of camel and sheep furs and leathers as well.

In agriculture, some neglected groundwater wells would be restored to support the livestock development. Drip irrigation will expand to produce more vegetables, and experimental greenhouses would be established possibly by the partnership arrangement between the Oblast and the private sector. The formulation of strategy and measures for the fishery development will be completed, and the implementation will start.

Some man-made attractions will be established in the Kendyrli tourism complex together with additional accommodations. The Karakolsky zoological reserve near the Aktau city may be taken as a test case for integrated management of protected area and tourism development. The strategy for integrated management of other protected areas may be drawn up in steps.

Ongoing road and railway projects will be completed to establish the basic structure of the regional artery network in Mangistau Oblast. The upgrading of the Aktau port and the Aktau international airport will proceed as planned, and a widely varied and increasing number of industries will establish in the Special Economic Zone as the confidence is built up among investors with improved infrastructure. The logistic center will establish in the SEZ area. The Kuryk port complex will start to be implemented.

(2) Phase 2: 2012-15

The production of oil and gas may start to decline in the middle of this phase. To compensate for the declining value added in the oil and gas production, gas chemistry industry will start to develop to produce a widening range of products. The combined value added will increase at accelerated rates.

The linkage industries will accelerate their growth, and some of them will become export industries. The resource processing industries will continue to grow, and some of them also will start to export their products to neighboring regions and countries. New processing industries will establish to produce leather goods, some high value construction materials such as ornamental slabs and tiles, chemical products, and plastic products. Other industries may establish to supply materials and equipment for greenhouses and drip irrigation.

The expansion of oil and gas production during Phase 1 will enlarge the opportunity to establish the natural gas chemistry operation. To make it successful, specific production lines with methanol and their derivatives should be carefully studied in the light of marketing prospect, and the implementation planned in stages.

Both greenhouse agriculture and drip irrigation will further expand to meet the growing demand for fresh vegetables and fruits/berries, including supply to tourism industry. Livestock development will accelerate based on the improved land tenure and water use arrangements between peasant farmers and farm enterprises. The fishery sector will become fully operational, including both open sea fishery and aquaculture.

The Kendylri tourism complex will further develop with additional facilities and accommodations. Tour itineraries linking inland tourism sites with the coastal area will be developed, and facilities in the inland tourism sites will start to be provided in steps. The city beautification of Aktau and Zhanaozen will be initiated mobilizing citizen's efforts.

The upgrading of the Aktau port and the Aktau international airport will be completed by the end of this phase. Some local products of the linkage industries and other new industries will start to be exported not only from the port but also from the airport. Basic infrastructure for the Kuryk port complex will be mostly completed. The railway link from the central part of Kazakhstan to Beineu will start to be constructed.

(3) Phase 3: beyond 2016

The combined value added of the oil and gas industries and the gas chemistry operation will continue to increase as the latter is developed in full scale and scope to produce a wide range of products. The share of the mining sector in the GRDP may decline to 50% more or less in the early part of this phase.

The linkage industries and other new industries will continue to develop despite the decreased oil and gas production, as their markets expand in the Oblast and neighboring regions and countries. As the railway link from the central part of Kazakhstan to Beineu is established in the early part of this phase, the market for some industries will further expand, and some of them may effectively substitute existing industries in other regions.

The logistic industry will develop most rapidly in this phase to become the lead industry in the Oblast, including increasing goods in containers to be transshipped. It is supported not only by the facilities in Aktau but also by the inland container depot, truck terminal and related facilities in Beineu. The Beineu city will become a major urban center in the inland area to provide social services, including some higher order functions, to its residents and vast rural hinterland.

The Aktau city will be established as the functional capital of the Pan-Caspian region, equipped with higher order service functions to serve neighboring countries as well. These functions may include environmental and maritime education and research, and specialized health care such as radio-therapeutics. Mangistau Oblast will be characterized by the diversified economic structure with many export industries in addition to the oil and gas industries, high value industrial agriculture, international tourism featuring beach resorts, cultural heritage and experience/action oriented tourism, and international logistic services linking China in the east to Europe in the west. In addition, Mangistau Oblast in general and the Aktau city in particular will be known for cosmopolitan atmosphere with the population of mixed ethnicity, embracing many cultures and receptive for different faiths. The Oblast will attract a large number of international tourists from all over the world, including those for conference tourism.

The natural gas chemistry will be fully operational to produce high value-added specialty products.

Also, some downstream industries utilizing output from the petrochemical complex in Atyrau should be established. Together, Mangistau would become a production center of plastics and chemicals.