1 Introduction

1.1 Background

The Republic of Azerbaijan covers an area of 86,600 square kilometres with a population of about 8.0 million (1999)[1]. The independence from the Former Soviet Union (FSU) in 1991, however, resulted in the collapse of trade among the republics of the FSU, only leaving the least efficient industrial systems. Unstable economic and social conditions have hindered Azerbaijan in shifting from a planned economy to a market economy. The GDP decreased significantly: to 42% of the1990 level in 1995.

Full-scale industrial development based on the rich oil resources in Baku, the capital of Azerbaijan, and its surroundings started in the latter half of the 19th century, and the Baku oil field was the largest in the world at the beginning of the 20th century. The technology used for more than one century, however, lacks attention to the environment and keeps affecting all environmental media. After independence, a wide range of environmental damage began to be identified, including the accumulation of toxic substances in the abandoned oil field and aged industrial zones, health impacts and the loss of natural resources.

Ironically, environmental degradation in recent years proceeds at lower pace than before, due to the current diminished economy. As the result of the commencement of economic development assistance by the World Bank and International Monetary Fund and the economic policy of foreign investment promotion, the annual GDP growth turned positive in 1996 for the first time since independence. A record 10% GDP growth rate was attained in 1998. Therefore, the realisation of sustainable economic development with attention to the environment and integrated environmental management planning is now the aim, before the real economic take-off.

Given these conditions, the government of Azerbaijan requested a master plan (M/P) on integrated environmental management in Baku to be drawn up. In response, the Japan International Cooperation Agency (JICA), Japan's technical assistance implementing agency, decided to implement the study in close cooperation with the relevant authorities of the government of Azerbaijan.

After a competitive tender, JICA appointed Kokusai Kogyo Co., Ltd. as the consultant for the study.

1.2 Scope of the Study

1.2.1 Objectives of the Study

The study aimed to achieve the following objectives:

1. Formulate a M/P on integrated environmental management for Baku city for the target year 2010 and implementation programmes for the selected priority projects.

[1] Information from State Committee of Statistics.

2. Pursue technology transfer on developing the M/P by means of joint work between the counterpart personnel and the Japanese study team.

1.2.2 Study Area

The study covered the area under control of the BCE as shown in Figure 1-1.

1.3 Policies of the Study

The study team carried out the study under the following policies:

- to jointly carry out the study with the C/P;
- to formulate a practical plan;
- to contribute to the sustainable growth of Baku city.

1.4 Work Schedule

The study began in January 2000 and will end in March 2001. The study consisted of the following four phases.

Phase 1: Understanding the Current Condition of the Environment

Phase 2: Field Investigations and Future Scenario Setting

Phase 3: Formulation of Master Plan

Phase 4: Formulation of Implementation Programme for Priority Projects

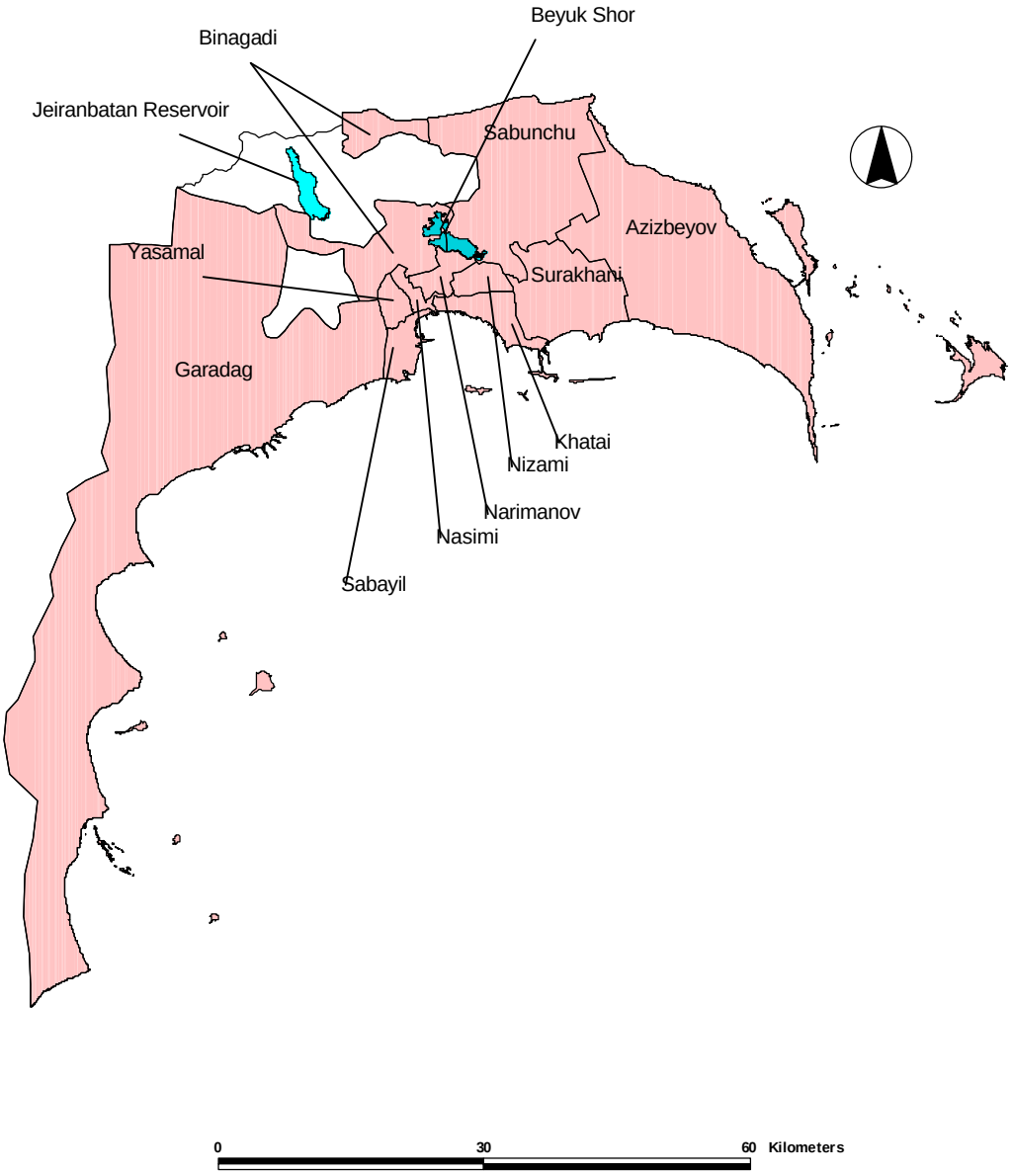


Figure 1-1: Study Area

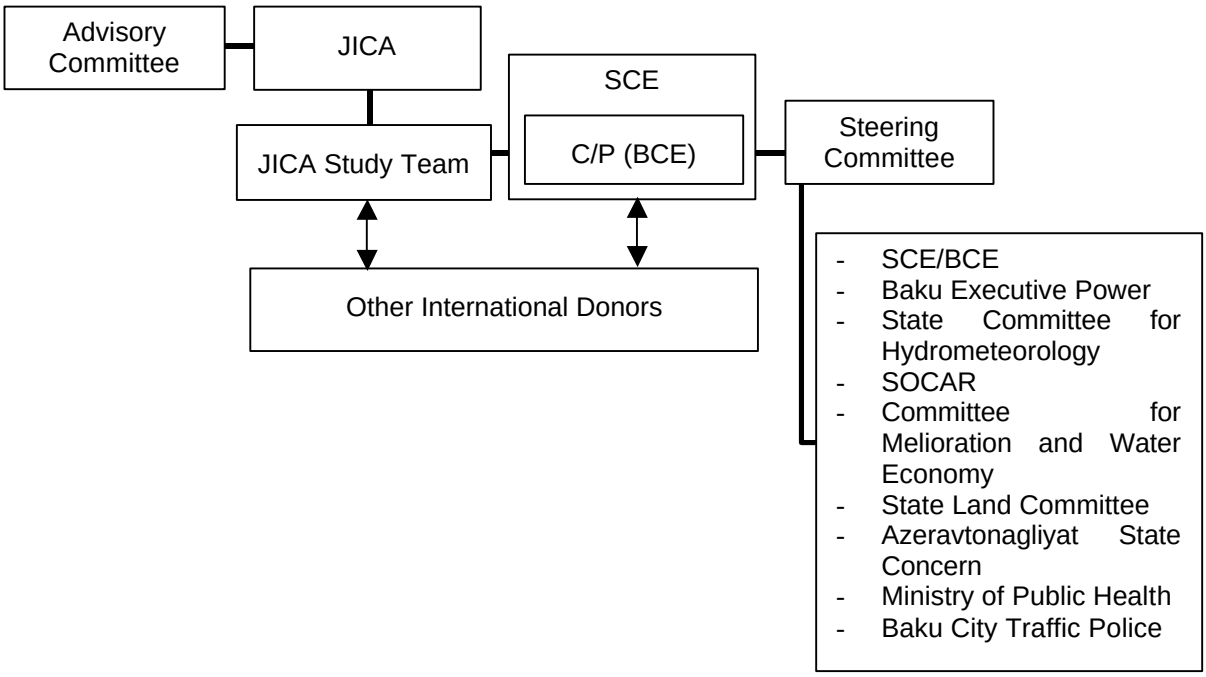
1.5 Study Organisation

The counterpart of the study was the BCE (Baku Committee on Ecology and Nature Utilisation Control), a regional sub-committee of the SCE (State Committee on Ecology and Nature Utilisation Control).

A steering committee was organised with an initiative of the BCE and the SCE involving other state organisations and agencies for overall management of the study. The composition of the steering committee members was determined at the commencement of the study through discussion between the BCE/SCE and the team.

JICA organised an advisory committee that provided JICA with appropriate advice.

The organisational structure of the study was as shown below.



2 Current Environmental Management of the Study Area

2.1 Profile of the Study Area

2.1.1 Administration

a. Administration of Study Area

The country is divided into 65 districts and 11 cities and heads of those 76 administrative units are all appointed by the President. One of the cities is Baku, more often called Greater Baku, and is the capital. The administrative body is known as the BEP (Baku Executive Power). Baku also corresponds to the area under the control of the BCE and the study area. The study area is further divided into 11 districts (see Figure 1-1). Each district has its district executive power office, headed by an appointee of the mayor.

It should be noted that the study area is spotted with a number of small agricultural areas, which are under the control of Absheron executive power and, in terms of the environment, Absheron Committee for Ecology. Such administrative complications often hamper the proper execution of environmental management by the BCE.

b. Municipalities

At present the substance of municipalities is vague. Even higher officers of the central government do not have a clear idea of actual responsibilities of the municipalities. Although the responsibility and status are described in a law regarding municipality, which was published on 12 July 1999, the substance is "enshrouded in mist". It is not yet known how to distribute responsibility and power among BEP, the district executive power offices and municipalities. There are neither premises nor offices for municipalities and generally no staff of municipalities with whom the team could meet to discuss the issues. The proper and actual status of municipalities will be defined as time goes by and as the actual situation evolves.

Therefore, it seems appropriate to consider that the BEP and its subordinate organisations of 11 districts are the administrative organisations to be studied practically, although in the long run, municipalities will gain more presence in environmental management.

2.1.2 Natural Environment

a. Meteorology

Azerbaijan Republic can be divided into five physical-geographic areas, namely Kura-Arak lowlands, Greater Caucasus, Lesser Caucasus, Lenkoran and Nakhichevan areas. The climate of these areas varies. Baku City is located on the Absheron peninsula northeast of the Kura-Arak lowlands, and its climate is semi-arid.

The average temperature in Baku is 26.0°C, 4.0°C and 14.6°C in summer, winter and throughout the year, respectively. Baku's average rainfall is around 200 mm/year, most of which occurs between September and February.

Wind velocity does not fluctuate much and the annual average was calculated at 3.8 m/sec. Wind velocity exceeds 15 m/sec on 60 – 100 days a year.

b. Topography

Baku City can be roughly divided into three sections in terms of topography: eastern plain, western hilly area and western coastal corridor.

There are more than 200 big and small lakes that altogether cover about 50 km^2 and about 50 saline marshes (1,980km^2) on the Absheron Peninsula.

2.1.3 Land Use

In the City of Baku, a vast area (1,324 km^2) is unused open space, which extends to the south-west and east sides of the city. Oil fields (180 km^2) surround the central part of the city and the oil fields are as large as the whole residential area. A large industrial zone exists in the central part of the city (Nizami district and Khatai district) dividing the residential area in two. This industrial zone extends from the Caspian Sea to Bayukshor lake. However, many factories in this industrial zone are not working. In Khatai district alone 30 large factories and 12 transportation related industries have been closed. There are many more small industries which were closed.

2.1.4 Socio-economic Conditions in Baku

a. Population

The integrated population, including refugees and internally displaced population in addition to the census population, of Baku in each district is as Table 2-1.

Table 2-1: Number of Refugees and Internally Displaced Population by District, 1999

	District	Area (km^2)	Population (1,000)	Refugee (1,000)	Internally displaced (1,000)	Total (1,000)	Density (person/km^2)
1	Sabail	28	74.3	4.6	6.9	85.8	3,064
2	Yasamal	16	221.5	1.2	14.8	237.5	14,844
3	Nasimi	10	195.8	14.5	11.3	221.6	22,160
4	Narimanov	25	147.9	17.2	11.9	177.0	7,080
5	Nizami	20	159.1	7.4	12.9	179.4	8,970
6	Khatai	32	215.5	10.2	15.1	240.8	7,525
7	Karadag	1,137	94.3	2.4	8.9	105.6	93
8	Binagadi	162	209.3	15.6	22.2	247.1	1,525
9	Sabunchi	244	188.6	8.3	16.2	213.1	873
10	Surakhani	122	165.8	8.1	12.9	186.8	1,531
11	Azizbekov	396	116.4	1.7	12.1	130.2	329
	Baku	2,192	1,788.5	91.2	145.2	2,024.9	924

Source: State Committee for Statistics, based on census data at the beginning of year 1999

b. GRDP and Industry

b.1 GRDP (Gross Regional Domestic Product)

Azerbaijan estimates the GDP but not the Gross Regional Domestic Product (GRDP). Based on limited statistical data, the concentration of every industry is assumed and

used together with the GDP by industry to estimate the GRDP of Baku City. The result of the calculations made based on the above premise shows a GDP of 44%.

If divided by the Baku City 1997 population of 2,022,100 (including refugees and internally displaced population), the per capita GRDP would be 3,457,000 manat (US$867). (1997 exchange rate: US$1 = 3,986.8 manat)

b.2 Industry

There are no statistical data on the industrial activities in Baku City. The list of enterprises in "Baku Today 2000" (Zaman-i company) was therefore used to determine the industrial activities in Baku City in 1999. According to the list there are 2,067 enterprises in Baku City and only 191 companies are belong to manufacturing sector.

2.1.5 Urban Services

a. Water Supply

According to the Water and Wastewater M/P ("Water and Wastewater Master Plan for Greater Baku, March 1999", WB), 89.3 % of the population in Baku City receive city water in 1997 and the M/P intends to increase the service 100 % by 2015.

b. Wastewater Management

b.1 Domestic Wastewater

According to the wastewater M/P, 78% of the population in the Greater Baku area are connected to the sewage collection system, but only 44 % of the wastewater generated by the population is treated (sewage collection coverage rate 0.78 x sewage treatment rate 0.57 = 0.44). Consequently the great bulk of wastewater in the study area is being discharged untreated either to bodies of surface water, such as the Caspian Sea or lakes, or to groundwater through cesspools or latrines.

The Wastewater M/P aims to raise sewage (domestic wastewater and industrial wastewater treated to an acceptable level) treatment rate from the present 44 % to 100 % by the target year 2015. Once the M/P is implemented thoroughly, water pollution problems caused by sewage, which is currently discharged into natural water bodies, will be resolved.

b.2 Industrial Wastewater

The Wastewater M/P concludes that it is the responsibility of industry to treat its wastewater to an acceptable level. According to the Factories Survey done by the team only 33 % of factories' wastewater is discharged to the sewage system. The M/P supposes 100% of industrial wastewater will be treated by 2015 to an acceptable level for the sewerage system by dischargers.

c. Waste Management

c.1 Municipal Solid Waste

In general almost all population in the city receive refuse collection services. However, it seems to be insufficient, especially in the area other than the core area of the city. In this report refuse is defined as non-hazardous solid waste that can be disposed of at a municipal landfill.

c.3 Medical Waste

- This study defines medical wastes as infectious/hazardous wastes generated from medical care. There is neither a medical waste management plan in the study area nor a plan to formulate one. Based on the medical institution survey, the team estimates that the amount of medical waste generated each day in Baku city is 12,892 kg and of general waste is 20,588 kg in 1999;

d. Transportation

In major cities of FSU countries, a public transport system has been generally well developed. That is the case for Baku, which has bus, tram, trolley bus and metro services. The fares are reasonable and the network is widespread, though the comfort, quality and reliability of the services are not always satisfactory.

2.2 Important Findings in Field Investigations

The study team carried out the following field investigations to fully understand the present environmental management of the study area:

- Mobile pollution source survey;
- Factories (point pollution sources) survey;
- Environmental Quality Survey;
- Opinion survey for medical institutions;
- Public opinion survey (POS);
- Waste amount and composition survey (WACS);
- Survey on recycling activities.

The findings obtained from the field investigations are presented below.

2.2.1 Mobile Pollution Source Survey

- Vehicles coming from the suburbs represent more than 50% of traffic in the city. Consequently, restriction of inbound traffic can be considered as a means of reducing exhaust gas from mobile sources in the city.
- As for the ratio of large vehicles to traffic volume, there are relatively few large vehicles, approximately 5.5%. Consequently, to reduce air pollution from mobile sources, it will be necessary to target emission countermeasures on small vehicles rather than large vehicles.
- The ratio of buses using petrol and diesel is about 50% each. However, concerning trucks, petrol vehicles account for 60.5% and diesel vehicles for approximately 40%. This is extremely remarkable, in comparison with Japan, Europe and North America where most trucks run on diesel.
- As a whole, 74.6% of vehicles measured in this study do not comply with the emission standard of CO in Azerbaijan, currently 2%.

2.2.2 Factories (point pollution sources) survey

- The JICA team could not get any authorised or official list of factories. Therefore the local consultant employed by the team prepared a list of 775 enterprises in the study area. Based on this list we selected 250 factories for the study and conducted the survey. Since a list of enterprises that may affect the environment is essential material for proper environmental management of the study area, we strongly recommend that BCE prepares an official list of factories if available or completes a list based on the identified 775 enterprises.

- Seven items of energy (electricity, gas, coal, LPG, petroleum, heavy oil and thermal energy) consumption were surveyed. Of five items (electricity, gas, LPG, petroleum and heavy oil), current energy consumption is much less than it reported in the passport, especially electricity is only 14.3 % of the passport. This proves the fall in operation rate.

- The three items of air pollutants (SOx, NOx and particulate matter) emission were surveyed. All current air pollutants emissions are less than reported in the passport, especially NOx is only 15.9 % of the passport, while SOx and particulate matter are 97.7 and 79.4 respectively. This may prove the fall in operation rate.

- The current discharge volume of industrial wastewater is only 66.7 % of that reported in the passport. This may be due to the fall in operation rate. The three items of pollutants (BOD, COD and SS) were surveyed and average concentrations of them are also less than those reported in the passport.

- The eight items of industrial wastes (waste oil, oil sludge, non-oily organic sludge, inorganic sludge, waste chemical, burnable solid waste, non-burnable solid waste and other wastes) generation were surveyed. The amount of industrial waste generated in the surveyed factories is 140,000 ton/year in total and 71.5 % of the amount reported in the passport. This may prove the fall in operation rate. 57% of generated waste, 80,000 ton/year, is non-burnable solid waste and 31% 43,000 ton/year is non-oily organic sludge. Waste chemical generation is 9,934 tons/year (7.1% of total) and is disposed or accumulated in the factory because of the toxicity.

- More than half of factories (56.9%) do not know CPT. Factories that introduced the CPT are limited (16.6%). Among them majority (53.6%) introduced it after independence of the country.

- For the implementation of environmental conservation measures or improvement of existing facility the majority (71.2%) need to have financial support from the government (full support 38.4% and partial 32.8%). Regarding the governmental support for the improvement of environmental conservation facility the most important issue is technical assistance and advice for the improvement; as half of factories (49.6%) indicated. Following the technical assistance and advice, 34.0% pointed out soft loan and 28.4% provision of technical information for the improvement.

2.2.3 Environmental Quality Survey

- Three factories were selected and pollutants generated at factories including industrial waste, gas emission and wastewater were sampled and measured to assess the data validity of the environmental passport. The industrial waste generation amount has tremendously reduced in recent years presumably due to the drop of operation ratio. Regarding gas emission the team could not see any remarkable difference between the figure observed and that reported in the passport. Current concentrations of BOD in wastewater from factories are higher than those declared in environmental passport while the concentration of the SM (suspended matter) at three factories is lower than that in the passports.
- According to the survey conducted on sediment and water quality of the lakes, in and around the city, many are severely contaminated due to their history of being used as wastewater receptors from households, industries and oil fields.
- As for the Jairanbatan reservoir, a major drinking water source for the city, as far as the study results suggest, the water contamination is not very serious. The current land use in its watershed is, however, threatening the water quality. Water quality monitoring in and around the reservoir should be started.

2.2.4 Opinion survey for medical institutions

- The team conducted an opinion survey of 40 medical institutions in the study area. Based on the unit generation rate obtained by the survey, the team estimates the amount of medical waste generated in the city as follows:

Category of waste Year	Medical Waste (ton/day)	General Waste (ton/day)
1999	12.9	20.6
2010	15.0	23.9

- There are still medical institutions in Baku city that mix medical waste and general waste because it is troublesome to separate them, and the efforts of preventing the spread of toxic chemicals and pathogens are insufficient;
- The fact that at the discharge stage, many institutions mix medical waste, which had been separated during in-house collection, is a cause for concern. Sterilized materials might end up being mixed with untreated medical waste, which carries the risk of increasing contaminated waste;
- 50% of the surveyed medical institutions pay a collection fee for medical waste, and 73% for general waste. It would be natural to have a higher fee for the collection of medical waste, which entails risks, but this trend does not appear in the survey results;
- The willingness to pay a fee corresponding to appropriate collection, treatment and disposal of medical waste is extremely low. In addition, the fee that some institutions are willing to pay for this service is even lower than the fee that they are currently paying.

2.2.5 Public opinion survey (POS)

- Most of dwellings and offices are equipped with the necessary urban infrastructure (city water, sewage, refuse collection and electricity). However, stable water supply and uninterrupted electricity supply are the most concern for the people. And they think responsibilities of those services lies with the Government, especially in the executive powers.
- Around 20 % of people were not paying service fees for water, sewerage and waste collection. There are several reasons for not paying but principally is that it is exempted due to pensionary, war participants and so on.
- A majority of the population obviously express concerns about ecological problems that can affect their daily life. Priorities are put on problems of air pollution, water pollution and water deficiency. The population also insisted on the necessity of early countermeasures to those issues.
- Though a majority of the population (more than 80 %) are willing to take part in solving ecological problems, which have a negative impact on their life, willingness to pay for service improvement is weakly expressed. Preference is given rather to the measures that are not connected to the financial charges: participation in greening territory and realisation of control of environmental conditions.
- The survey clearly shows the reluctance of the population to cover part of financial expenses under the hypothetical situation of improved urban services. It is very likely that this is because of limited budget allowed for the families. Monthly expenditure for around 70 % of the families is less than 400,000 manat (around 90 US$/month).
- Regarding government budget allocation to be increased, in the opinion of the people, the budget for supporting of the state staff and national security are the top and second priority. Social welfare is third.

2.2.6 Waste amount and composition survey (WACS)

- The WACS identifies the ratio of household waste discharge is much lower than other economically comparable countries, probably due to housing style (majority are multi-family building without garden, etc.) and economic recession: 245 g/person/day. Based on the results the team elaborates a draft waste streams of both year 2000 and 2010 as shown in the figures below. It should be recognised these flows were based on various assumptions. Industrial waste and construction waste, which seem to be a considerable amount, are not included.
- The WACS also provides a current household waste and MSW compositions. Comparing with MSW compositions of other countries a future MSW composition of the Baku city in 2010 is predicted as shown in the table below.

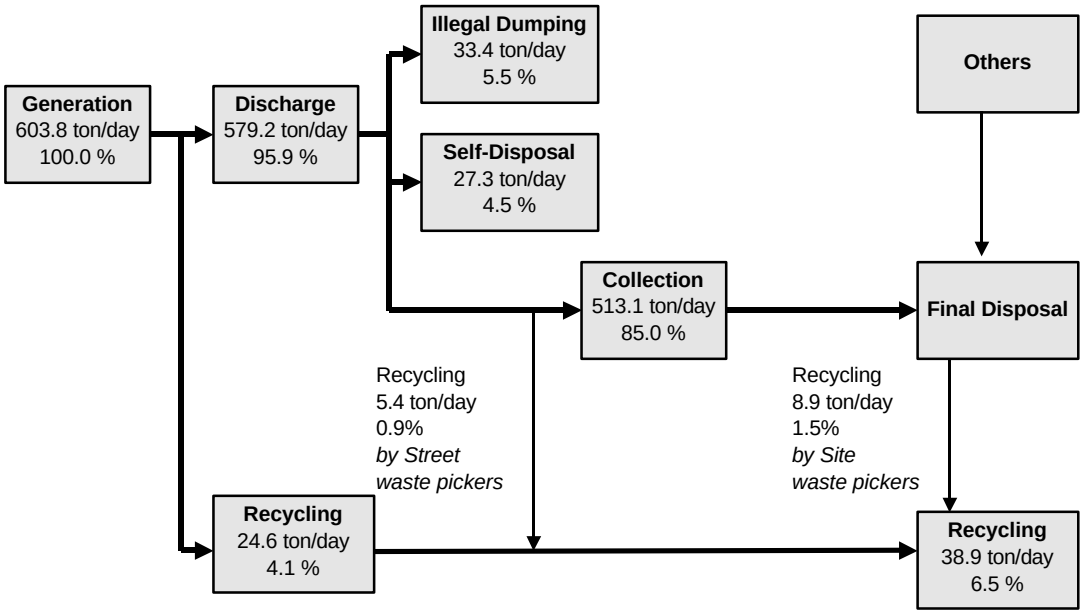


Figure 2-1: Waste Stream in 2000

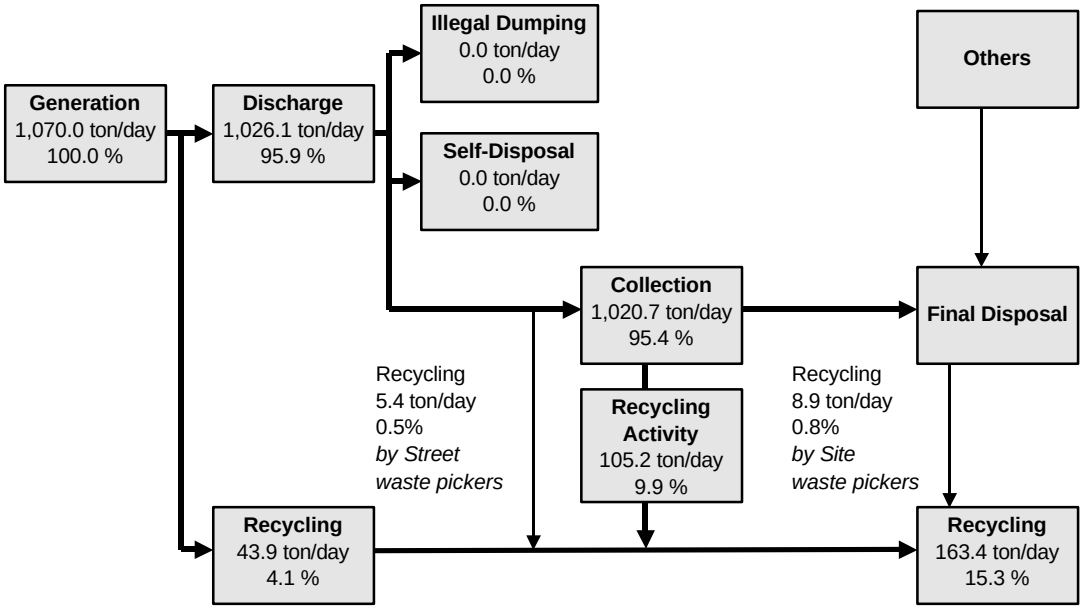


Figure 2-2: Waste Stream in 2010

Table 2-2: Waste Composition in 2000 and 2010

Type of Waste	Year 2000			Year 2010		
	MSW (%)	Total Discharge Amount (ton/day)	Discharge Ratio Per Capita (g.)	MSW (%)	Total Discharge Amount (ton/day)	Discharge Ratio Per Capita (g.)
Population (person)	2,051,600			2,357,600		
Kitchen Waste	51.8	312.9	152.5	46.8	500.8	212.4
Paper	11.1	67.0	32.6	15.0	159.6	67.7
Textile	3.3	19.9	9.7	2.1	22.9	9.7
Grass and Wood	4.5	27.2	13.3	2.9	31.4	13.3
Plastic	9.2	55.5	27.1	12.4	132.4	56.2
Leather and Rubber	0.9	5.4	2.6	0.6	6.1	2.6
Combustibles	**80.8**	**487.9**	**237.8**	**79.8**	**853.2**	**361.9**
Metal	2.5	15.1	7.4	3.4	36.3	15.4
Bottle and Glass	8.7	52.5	25.6	11.7	125.1	53.1
Ceramic and Stone	5.3	32.0	15.6	3.4	36.8	15.6
Miscellaneous	2.7	16.3	7.9	1.7	18.6	7.9
Non-combustibles	**19.2**	**115.9**	**56.5**	**20.2**	**216.8**	**92.0**
Total	100.0	603.8	294.3	100.0	1,070,0	453.9

2.2.7 Survey on recycling activities

Although the survey could not cover all types of recycling activities due to refusal for cooperation of some enterprises, it finds out total amount of recycling 38.9 ton/day.

The recyclable items are limited. At present major recycling items are non-ferrous metals and glasses in the form of bottle. Recycling of ferrous metal and paper, which are major recycling items in other country in terms of amounts, is very limited due to the absence of final users after the collapse of the FSU.

A compost plant was constructed in Baku in the Soviet era, but did not succeed because mixed waste was fed in and compost products contained a lot of impurities such as glass and metals.

2.3 Key Environmental Issues

2.3.1 Environmental Status

The total volume of harmful airborne pollutants from stationary sources has significantly decreased since the independence of the republic, corresponding to the drop in operation rates of industries since the independence of the republic. Without due attention to the environment or necessary anti-pollution facilities, but with

inefficient and obsolete production machinery, however, the pollution load per unit of production is high. Many old and ill-maintained vehicles are deteriorating air quality, although at present only in limited places such as bus stations and major road intersections.

The Absheron peninsula does not have its own water source. Almost all water necessary in the peninsula, either for domestic use or productive use, has been drawn from outside for a substantial time, resulting in a huge amount of wastewater to be discharged in Baku. Many lakes in Baku were thus created and are still receiving wastewater from households, industries and oil extraction. Not only the bad quality of lake water but also the risk of flooding due to increasing wastewater inflow are the key concerns. The shore along the Caspian Sea is also seriously polluted. Baku Bay is highly contaminated with oil compounds in particular.

Oil extraction with negligence for the environment for over a century has left more than 10,000 hectares of land contaminated with oil. Hazardous material left in abandoned factory premises is another threat to soil contamination.

2.3.2 Environmental Policy

The policy-making activities at SCE and BCE levels are inefficient and ineffective, but it is important to recognise that there are several causes for this:

- there is a lack of reliable, relevant and consistent data concerning the environment. The information which is received is typically late, restricted or suffers from inadequate measuring equipment;
- the SCE is not strong enough compared with the sectoral ministries;
- there is an unclear regulatory framework and a lack of effective enforcement at local levels;
- policy, production and enforcement are frequently vested in one organisation, posing conflicts of interest;
- there are many instances of shared, duplicated, absent or unclear responsibilities;
- there is an insufficient budget to permit the formulation *and implementation* of any new environmental policies;
- the potential for NGOs and other organisations to assist in environmental management has not been fully used within the BCE area.

It is also important to note that the BCE has no experience of policy formulation and implementation. The administrative and governmental systems have not encouraged this approach but only a tactical, responsive style of environmental management, dealing with problems after they occur.

2.3.3 Environmental Institution

a. Organisation

The SCE is the body formally responsible for the environmental management in the Azerbaijan Republic and the total staff of it is 1,278. The current SCE requires major

restructuring in order to enable the significant environmental management task facing Azerbaijan today to be met. The World Bank has identified the SCE as one of the pilots for a wider-ranging governmental reform programme. The WB is considering the structure of a technical assistance programme to enable the SCE to make the desired changes and is starting to address this issue with the Office of the President. The newly reorganised SCE (probably as a ministry) will be responsible not only for policy development, but also for ensuring its adoption into the appropriate legislative framework.

Clearly, whatever structural and institutional changes occur, there will be significant implications for the regional offices, including the BCE, which covers the largest population in the Republic. These bodies will become responsible for more effective, efficient and equitable implementation of environmental management, including pollution control, local policy development (and informing the SCE/Ministry of policy implications and development issues) and enforcement.

The Baku Committee is organised in the traditional soviet style and has 89 staffs in total. All authority rests with the Chairman, who reports to the State Committee

The organisation structure has recently been reviewed following institutional development proposals presented to the State Committee, but reporting relationships within this new structure have yet to be defined.

The indicated structure for the proposed Ministry of Environmental Protection (MoEP) should, in due course, be mirrored within the BCE and will require the development of a range of management and technical skills not currently available within the committee, in order that the BCE can deliver the ministerial mandate.

That structure, as currently proposed, has two major elements:

- a policy planning and coordination unit;
- an environmental compliance unit.

The BCE would be part of the latter division, but would be required to assist in policy formulation.

There would be closer formal links with the district and city authorities within the area covered.

At present, there is no agreed timescale for these changes, but in any event, the new (May 2000) structure should be regarded as an interim arrangement.

b. Legislation

b.1 Legislation

The BCE is established as a State body subordinate to the SCE and responsible for application of all environmental legislation within the Baku area.

As with many governmental charters, the description of responsibilities does not translate into activities “in the field”. The charter gives the BCE authority over productive, governmental and ministerial bodies in environmental matters

Superficially, the charter is a comprehensive document, having the force of law. It does however confine the BCE’s area of activities to monitoring and control of environmental matters and development of the standards and norms to support this.

As with the SCE charter, it does not appear to require the BCE to develop policies in any area of activity.

The BCE will require assistance to develop a new charter in the event the transition to ministerial status is accepted.

b.2 Enforcement

The charter of the BCE states clearly that there are a number of enforcement tools available. In the first instance, the BCE should concentrate on information and education as the means to ensure compliance with regard to good environmental practice. Only when that approach has failed, should the BCE resort to fines and other penalties.

Amongst other duties, the BCE is responsible for collection of charges and fines for the discharge of polluting substances, for the disposal, storage and burying of waste (polluter pays principle). Historically, these fines and charges have been used by the SCE and formed an environmental fund. However, since 1998 money collected has been transferred to the State budget.

Compliance with regulations and norms is mandated in detail. However, in Baku as nationally, the imposition of fines is at a very low level.

c. Financial System

c.1 Azerbaijan Financial System and Budget for SCE

In 1999, the central government revenue amounted to 2,748.4 billion manats (**US$667 million**), 85% of the initial target. One the other hand, an expenditure of 3,208.0 billion manats has resulted in a shortage of 459.6 billion manats (US$112 million). This amount corresponds to 2.8% of GDP.

The budget of the SCE/BCE is very limited at present and there are three budget sources. Aside from the *general budget*, which is allocated from the central government, SCE/BCE has an *off-budget* source that is a measure of its degree of self-sufficiency.

The *Environmental Protection Fund* is considered a separate account, little of which, however, is used for environmental purposes.

The 1999 budget of SCE was 3,159 million manat (**US$767,000**), only 0.1% of the central government budget. The off-budget resources total 14% of the overall budget. The SCE budget also covers the BCE general budget.

c.2 Budget for BCE

The total budget of BCE in 1999 was 426 million manat (**US$103,400**), only 13% of the SCE budget. The off-budget resources are approximately 30% of the overall budget.

The BCE has several problems: small absolute budget amount, difficulty in securing most of the investment fund (personnel expenses, including social insurance, amount to 67% of the budget), incapability of managing natural reserves. The average wage (1999) in the public sector is less than half of the private sector (412,000 manat/month) at 166,000 manat/month, and this low wage level results in low motivation.

Revenues from services rendered to enterprises provide the funds necessary for other expenses excluded from the budget. Nonetheless, the lack of transportation limits the range of services that the committee can offer.

Even with the Environmental Protection Fund, the BCE collected only a total of 154 million manat in the first three quarters in 2000, which was merely 35% of the billing amount. The absence of a ledger system results in time spent tracing the source of money received.

d. Land Use

The land use plan of Baku City is said to be under on-going preparation, but it is not currently in progress due to a budgetary restriction.

It is essential to prepare a competent land use plan, which is authorised by the city for the enforcement. The land use plan should be open to the publicand be available and accessible without difficulty. A development permit or a building permit should be given *only* according to the land use plan. The procedure of development permit should be clear and open, as well as the land use plan. There should not be many (if any) exceptions. Both city officials and developers should well understand and observe the aims of the land use regulation plans.

In soviet times, BCE's permission was required for a development permit by regulation, but since the break-up of Soviet Union, followed by the independence of Azerbaijan, this practice has been ignored. However, the BCE should be more involved in land use plans to express its recommendations from environmental consideration for more environmentally sound land use

2.3.4 Technical Management

a. Monitoring System

a.1 Institutional Issues

Monitoring must include environmental quality management based on collected information, and the obligation and power to execute monitoring reside in the SCE.

At present, however, the task of the SCE is largely confined to the control of pollutants discharged to the environment and they do not pay adequate attention to the status of the environment, which is the consequence of pollutants discharge. As far as the SCE bears responsibility for conducting monitoring, it should be obliged to guarantee clean environmental media, such as air and water, for the general public.

There are three major issues to be addressed that hinder the SCE from complying with its responsibility of monitoring.

a.1.1 Issues which hinder the SCE's monitoring

i. Duplication and complexity of laboratories

The collapse of Former Soviet Union (FSU) has left behind many laboratories, which carry out environmental quality analysis, and a number of experienced scientists. The Academy of Sciences has several institutes, each of which has its own laboratory and highly skilled staff. There are also laboratories within the Caspian Inspectorate under the SCE, Hydromet, and the BCE.

As a result of the duplication and complexity of laboratories, huge collection of data, which have been collected by well-educated personnel, are held by different organisations.

ii. Data collection without objectives

Data used to be collected according to directions and principles formulated in Moscow. Now that the decision flow from Moscow is cut off, the laboratories are simply following their old practices, still continuing analytical works without particular objectives.

Data collected without any purpose have been unfortunately simply accumulated and not been utilised.

iii. Charges for data

The loss of links with Moscow also implied to the laboratories that they had to be economically independent. Azerbaijan, however, encountered severe economic difficulties after its independence and financial conditions of the Azerbaijan Government was too tight to support the activities of laboratories financially.

The data previously collected by the laboratories turned to be a means of self-support. In general, no data is accessible without payment. The governmental organisations, however, can not afford to obtain data, resulting in a total lack of data-sharing.

a.1.2 Factors for Change

Since data are dispersed, closed and costly, the SCE is not able to understand the environmental status, which should be a prerequisite for environmental monitoring. There are, however, two factors that could bring about a positive change to the SCE:

- maximising the potential of the existing resources is one of the optimal approaches to be taken. Considering the weak financial basis of each laboratory at present, the integration of the existing resources will be the most realistic and prudent decision;
- there is a plan to transform the SCE to a new Ministry of Environmental Protection (MOEP) by combining the environmental measurement functions of Hydromet. When it is put into practice, the laboratories of the Caspian Inspectorate and Hydromet will be put together under the MOEP.

a.1.3 Team's View

In the view of the JICA team under the circumstances as above, the unification of the laboratories of the Caspian Inspectorate and Hydromet and upgrading the integrated laboratory to create a new comprehensive laboratory within the MOEP will be the best practical option.

The creation of the MOEP laboratory, which would be called "Central Laboratory", will give such benefits to the MOEP, and to the environment, as below:

- all components necessary for the execution of monitoring including environmental quality measurement, data integration, data utilisation and reflection of data to environmental quality control come together under the jurisdiction of the MOEP;

- expertise raised in the current laboratories can be utilised for a specific objective of environmental management and will be further developed;
- the concentration of laboratory works will enable the efficient allocation of budget.

a.1.4 Function of the Central Laboratory

The Central Laboratory of the MOEP should play a leading role in developing an environmental quality monitoring system throughout the country and should be equipped with a range of analytical equipment.

The Central Laboratory should functions as follows:

- monitoring planning;
- research and development;
- quality control of laboratories in the country;
- education and training;
- analysis of samples;
- data evaluation.

The next question will be what the relationship between the Central Laboratory and the BCE will be. The BCE should take responsibility to monitor environmental quality in its territory and therefore needs analytical equipment. Although the BCE may have a new laboratory, the Central Laboratory should also work as a regional laboratory for the BCE. The functional structure of the Central Laboratory is schematically shown in Figure 2-3

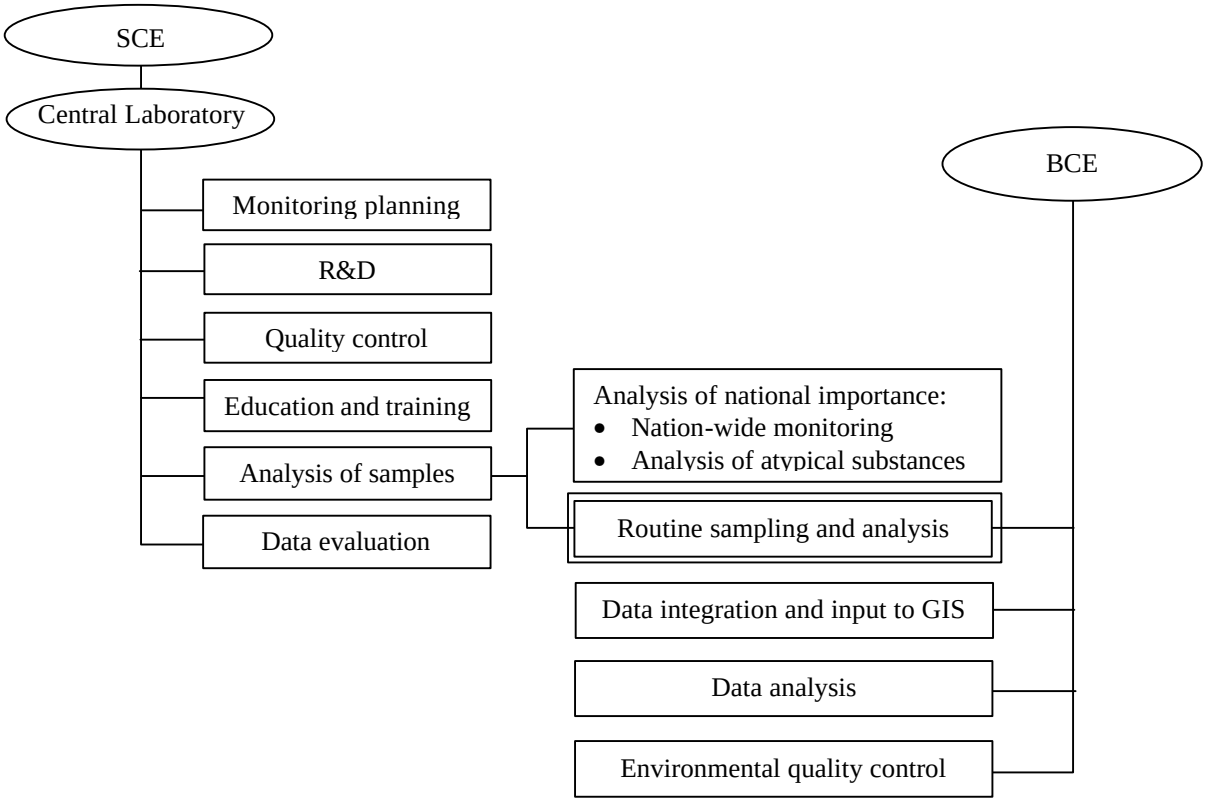


Figure 2-3: Function of the Central Laboratory and Relationship with the BCE

a.1.5 Data Management

On the establishment of the MOEP, data acquisition will be considerably improved since necessary data will be collected by its own staff. In order to assess environmental quality in the past and understand the trend of environmental quality, however, the MOEP still needs to get data from other institutions. Furthermore, other laboratories, such as those in Academy of Sciences, will continue to be in important positions in environmental quality analysis. They and the MOEP should complement each other. A system for data exchange among the relevant organisations is an urgent necessity.

All citizens should have a right to claim a healthy and clean environment: the currently active and prospective business entities should know what the environmental status is near their operation areas. Therefore, the data of the MOEP should be accessible to the public, and the GIS that is being developed in this project will be a useful tool by which the data can be presented through the internet.

a.2 Technical Issues

a.2.1 Air Quality Monitoring

Vehicle transport will become a main culprit of air pollution, as the economy develops. The current air monitoring system, however, does not have enough monitoring stations to monitor air pollution caused by mobile sources, and pollutants specific to vehicle emission are not well monitored.

Among the nine stations, a monitoring station near the Ishaalchar subway station in Yasamal district is the only station where direct impacts of vehicle exhaust gas can be monitored. The team recommends adding one monitoring station along a road with heavy traffic in order to raise the confidence of monitoring data. Furthermore, some other parameters specific to vehicle pollution, namely hydrocarbon, and suspended particulate matter, should be measured additionally.

The remaining eight stations, located some distance away from roads, monitor general air quality background and are generally adequate. A minor problem is wind speed and direction, measured at the monitoring stations near the Baki Soveti subway Station, Moscow Avenue and Babek Avenue, since these sites are surrounded by tall buildings and wind measurement is erroneous. Wind speed and wind direction should be measured at open places near those sites.

The photochemical oxidant is a secondary pollutant which is formed by photochemical reactions between hydrocarbons and nitrogen oxides. Generally hydrocarbons arise from traffic, but in some places in Baku, the principal source of hydrocarbons may be oil extraction.

a.2.2 Water Quality Monitoring

In monitoring lakes and canals, it is necessary to examine the possible impacts of water pollution on people, groundwater, crops, fauna and flora; to clarify the objective to monitor those water bodies; to locate monitoring points that well represent the appropriate bodies of water; and select appropriate monitoring items. In this process, particular attention should be paid to the purpose for which the water is used.

A possible constraint on water quality monitoring in the study area is that different authorities are involved in the control of bodies of water such as lakes, canals, sea, and a potable water source. As departments collect water quality data and keep the data to themselves, it is costly and time consuming to access, exchange, interpret, and analyse data. Under such circumstances, it is difficult to develop practical policies that accurately reflect the status of the actual water environment in the area. Therefore, the promotion of data sharing is vital and the GIS will be a valuable tool.

Although the Jeiranbatan reservoir is out of the study area, it is necessary to develop a water quality management plan for the reservoir using the following components:

- geological investigation in its watershed;
- study on land use in its watershed;
- identification of sources and causes of pollution;
- development of land use control measures to protect water quality.

a.2.3 Soil Quality Monitoring

The action against oil contamination should start with the examination of existing data. The release of data is a prerequisite.

There is an urgent need to understand what sorts of toxic substances are left, to what extent and where they are. The possibility of soil contamination should be assessed by reviewing the operational history of each factory. An inventory of factories with a risk of soil contamination has to be developed by starting with those with higher risks. Policy decisions must be then made on control measures, reflecting the significance of contamination for human health and natural assets.

Although the pesticide disposal site is out of the study area, the team considers that there should be signboards to notify people of danger and the site should be enclosed by fences.

b. Pollution Source Control

b.1 Factory

b.1.1 General

Due to the collapse of FSU, Azerbaijan's industry lost economic ties with its clients, resulting a significant drop in operational rate of factories. The physical volume index (PVI)[2] in 1998 is 31.8% of that in 1990. The oil industry and power sectors show relatively good PVI figures, 65.9% and 61.0% respectively, while the PVI of the other industries is below 25%. Industrial restoration is one of the foremost matters of importance for the country, but it will be only possible - not by the rehabilitation of existing obsolete and inefficient facilities - but by its regeneration.

The fall in operational rate, which signifies economic depression, has brought favourable conditions in terms of the environment. Assuming that the amount of emitted pollutants is in proportion to the operational rate, the current pollution level will be one third of its peak. This further implies that the pollution abatement cost currently needed would not be very high.

b.1.2 Environmental Conservation Measures

[2] Statistical Yearbook of Azerbaijan 1999, State Committee for Statistics.

Environmental conservation measures are classified into **upstream measures** seeking to reduce or prevent the generation of polluting materials and **downstream measures** seeking to convert those polluting materials, which are inevitably produced, to harmless ones.

The upstream measures are further divided into:

- use of energy and raw materials with little pollutants;
- improvement of the efficiency of resources use. Improving efficiency of raw material use can not only contribute to reduce the generation of the waste but also contribute to improve the productivity of the factory in many cases. Improvement of water use reduces the volume of wastewater.

The downstream measures are further divided into:

- treatment in the factory itself.
- treatment in collective facilities such as wastewater treatment in sewage plants.
- remediation of the polluted sites.

There are various countermeasures from upstream to downstream. In general upstream measures are more cost effective than downstream measures and contribute to the improvement of the productivity of the factories in many cases.

b.1.3 Current Pollutant Emission

i. Air Pollutant

Sulphur oxides

Sulphur content in heavy oil used in Azerbaijan is substantially low and gas fuel is also widely used in the factories. This is actually an absolute advantage over most other industrial cities. Therefore, boilers at factories and power stations are not equipped with sulphur removal units and they do not, generally, need them.

According to the Factories Survey, the maximum concentration of sulphur oxides (SO_x) emission is 309mg/Nm^3 and the average concentration is 67 mg/Nm^3. This low level concentration without any countermeasures is largely due to low sulphur content in fuel. The maximum concentration of emission, 309mg/Nm^3, needs to be reduced by installing an exhaust gas treatment facility if an emission standard in the most strictly controlled areas in Japan were applied. However it is slightly higher than the maximum allowable emission level of EU, 300mg/Nm^3.

Nitrogen oxides (NO_x)

There are almost no devices to control nitrogen oxides at the 19 factories visited by the team. According to the Factories Survey, the maximum emission concentration of nitrogen oxides (NO_x) is 160mg/Nm^3 (110 ppm) and the average one is 17mg/Nm^3 (12 ppm). In Japan an allowable emission level is stipulated in volume and ranges between 60 – 800 ppm depending on the area. The maximum concentration of Baku (in weight) is equivalent to 110 ppm, which needs to be equipped with an exhaust gas treatment facility in some area (160mg/Nm^3 x 22.4 ltr/32.6 = 110 ppm). However, the average NO_x concentration in Baku (17mg/Nm^3 is equivalent to 12 ppm) is much lower than the allowable emission level stipulated in Japan.

Particulate Matters (Dust and Soot)

According to the Factories Survey, the maximum emission concentration of dust is 207mg/Nm^3 and the average is 14mg/Nm^3 In Japan the maximum allowable concentration is regulated in weight and it ranges between 30 - 500mg/Nm^3 according to the facility type and emission gas volume. For instance, the maximum allowable concentration for a cement production furnace is 100mg/Nm^3 (and 50mg/Nm^3 for the most strictly controlled area) and that for a waste incinerator, emission gas volume of which is more than 40,000mg/Nm^3/hour, is 150mg/Nm^3 (and 80mg/Nm^3 for the most strict area) Taking the current dust and soot emission in Baku into consideration dust and soot collectors with high performance such as electrostatic precipitators or bag filters are recommended to be introduced in the factories which deal with powdery materials.

ii. Industrial Wastewater

According to the Factories Survey, there are 199 wastewater discharge sources (factories) and the total volume is 17,800 tons/hour except cooling water with no pollution. Of this volume, 33% of it (107 wastewater, 5,800 tons/hour) is sent to sewage plants. Maximum concentration of pollutants of the water is 381mg/litter for BOD, 513mg/litter for COD and 535mg/litter for suspended solid. A common sewage plant with biological treatment process can treat this concentration level if the wastewater does not contain harmful materials.

On the other hand, 60% of wastewater discharge sources (46 wastewater, 10,700 tons/hour) are to public water bodies. It is necessary to monitor the quality of them.

Azerbaijan already employs a system in which industrial wastewater is pre-treated at factories and collected to sewage treatment plants for final treatment, although the system requires further improvement. Problems may arise, however, if the enforcement of pre-treatment at factories is weak, or if cost sharing lacks fairness.

iii. Hazardous Waste (HW)

According to the Factories Survey, most of the factories (77.9%), which produce HW, treat/dispose HW within their compound. When asked about future HW management, most of the factories (72.6%) that produce HW answered that they will continue to treat/dispose HW within their compound. Very limited number of factories (14.4%) stated that they may entrust treatment/disposal works to a waste disposal agent.

From the economic and technical point of view, however, it is preferable to pre-treat and dispose of the HW by a centralised system except for some types of specific waste. The promotion of enterprises, which are specialised in HW treatment and disposal, will be necessary.

iv. Pollutant from Oil Mining

Pollutants generated by oil extraction are mainly volatile organic compounds (VOCs) together with carbon monoxide, wastewater and oil sludge.

VOCs are released to the air directly from oil wells, but also during the oil-water separation process. Oil-water separation is at present operated in the open air, but it will be worth examining the recovery of hydrocarbons by enclosing the process. Oil content in wastewater should be reduced by upgrading the efficiency of oil-water

separation. Oil sludge must be collected periodically, and it is recommended that the oil content in the sludge is recovered and the remainder purified.

b.1.4 Environmental Management System at Factories

According to the 250 Factories Survey, most of factories surveyed (85.6%) replied that they have made effort to reduce adverse impacts on the environment. However, more than half of factories (56.9%) do not know of CPT (cleaner production technology). The factories that introduced the CPT are limited (16.6%).

The anticipated growth of exports to the European market will require enterprises to develop an environmental management system that complies with worldwide standards. The standard, ISO14001, includes not only traditional pollution control but also energy saving and efficient use of resources measures. Environmental management stipulated in ISO14001 must include the rigid execution of four steps (environmental management planning, implementation of the plan, check on activities, and modification of the plan) and continuous improvement of the system.

Most of the 19 factories that the team visited have staff specifically in charge of the environment, even the factories which had stopped their operations. This suggests that there is a foundation within the factories to foster their environmental management systems.

b.1.5 Environmental Impact Management by Factories

i. Current Methodology

The control of air pollution caused by air emission from a factory is based on a diffused concentration control method, by which the factory applies a diffusion model in omni-direction to major pollutants and forecasts environmental impacts in its surrounding area. They have to consider the consequence of their air emission, taking account of not only the ground level concentration of pollutants from them but also the background pollution level.

On the other hand, industrial wastewater is, in general, controlled by pollutant concentration. This ensures fairness among pollution dischargers, but requires additional attention to total pollution load to the environment.

ii. Future Environmental Impact Management

Environmental impact management in the coming decade in Baku must reflect the current trend towards privatisation. Companies, once privatised, do not act complementarily as under the planned economy but turn to become competitors providing similar services. Therefore, environmental control over the factories has to be fair and transparent, and pollution control requirements must be clear enough to make all factories consent.

Considering such a change of business, air pollution control should more depend on discharge concentration control than diffused concentration control. As for wastewater discharge control, the current control method will not need any major modification since it mainly take discharge concentration into account.

Control of concentration of air emission and wastewater discharge, however, limits the environmental obligation of factories only up to their outlets of pollutants and their attention to the regional environment cannot be expected. Instead, an

environmental authority has to take the responsibility to monitor regional environmental quality and enforce concentration control at pollution sources from the wide viewpoint of the regional environment.

b.1.6 Environmental Control of Factories by BCE and SCE

The JICA preparatory team, dispatched in August 1999 prior to the current study, reported that factories in Baku need to submit documents called "environmental passports" containing information on their environmental control, and that the BCE keeps more than 1,000 environmental passports.

The JICA study team, however, found that the responsibility for keeping the environmental passports had been shifted from BCE to SCE, and neither BCE nor SCE actually keep environmental passports, their summaries, or even a list of factories under their control. In other words, there is no authority that grasps the overall status of pollutant generation in region. The reason for this situation is that the responsibility to control influences by productive activities on the environment was by and large entrusted to factories.

As privatisation is promoted, however, pollution control at source is not enough and it is necessary to develop an environmental management structure that covers an entire region. For this purpose, the BCE or SCE should develop a list of factories operating in their jurisdictions, categorise them by type of operation, and periodically obtain data of pollutant discharge from them. The team recommend the BCE to develop a database for proper control of point pollution sources (factories) based on data obtained by the Factories Survey conducted by the team.

b.2 Mobile Pollution Sources

Control of mobile pollution sources is the responsibility of the Ministry of Internal Affairs and the Police, and monitoring of air pollution by the mobile sources is the responsibility of the BCE. The BCE should request the Ministry of Internal Affairs to fully accomplish its work of exhaust tests and send the results to the BCE.

Traffic jams seem to be one of the contributors to air pollution. Illegal parking is hindering traffic, causing vehicle congestion. Vehicles' frequent stopping and starting results in a large amount of emissions gas. It is essential to develop a plan to ease traffic jams in the city in order to smooth traffic flow so that gas emission is reduced and ambient air in the roads is well mixed and diffused.

b.3 Wastewater

b.3.1 Sewage

The Wastewater M/P aims to raise sewage (domestic wastewater and industrial wastewater treated to an acceptable level) treatment rate from 44 % at present to 100 % by the target year 2015. Once the M/P is implemented thoroughly, water pollution problems caused by sewage, which is currently discharged into bodies of water inland and in the Caspian Sea, will be resolved.

The M/P report estimates the total capital investment required is US$ 1,131 million. However, the report points out the following:

- the total capital expenditure required is much greater than is affordable given the current levels of wastewater tariffs and revenue collection;

- it will therefore be necessary to curtail significantly the programme shown in the M/P and to prioritise investment over the next 15 years;
- capital expenditure should therefore be concentrated on measures that will eliminate flooding in Baku city and the current gross pollution of the harbour.

b.3.2 Industrial Wastewater

It is currently the policy that industry is responsible for treating its own wastewater, and this should continue. According to the Wastewater M/P, by 2015 all industrial wastewater should be discharged to the city sewerage and treated at the wastewater treatment plant, together with domestic wastewater. Therefore the industry is obliged to treat its wastewater to an extent that is acceptable to the city sewerage. The M/P, however, does not include an industrial wastewater treatment.

b.4 Municipal Solid Waste

There are no MSWM M/Ps for the whole study area. In addition, no authorities identify factors crucial for proper MSWM, such as generation and disposal amounts of MSW.

There are four authorised but non-sanitary disposal sites in the study area. Balahani and Lokbatan disposal sites operated by UPA and KASCO-RCP respectively charge for tipping and others are free. There are, however, 800 to 850 illegal dumpsites (the area of which is 200 to 250 ha in total) according to a report made by an inspector of the BCE. It is clear that this large number of illegal dumping sites results not only from a reluctance to pay for tipping and transportation to the disposal site, but also insufficient refuse collection services.

Except in the city centre, illegal dumping is found everywhere, including in a natural monument area such as Yasamal valley. It denigrates the landscapes of the city and even threatens the health of citizens, because some illegally dumped waste may contain hazardous substances. The inspectors of BCE know the sites, but in practice, all they can do is to ask the district offices to clean them up.

Baku EP intended to strengthen MSWM capacity through the privatisation of collection and disposal operations. UPA obtained the concession for nine districts in 1998 but they are operating only in Narimanov district as at May 2000, due to financial problems mainly caused by an insufficient refuse collection fee. KASCO-RCP, the contractor for Yasamal and Sabayil districts, cannot provide sanitary landfill operations due to financial constraints as well.

There were well-established recycling systems and markets for recyclable wastes before 1991 in the Former Soviet Union (FSU). However, the collapse of the FSU resulted in the absence or insufficiency of final users of recycled materials in Azerbaijan. Without sufficient final users, the recycling system and market for recycled materials such as paper, plastics, textiles and metals were seriously damaged, although recycling of waste is the most desirable way of MSW disposal.

In order to establish a sound MSWM system in the study area, the team recommends formulating a MSWM M/P. The M/P should be formulated paying attention to the following aspects:

- identification of current waste flow that shows how much waste is generated, discharged, illegally dumped, and disposed of at landfills;

- establishment of sustainable financial system;
- elimination of illegal dumping;
- reestablishment of the recycling system.

b.5 Hazardous Waste

In general, hazardous waste management (HWM) is not established in the study area and is not even planned. Since improper HWM is a direct threat to human life, the Urgent Environmental Investment Project (UEIP) financed by the World Bank (WB) includes a HWM project as a sub-component of the Environment Management Component. The HWM study has commenced in July 2000 and will end in June 2002.

This HWM study will develop a "cradle-to-grave" management system for hazardous waste (HW). The study includes the development of a classification system and inventory for HW, a register for producers of HW, the development and implementation of regulations for storage, handling and transportation of HW and site design.

The WB UEIP has another component important to HWM - Mercury Cleanup Component, which is due to commence shortly and will end in 2003. The component includes the construction of a safe, new landfill. The Project Implementation Unit (PIU) of UEIP intends to construct a HW landfill not only for mercury-contaminated waste but also for other HW.

b. Medical Waste

The "Sanitary Regulations for Maintenance of Residential Areas, SanPiN 42-128-4690-88" prohibit medical waste disposal (infectious/hazardous from medical institutions) at a landfill without treatment. According to the Opinion Survey for Medical Institutions conducted by the team, some medical institutions discharge their medical wastes without treatment and those wastes are disposed of at landfills with municipal waste. A M/P for medical waste management is therefore urgently needed.

c. Nature Environment Conservation

c.1 Conservation Areas Management

Nature conservation works in Baku have been attempted by preventing or minimising impacts of human activities that may affect the nature resources. Practically the role of the BCE is to keep nature intact, and peoples' access to the two sanctuaries to enjoy the nature is not encouraged.

In fact, the BCE does not possess fundamental instruments to accomplish such duties. They have no transport means except for two obsolete vessels to cover the land of over 2,000 km^2 with a 375 km coastline. In the Absheron sanctuary there is only an old gate and a small lodge for the guards, which is an extremely poor condition for the guards to stay for 24 hours in three shifts. There is no signboard at the entrance, no fence, nor any monitoring posts to survey the ecological status of the area. Such deficiencies totally hamper the nature conservation efforts of the BCE.

Although nature conservation under these conditions is therefore a hard task for the BCE, protection by exclusion of the public may still not be sufficient. The team

recognises that the sanctuaries are of paramount importance considering the following facts:

- the environment and landscape in most parts of Baku city are severely degraded;
- the opportunity for the general public living in the city to enjoy nature is inadequate;
- the Absheron peninsula is semi-desert and is not rich in natural resources by nature except for the sanctuaries.

Therefore the sanctuaries are environmentally vital in the peninsula. It is unfortunate that a relevant law does not allow people to visit these and enjoy nature. It is impossible for people even to notice the nature value that they actually have. Without the appropriate appreciation by people of nature, however, there would be little rationale to protect it. Thus what needs to be done is not only the maintenance but also the enhancement and best use of the real nature value.

For the general public to enjoy the nature in the sanctuaries fully, legislative review and formulation of a new legal framework that are currently under way in Parliament are needed. Further, some other facilities will be required for safe and pleasant visiting. If people's appreciation of nature value is promoted, society as a whole will start to keep watch over the natural values of the sanctuaries, and nature conservation will be advanced.

c.2 Fauna Protection Works

The tasks of the Fauna and conservation areas department of the BCE and their problems that hamper the proper execution of those tasks were discussed with the BCE personnel and the team. They can be illustrated as in Figure 2-4.

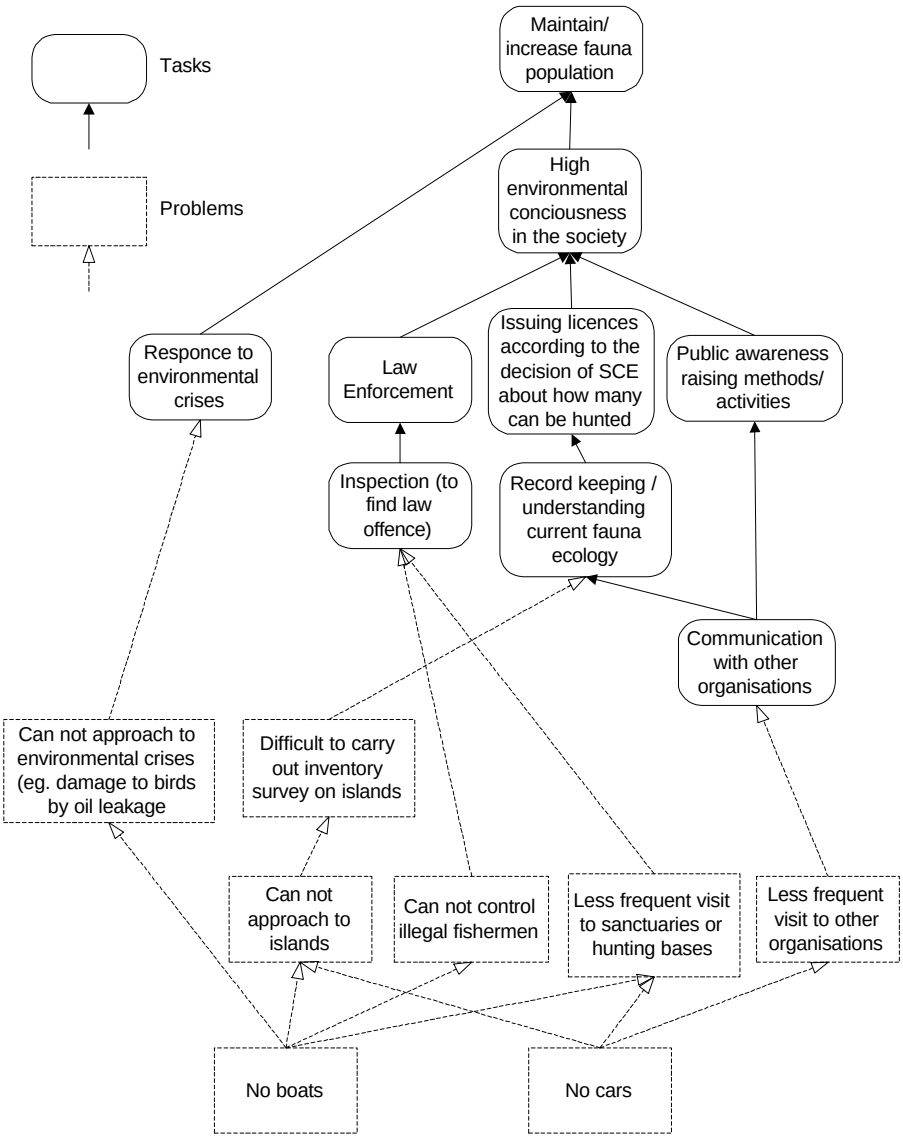


Figure 2-4:: Tasks and Problems of the BCE Fauna Protection Works

c.3 Flora

c.3.1 City Greenery

From the land use data (existing 1:10,000 land use map), it can be presumed that four land use categories, namely park and green area, forest plantation, recreational area and wild nature reserves, correspond to the area where people can enjoy greenery. Those are shown in Table 5-2 of the main report.

It is an internationally accepted way to assess greenery area by examining area per capita, as Table 5-3 of the main report shows. This table suggests:

- Yasamal, Nasimi, Narimanov and Khatai districts, which are in the central Baku and in which one third of city population live, have extremely small greenery area per person (3.04, 1.56, 4.32 and 6.21 m^2 respectively). In those districts, open space per capita is also scarce, thus greenery area can be

increased only by the conversion of land use (e.g. conversion of abandoned old factories to parks).

- The other districts have relatively large green area per capita. This is, however, largely due to the presence of large recreational areas and forest plantation. If we take only parks into account, the figures drop significantly for all districts.
- Considering the result of Question 39 of the public opinion survey that not many people enjoy excursion, large recreational area may not serve the population as would be expected. From the observation by the team, the forest plantation areas are the places where single species are systematically and monotonously planted on grids. Although such a forest is one of the important elements of city landscape, it does not serve as a place where people commune with nature. Therefore it can be presumed that the opportunities for people to enjoy greenery are limited throughout the city in spite of large recreational area and forest plantation.

From the argument above, nearby greenery (parks) should be developed in the urbanised city centre. Because of the limited resources in Azerbaijan in terms of finance and manpower, it will be reasonable to concentrate the resources into the limited area, which will be the six districts in the city centre (Sabayil, Yasamal, Nasimi, Narimanov, Nizami, and Khatai). In these districts, greenery area/capita is 8.29 m^2/capita and park is 4.30 m^2/capita, while open space is 3.22 m^2/capita.

Because of the limited open space, development of parks requires the conversion of land use, which will not be easy. Therefore, it will become vital (i) to urge industries, schools, public offices, housing complexes, and other organisations to plant trees within their properties, (ii) to oblige or strongly recommend the contractors to plant trees when land use is to be converted for new development purpose, and (iii) obviously to prevent existing trees from being felled as far as possible.

c.3.2 Flora Protection

Through the repeated meetings, the team and the Flora protection department of the BCE developed a "problem tree" as shown in Figure 2-5.

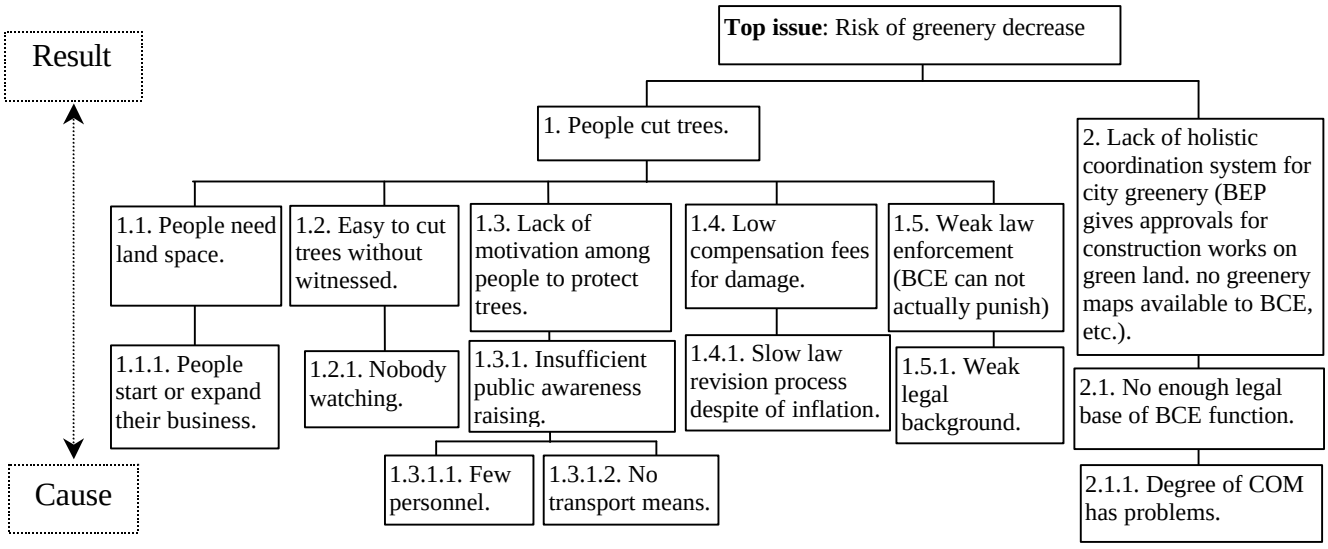


Figure 2-5: Problem Tree of Flora Protection

From this analysis, the team concluded as follows.

- In reality it is impossible to protect all greenery in the city by any means. Citizens should fully understand how important the greens are and how many efforts have been made to increase greens in the city to the current level in its history, and should appreciate the benefit of greens. Raising public awareness is the ultimate solution, although it takes time.
- Because the ownership of trees belongs to those who planted them, it is reasonable to entrust the protection works to the tree owners who should have good grounds to protect their trees. In this case, the BCE's task will be to supervise the protection works.
- If the BCE can expand its task, which is now limited to greenery protection, BCE should have more wider view to enhance city greenery. Its tasks will include:
    - to monitor planting and cutting works by BEP, Ministry of Road Construction, and industries and control the overall increase of greenery;
    - to set priority areas to plant and urge relevant organisations to plant there;
    - to promote tree planting (for example, to oblige or strongly recommend new industries, commerce and housing development to plant trees in the EIA process or other occasions, to oblige legal or physical persons who want to cut trees to plant trees in other places (no net loss of greenery), organise events at schools to plant trees/flowers, support tree nurseries;
    - to encourage voluntary work among people and involve NGOs.
    - to develop close cooperation with Universities, Academy of Sciences and Botanical Garden and discuss which species should be planted, to which tree diseases attention should be paid, how to raise public awareness (cf. Botanical garden and a NGO has an education program for school children) and others;
    - to keep a record of greenery (how many trees were planted, how many m^2 of greenery increased, where will be planted in the next year, etc.) and open the record to the public.

It is obvious that expanding the BCE's tasks as above requires new legislation which clearly stipulates the rights and responsibilities of the BCE, and partnership among relevant organisations particularly the BEP.

d. GIS

GIS database establishment is one of key components of the current project. Although the term "establishment" may imply "completion of the system", it must be noted that a GIS requires constant database update that should never be terminated. A GIS is not a solution but a merely tool whose value can only be realised when it is actually utilised. Furthermore, institutional arrangements are necessary to operate the system. Therefore, the issue is threefold: (i) how to keep the GIS alive (GIS maintenance), (ii) how to apply the GIS to environmental management (GIS application) and (iii) how to manage the GIS (GIS management).

d.1 GIS Maintenance

GIS maintenance requires a regularly updated database, which in turn requires constant access to data sources. In this regard, the team has noticed that there are

external data sources and internal data sources both of which are important for the BCE's GIS.

d.1.1 External Data Sources

The majority of data related to environmental issues are collected by organisations other than the BCE, including Hydromet and Academy of Sciences. This will be largely because the work scope of the BCE (and the SCE) emphasises the control of human activities, which might cause negative environmental impacts, paying little attention to environmental status itself. Inspection at enterprises and development design review (EIA) are their main tasks, and status of the environment is observed by the others. Such task demarcation is not necessarily to be criticised, but the problem is that environmental data are kept undisclosed. In other words, external data sources exist, but data flow towards the BCE is severely limited.

The JICA team has attempted to collect and integrate such information into the newly developed GIS database. The team, however, also recognises that clear rules must be worked out among those organisations concerned, in order to ensure a steady data stream is obtained.

Meanwhile, the GoAz plans to reform the SCE to a Ministry status incorporating the environment-related responsibilities of Hydromet, the forestry and fisheries state concerns. Data accessibility is therefore executed to improve to a certain extent.

d.1.2 Internal Data Sources

The JICA team received vital information from the BCE personnel. The information, however, was possessed by individuals and had not been documented until the team requested. This signifies that there *are* internal data sources but these are not ready to be used or shared by the organisation as a whole.

The internal data sources should be fully utilized and reflected in the GIS.

d.2 GIS Application

The actual application depends on the purpose the BCE wants to achieve by applying the GIS. It will mainly apply to:

- overall environmental management in Baku city;
- inspection and enforcement works;
- evaluation of EIA reports;
- instruction and recommendation for the land use in view of environmental protection of the city.

GIS applicationshowever, should not be restricted to be purpose-driven. For example, GIS is a sophisticated visual tool and self-explanatory. Therefore, it could be easily and effectively applied for educational purposes, even though environmental education would not be initially intended by the BCE

d.3 Institutional Arrangement for GIS

Introduction of GIS is nowadays a worldwide trend; a number of cases of GIS introduction can be found. There are, however, also a few cases where the GIS is no

longer taken care of and ends up as ornament. Most of such problems stem from the following:

- only one or two personnel know how to operate the GIS. The GIS is thus used for limited purposes interesting to that minority. When the staff are moved to different departments or organisations, nobody remains who knows the GIS;
- the cost in terms of manpower, finance, and time was not fully understood prior to GIS introduction. GIS introduction is not a final stage, but simply a starting point, from which operation and maintenance develop;
- the GIS is regarded as a burden which does not improve the works but only complicates them. There is no motivation to use it among the personnel.

A GIS entails various actions, including data acquisition, data input, computer operation, data application, data presentation, and data distribution (Figure 2-6). Since all these are virtually new and additional tasks for the BCE, these could be heavy loads if there is no practicable institutional arrangement to systematise all these actions.

In order to arrange effective use for the GIS, the BCE and the team must consider a number of points.

1. All actions mentioned above must be simple at the initial stage. In particular, data acquisition and input has to be as simple as possible since this is the backbone of the whole system and should not be impeded. It is preferred that data are digitised at source and sent to the BCE as computer files. The BCE should have rules to standardise the data format and data supply procedure.

2. The GIS should not remain supplementary but be incorporated into the BCE's daily works. Therefore, not only the personnel of the Department of Information but also personnel of other departments should have access to and use the system.

3. The GIS should be regarded as an asset not of individuals but of the BCE, and preferably of the general public. The team has proposed to open the database to the public using the internet, so that the population can enjoy benefits that can be drawn from the GIS. Awareness that the GIS is serving society will be a foremost impetus for the personnel which operates and maintains the system.

4. The BCE must have a taskforce that has full responsibility for GIS management. The taskforce mainly should:

    - explore the use of the GIS;
    - decide which kinds of data are needed.;
    - identify data sources;
    - orchestrate data handling procedures;
    - encourage the personnel to use the GIS;
    - find out the best way of data release and presentation management.

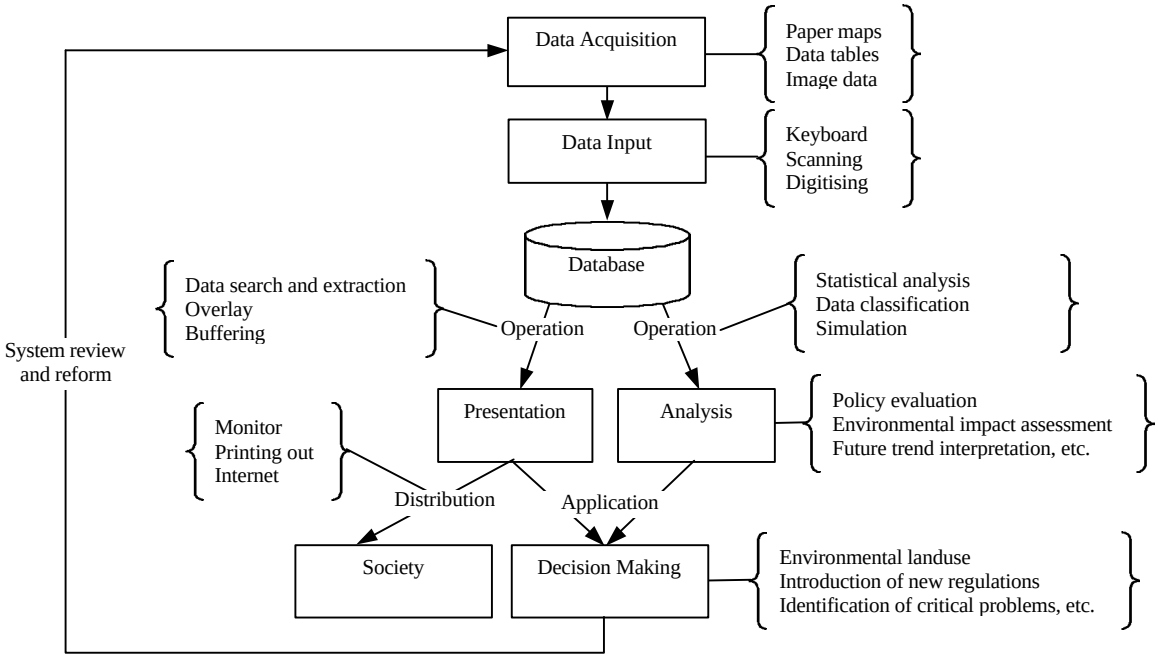


Figure 2-6: Series of Actions Involved in the GIS

e. Food Control

The food control of the Republic is under restructuring.

The team considers that a public health matter in regard to food poisoning should remain with Centre for Sanitation and Epidemiology, which has long experience in food analysis and possesses a large number of staff with medical-related backgrounds. Food safety is one of the fundamental tasks in a country, and should not have any confusion or misunderstandings among governmental bodies. The development of a clear legislative structure is of the utmost importance.

When considering the BCE's role, one should always remember that the BCE, under the SCE, is the superior body in the area of nature protection and rational utilisation of nature resources as stated in the BCE charter. The understanding of the team about the relationship between food control, environment and the BCE/SCE is as in Figure 2-7.

The figure expresses that the role of BCE/SCE is, at least primarily, to control the environment quality which, if it is poor, could damage food quality. The damaged food could in turn affect human health through the food chain. The causal substances could be heavy metals from factories, misuse of pesticides, dioxins from incinerators and others. Under such circumstances, the control of food alone can not be effective at all, because food still continues to be polluted as he environmental quality is deteriorated. In fact, the detection of such damaged food is evidence of unsatisfactory environment control by the BCE/SCE. Therefore the BCE/SCE should pay the prime attention to environmental management. In consequence, food quality will be ensured.

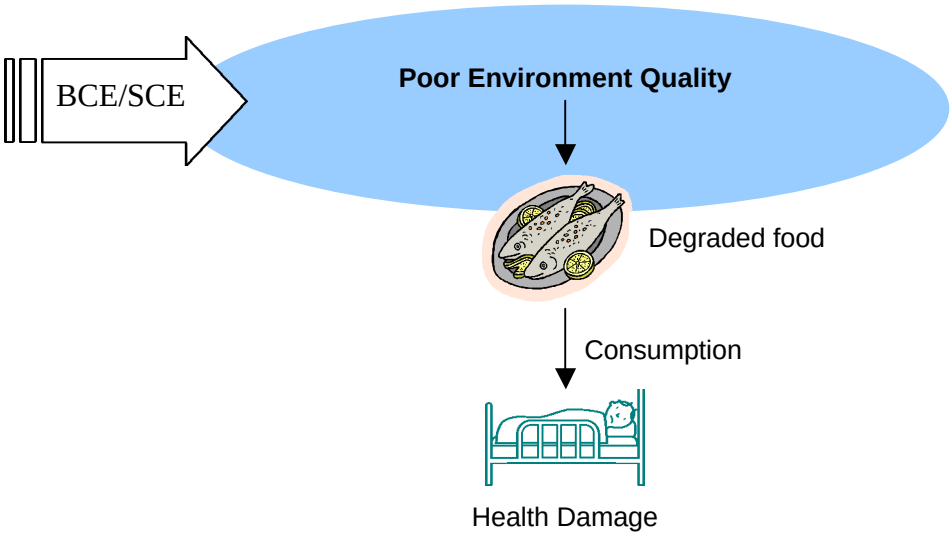


Figure 2-7: Food, Environment and BCE/SCE

f. EIA

The EIA system currently run by the BCE has the following issues to be addressed.

- It is necessary to stipulate clearly which environmental items should be assessed for each project.
- The methods to be used for impact prediction and assessment must be made clear.
- In the current system, part of projects in Baku city are subject to the EIA process by the SCE. However, once new development takes place, it is the BCE that is responsible for environmental control of all those activities in its territory. It is therefore recommended that the BCE should take all responsibility in regard to the EIA process of projects in the city. Consequently the environmental control over the newly completed projects becomes easier for the BCE.
- When the BCE handles the EIA of technically complicated projects, it should organise an Environmental Review Expert Group involving external experts of relevant specialities.
- The EIA charges, which developers have to pay to the BCE, should be set according to the size of workload necessary for the BCE in the EIA process.
- The conclusion given by the BCE is too simple. Its bases should be clearly expressed so that the developers can take appropriate actions prior to project application.
- The EIA process should involve local residents.

g. Protection of Mineral Resources

The problem of authorised limestone mines is improper development of deposits. Due to out-of-date equipment the efficiency of existing limestone mines is very limited

(according to the BCE inspector only 30-50% of potential resources are mined) and no restoration measures are taken upon completion of mining activity. Additionally, the wastes generated are not disposed of at the landfills approved by the authorities. As a result, about 1,000 hectares around Baku have been damaged with 1.2 million m^2 of wastes generated from limestone mines during the past decade.

Illegal mining activity has caused a large number of pits of a different scale scattered all over the area, including the protected recreation sites and health resorts located in the northern seashore of Absheron peninsula. In many cases such pits are turned into illegal dumpsites.

A major problem of the responsible department in the BCE is insufficient number of inspectors and a lack of transportation for the inspection/control of the large area.

3 Environmental Management Master Plan

3.1 Master Plan Framework

3.1.1 Scio-economic Framework

a. Population Forecast

A population forecast is generally made considering several factors of a city including magnitude, the characteristics, history and development, as well as past trends. However, the forecast is mainly based on the current population and the population increase rate. The population of Baku, obtained from the State Committee of Statistics, is adopted as the current population.

The rate of increase of the Baku population was estimated, with the cooperation of the counterpart, assuming the following:

- Baku population growth rate over the past 5 years;
- Azerbaijan population growth rate;
- situation of refugees and internally displaced persons (IDPs);
- political and economic situation of Baku.

Based on the above considerations, the population increase rates of 1.3% until 2005 and 1.5% from 2006 to 2010, which was adopted by the WB project for the Greater Baku Water and Wastewater project, are considered appropriate. As a result the population forecast for the study is as follows.

Table 3-1: Baku Population Projection

	District	1999 (1,000)	2005 (1,000) (Increase rate: 1.3%/y)	2010 (1,000) (Increase rate: 1.5%/y)
1	Sabayil	85.8	92.7	99.9
2	Yasamal	237.5	256.6	276.5
3	Nasimi	221.7	239.6	258.1
4	Narimanov	177.1	191.4	206.2
5	Nizami	179.4	193.9	208.8
6	Khatai	240.9	260.3	280.4
7	Garadag	105.6	114.1	122.9
8	Binagadi	247.1	267.0	287.6
9	Sabunchu	213.1	230.3	248.1
10	Surakhani	186.8	201.9	217.5
11	Azizbeyov	130.3	140.8	151.7
	Baku	2,025.3	2,188.5	2,357.6

Source: 1999 figures are based on data from State Committee for Statistics; 2005 and 2010 figures were projected by the Study Team

b. Economic and Industrial Development

b.1 GDP Estimate

Considering that the 1999 GDP was only 53% of the 1990 GDP, and that direct petroleum related investments from overseas in 1998 made up 21% of the GDP, the study team thinks that developments in economic reform would engender the rehabilitation of production facilities to comparatively high standards. Consequently, the team concurs with the opinion of an officer of the Ministry of Economics as to the possibility of attaining an annual growth rate 8 to 10%.

The team, however, infers that the take-off period will be influenced by the time required to construct transportation means for petroleum and gas exportation.

In the preparation of this study's framework, the following assumptions are applied:

- 8.5% per annum, the growth rate in the first half of 2000, is assumed until 2004, the initial target year for the Baku-Tbilisi-Ceyhan route construction project;
- 10% per annum growth rate from 2005 to 2010.

Based on the above growth rate, the GDP in 2006 will reach the 1990 level. The GRDP of Baku City is assumed to increase in proportion with the GDP.

Table 3-2: Economic Development Forecast

(unit: billion manat)

	1999	2000	2005	2010
GDP	16,489	17,891	27,273	43,924
GRDP	7,305	7,926	12,083	19,459

b.2 Industrial Structure

In reference to the changes in the 1991-1999 period, the following assumptions are made and also shown in the table below:

- continuous decrease in primary industries;
- secondary industries are going to maintain their 1999 level;
- increase in tertiary industries will be in proportion to the decrease in primary industries.

Table 3-3: Industrial Structure in 2010

(unit: % of GDP)

	1991	1999	2010
Primary Industry	30.4	21.7	15.5
Secondary Industry	23.6	23.5	23.5
Tertiary Industry	46.0	54.8	61.0

Source: JICA Study Team

c. Implication of Population Forecast and Economic Development to the Environment

As shown above, the population in 2010 is expected to be 306,000 (15%) more than the present level. The negative consequences that could result from this include:

- increase in sewage, solid waste, air pollutants from housework and traffic;
- loss of natural environment by urbanisation;
- necessity to treat and dispose of contaminated soil, illegally dumped waste and industrial waste buried in abandoned factories.

Economic development in Baku is forecast to increase the GRDP in 2010 2.5 times more than it in 2000. The share of the industrial sector in the GDP is foreseen to stabilise in the next decade, and this would consequently raise the present volume of industrial operations 2.5 times. On the other hand, this could also result in the increased generation of wastewater, air pollutants, solid waste, and exhaust gas due to the activities and traffic of individuals and cargoes.

The team attempted to predict the increase of each pollution load according to the population growth and industrial development of Baku. It was assumed that the amount of water consumption, domestic wastewater and medical waste is proportional to population, and the amount of industrial wastewater increases in proportion to GRDP growth. As for the air pollutant, it is presumed that its amount from point sources is proportional to GRDP growth, and that from mobile sources it increases in proportion to the number of vehicles, which is estimated to be 1.51 times more in 2010 than the 1999 level in the whole country, according to Statistical Yearbook of Azerbaijan 2000. The yearbook also states that the total amount of air pollutant in 1999 was 917,100 tons, 62.7% of which is from point sources and the rest is from mobile sources.

Table 3-4: Predicted Pollution Loads

	Unit	Year			
		2000	2003	2006	2010
A. Population	Person	2,051,200	2,132,300	2,220,900	2,357,200
B. GRDP	bill. manat	7,926	10,123	13,290	19,459
C. Air Pollutant	ton/year	983[3]	1,204	1,497	2,048
from point sources	ton/year	(624)	(797)	(1,045)	(1,531)
from mobile sources	ton/year	(359)	(407)	(452)	(517)
D. Water Consumption	1,000 m^3/day	1,381[4]	1,436	1,495	1,587
E. Industrial WW	1,000 m^3/day	288 [4]	368	483	707
F. Domestic WW	1,000 m^3/day	1,008 [4]	1,048	1,091	1,158
G. Municipal SW	ton/day	603.8[5]	704.0	835.7	1,070.0
H. Medical Waste	ton/day	13.1 [6]	13.6	14.1	15.0

[3] Pollution of harmful particle matters into atmosphere quoted in the Statistical Yearbook of Azerbaijan 2000.
[4] quoted in the wastewater M/P.
[5] from the waste amount and composition survey by the JICA study team.
[6] from the medical institutions survey by the JICA study team.

3.1.2 Master Plan Framework

a. Definition of Environmental Management Master Plan

A master plan for integrated environmental management, which this study is to formulate, aims to show the direction towards the sustainable development of Baku city to the SCE, BCE and the general public.

Environmental management embraces broad fields ranging from nature conservation to pollutant discharge control. The integrated environmental management M/P is, however, not a series of master plans for each field of the environment, which requires considerable input of time and finance. Instead, the M/P as an output of this study will be the plan that directs the BCE/SCE to improved environmental management by executing their responsibility and promoting environmental projects and actions of other organisations. The individual M/Ps and concrete action plans should be developed, following the directions shown in the M/P by this study, by relevant authorities.

b. Goals

Taking the above-mentioned principle of the study into consideration, the ultimate goal of the integrated environmental management master plan is:

"To contribute to the sustainable growth of Baku City with due attention to the environment, by the target year 2010."

The master plan will aim for the following objectives to attain this goal:

1. Development of an environmental management policy framework in Baku City.
2. Enhancement of capability to enforce the environmental management policy framework in Baku City.

c. Targets

c.1 Target Year

The target year for the master plan is set at 2010. The M/P will be implemented by phase, as shown below, to achieve the above-mentioned objectives.

Phase I: 2001 - 2003

Phase II: 2004 - 2006

Phase III: 2007 - 2010

c.2 Targets by Sector

Environmental management covers multiple areas of interest, involving various organisations and individuals. Setting targets, particularly those expressed in figures, is beyond the discretion of the C/P and the study team. Therefore, the team took the following procedure to ensure these were established:

1. The team proposed a table to show targets in the IT/R, which served as a base for further discussion during the second study work in Azerbaijan.

2. The team discussed the targets with the C/P and members of the steering committee, and received the comments from them.

3. Taking those discussions and comments into consideration, the team set up the targets presented in the table below to formulate the environmental management M/P.

Table 3-5: Targets for Each Environmental Sector

Phase Sector	Present (2000)	Phase I (2001 – 2003)	Phase II (2004 – 2006)	Phase III (2007 – 2010)
Air Quality	1. Emission gas is not measured practically. 2. 25% compliance with exhaust gas standard of vehicles.	1. 50% compliance with maximum permissible emission of factories. 2. 30% compliance with exhaust gas standard of vehicles.	1. 60% compliance with air emission standard of factories. 2. 50% compliance with exhaust gas standard by vehicles.	1. 80% compliance with air emission standard of factories. 2. 90% compliance with exhaust gas standard by vehicles.
Water Quality	1. **Industrial WW:** Industrial WW from 33% of factories is discharged to the sewerage.[7] 2. **Domestic WW:** 44% of domestic WW is treated at the WW treatment plant.[8] 3. **Water Resource Protection:** Total water losses to the actual water consumption is 160%.[9]	1. **Industrial WW:** 60% of industrial WW is discharged to the sewerage for treatment. 2. **Domestic WW:** 60% of domestic WW is treated at the WW treatment plant.[8] 3. **Water Resource Protection:** Total water losses to the actual water consumption is 125%.[9]	1. **Industrial WW:** 78% of industrial WW is discharged to the sewerage for treatment. 2. **Domestic WW:** 78 % of domestic WW is treated at the WW treatment plant.[8] 3. **Water Resource Protection:** Total water losses to the actual water consumption is 90%.[9]	1. **Industrial WW:** 90% of industrial WW is discharged to the sewerage for treatment. 2. **Domestic WW:** 90 % of domestic WW is treated at the WW treatment plant.[8] 3. **Water Resource Protection:** Total water losses to the actual water consumption is 50%.[9]

[7] from the factory survey by the team.
[8] quoted in the Wastewater M/P. (Sewage collection coverage **0.78** x Sewage treatment rate **0.57** = **0.44**)
[9] quoted in the Water M/P.

Phase Sector	Present (2000)	Phase I (2001 – 2003)	Phase II (2004 – 2006)	Phase III (2007 – 2010)
Land Protection and Waste Control	1. **MSWM:** Refuse collection is insufficient and waste is open dumped at the disposal site. 2. **HWM:** There are no appropriate disposal facilities. 3. **Medical WM:** More than 20 % of medical waste is disposed of at landfills with municipal waste without treatment.[10] 4. **Illegal Dump:** 800 to 850 illegal dumpsites are identified. 5. **Land Contamination:** More than 10,000 ha of land is contaminated with oil.	1. **MSWM:** Sufficient refuse collection service covers whole population. 2. **HWM:** A HW final disposal site is constructed. 3. **Medical WM:** Primary treatment (at generation) of 100 % of medical waste. 4. **Illegal Dump:** The increase of illegal dumpsites is stopped. 5. **Land Contamination:** The research for oil contaminated land restoration is completed.	1. **MSWM:** 70% of MSW is sanitarily disposed. Recycle rates of metal scrap and waste paper reach 35 % and 25 % respectively. 2. **HWM:** 50% of HW is appropriately treated and disposed of. 3. **Medical WM:** 50% of medical waste is appropriately treated and disposed of. 4. **Illegal Dump:** 20% of illegal dumps are cleaned up. 5. **Land Contamination:** 10% of oil contaminated land is cleaned up.	1. **MSWM:** 100% of MSW is sanitarily disposed. Recycle rates of metal scrap and waste paper reach 70 % and 50 % respectively. 2. **HWM:** 100% of HW is appropriately treated and disposed of. 3. **Medical WM:** 100% of medical waste is appropriately treated and disposed of. 4. **Illegal Dump:** 50% of illegal dumps are cleaned up. 5. **Land Contamination:** 20% of oil contaminated land is cleaned up.
Fauna and Flora Protection and Conservation Areas Management	1. **Fauna**: Fauna population and diversity are at the risk of decline. 2. **Flora:** Greenery space in the central 6 districts is 8.3m^2/capita, of which park area is 4.3 m^2/capita. 3. **Conservation Areas:** Conservation areas are at the risk of deterioration without practical control plans.	1. **Fauna:** Fauna population and diversity are preserved. 2. **Flora:** Greenery space in the central 6 districts is 8.5m^2/capita, of which park area is 4.5 m^2/capita. 3. **Conservation Areas:** Control plans for priority conservation areas are developed.	1. **Fauna:** Fauna population and diversity are preserved. 2. **Flora:** Greenery space in the central 6 districts is 9m^2/capita, of which park area is 4.7 m^2/capita. 3. **Conservation Areas:** Control plans for priority conservation areas are put into effect.	1. **Fauna:** Fauna population and diversity are preserved. 2. **Flora:** Greenery space in the central 6 districts is 10.0m^2/capita, of which park area is 5 m^2/capita. 3. **Conservation Areas:** Conservation areas are appropriately protected by development activities.

[10] from the medical institutions survey by the team.

d. Environmental Zoning

Environmental values vary and include natural resources such as fauna, flora and soil resources necessary for human living such as water, cultural values such as a historical heritage, and also a peaceful landscape. These environmentally valuable elements in Baku must be carefully protected or conserved. Environmental zoning is a process to designate such areas of environmental importance as an environmental zone against the foreseeable environmental damages in the processes of urbanisation or other human activities, and by designating the area as environmental zone.

At present there is neither a city master plan nor a city land use plan. The team strongly urges the relevant authority to develop a city land use plan incorporating the environmental zoning proposed in this M/P and officially approve the plan for practical enforcement. Environmental zoning is a powerful means of guiding sound development and protecting the natural environment provided only if it is properly enforced.

The team's proposed environmental zoning is shown in Plate 10.

The following table is a list of proposed environmental zones. Their location is indicated on a GIS map. Actual boundaries of zoning areas should be examined more closely by using maps of larger scale like 1/500 or 1/1000.

Table 3-6: Environmental Zoning Proposal

		Zone	Code	Location *	Description	Conservation Measure
Conservation zone	a) Nature conservation zone***	Nature reserve	ncz-1	Gobustan nature reserve	prehistoric living quarters with numerous pictures on rocks and living devices, an excellent tourism resource	to be protected and reserved without any change, a buffer zone to be designated
		Sanctuary	ncz-2	Absheron sanctuary, Gil island sanctuary	not properly managed at present, detail description in 4.4.3 of the Main Report	wise use with appropriate facility details are described in 7.4.3 of the Main Report
		National park	ncz-3	Sea side boulevard in front of old town	major recreational park in the city, shore is oil contaminated, no water contact	recreational facility to be controlled, water contact is desirable by cleaning oil contaminated sea shore
		Natural monument	ncz-4	10 sites	detail description in 4.4.3 of the Main Report	no development to be allowed to endanger the value of the monuments, refer to 7.4.3 of the Main Report
		Health resort area	ncz-5	northern part of the peninsula	many long beaches with resort facilities, sea water of some bathing beaches are contaminated either by oil or coliform bacilli **	area reserved for health resort use only, no other development allowed, water quality to be complied with Azeri sanitary limit and the Caspian sea EQS, inflow waste water to be controlled
	b) Resource conservation zone	Water reservoir for potable water	rcz-1	Jeiranbatan water reservoir	water basin is developed without proper control, in danger of water pollution by sewage from surrounding housings and factories	restriction of development in water basin area, measures against possible land slide/erosion
		Fishing lake	rcz-2	Lake Bulbul	illegal fishing, illegal waste dumping, can be a good lake to enjoy fishing, major housing developments are going on in surroundings	the lake water to be protected by stopping illegal dumping and proper treatment of inflow waste water from the surroundings
		Salt lake	rcz-3	Lake Masazir	salt production at lake shore, nearby oil pipe line accident once happened	protection of water by restricting surrounding development, precautionary measure against possible contamination
	c) Cultural conservat-ion zone	Old town of Baku	ccz-1	within the wall of old town	town of Baku originated here in middle age, surrounded by heavy stone wall, many old architectures inside the town	to preserve historical architectures and town structure itself, development is not allowed, but to renovate old buildings
		Conservation village and temple	ccz-2	Gala village and Ateshgah temple	old and unique form of village, Ateshuga temple is the centre of Zoroastrianism	protection of village houses and unique temple, restriction of new development within the conservation area

	Zone	Code	Location *	Description	Conservation Measure
Proposed zone for appropriate land use	Seashore for recreational use	pal-1	Shikh beach, Sahil beach, Lokbatan beach	beach water is not fit for swimming at present due to sewage inflow and oil contamination**	to be conserved for swimming beaches from possible contamination by waste water and oil
	Oil field	pal-2	surrounding area of Baku amphitheater	approx. 80% of oil rigs are abandoned, scattered pipes and electric poles are ugly, production of oil is quite limited	deserted appearance, and deserted oil field to be improved, e.g. soil covering, planting trees, land use alteration to be encouraged
	Industrial area	pal-3	within Baku central part	majority of factories have been practically closed, creating vast vacant space in the middle of the city	gradual conversion of derelict industrial area to green residential area or city use e.g. distribution centre to be encouraged, no new industry, no polluting industry, no further expansion of major polluting industry, obligatory greenery
	Baku buffer zone	pal-4	along Baku amphitheatre, in and around oil field	most of the area is barren land or deserted oil field at present	creating large green buffer belt by planting trees 500m to 1000m wide along oil field for wind and dust protection of the city, species of planting trees to be carefully selected
Restricted zone	Oil refinery	sbz-1	in the central part of Baku	right in the middle of the city, no security buffer zone	security buffer zone to be provided, no further expansion, encouraged to remove from the central part of Baku
	Lake Beyuk Shor	sbz-2	refer to the map	highly polluted lake due mainly to oil excavation activities	limited access to the site to prevent people from accessing close to the lake
	Waste disposal site	sbz-3	refer to the map	4 urban solid waste disposal sites, 1 hazardous waste disposal site, 1 radio active waste disposal site	limited access to those sites especially hazardous and radio active waste disposal sites to protect people from any harmful effect

* Location of environmental zones are indicated on GIS maps.
** Based on the study of WB on Water and Wastewater Master Plan for Greater Baku.
*** defined by the Law of Azerbaijan Republic on Particularly Protected Areas and Units.

e. Institutional Framework

e.1 Change from SCE to MOEP

It is envisaged that during the period of the M/P, the SCE will undergo a transition to a Ministry for Environmental Protection (MOEP).

The objective of organisational changes to consolidate responsibility for environmental management is to create one body - a new government ministry, the MOEP with an over-arching and cross-cutting responsibility to safeguard and improve environmental quality. The MOEP will take on a range of additional responsibilities, some immediately and others over a phased period of organisational transition and development. The result will be an organisation with responsibility for:

- environmental policy setting, taking over the functions of environmental policy setting and enforcement from production and abstraction entities[11];
- implementation of policies through appropriate agencies;
- monitoring the environmental performance of the country as a whole, specific regions, industrial sectors and individual units through designated agencies[12] ;
- determination of standards for environmental quality;
- control of emissions, abstractions, discharges and pollution through integrated systems of licensing;
- enforcement of the law by working with other agencies to prosecute and penalise offenders;
- educating the public and informing them of environmental matters, being accountable to Parliament and thereby to the population of Azerbaijan in a democratic framework;
- the coordination of international agreements in the environmental field, with particular reference to the Caspian Sea issues, giving rise to a more co-ordinated and integrated approach;
- the development of a single centre of expertise, adequately resourced, seeking to bring Azerbaijan up to world class standards and enabling the country to take its rightful place in world environmental affairs;
- the coordination of environmental research, in particular with regard to critical sustainable development issues in Azerbaijan (for example sturgeon breeding, heavy metal and chronic industrial pollution, desertification etc), with reference to research conducted elsewhere, enabling the investments in research within Azerbaijan to be capitalised and maximised;
- the establishment of an environmental disaster management centre of expertise[13] able to advise on protection from disaster, prevent or mitigate emerging crises pending intervention and assistance from other bodies (other state committees with relevant responsibilities), and able to coordinate such

[11] for example, oil sector, minerals extraction etc
[12] Which might be from other government bodies or the private sector where appropriate
[13] working where appropriate with the UNDP DMTP unit established in Azerbaijan

assistance, ensuring that in the event of disasters occurring, damage to the environment can be minimised.[14] This would cover, for example, nuclear, flood or earthquake incidents;

- the development of a transparent system of economic instruments, both incentives and constraints to encourage environmental performance improvements, together with clear accountability for disbursement of grants and funding in the environmental arena;
- possible development of the Environment Fund to lessen the burden of the environmental management programme on the state budget, ensuring that environmental improvements are not seen as a "drain" on the state's limited resources;

The recommendations for change to MOEP have been accepted by Deputy Prime Minister Hassanov as Chairman of the SCE, although it is not clear what progress is currently being made.

e.2 The BCE

e.2.1 Organisation

In making the recent reorganisation, the BCE chairman has sought to introduce the positive management reforms intimated in the review of environmental management undertaken with the SCE as part of the UEIP project.

However, there needs to be a clear definition of the tasks, roles and responsibilities of the BCE to be implemented as part of the reform process. In particular, there will be a need to separate policy making from enforcement functions and develop the institution's capacity to educate and inform the community to effect compliance with best environmental practice.

The BCE will need to work with the SCE and other governmental agencies to ensure that unnecessary replication is kept to a minimum (for example in measurement, standard setting, policy development, environmental economics etc).

As the SCE transforms to the MOEP, the BCE will need to have a structure reflecting the priorities mandated for it in the charter which will be constructed. The clear focus for the BCE will be on implementation of environmental policy to ensure:

- effective local implementation, reducing pollution and identifying likely problem areas through a licensing and permitting regime;
- efficient management of its own operations and support for industry and the population through enhanced professional standards;
- equitable approaches to ensure that no organisation in the Baku area is treated more or less severely in assessing environmental impact, in assessing environmental liability or in monitoring, control and enforcement.

It is clear that there will be a need for a major reorganisation whether or not the SCE develops into a Ministry for Environmental Protection. Within this report, there has been an identification of the minimum staffing levels for monitoring and control of a

[14] There will clearly be a need to recruit and develop suitable experts in this area to ensure that there is a competent response to any incidents.

number of environmental management areas. The suggested transitional mechanism is shown in Figure 3-1.

The structure mirrors that proposed for the MOEP and pre-supposes that the primary function of the BCE will be to ensure environmental compliance. In general, policy making will be a key function of the MOEP, informed by the BCE.

e.2.2 Legislation

Following transition to ministry status, the SCE and regional offices will require new charters in accordance with the legal process. The charters should be much broader in scope than the present editions.

In the event that the proposals referred to above in respect of the SCE/MOEP, it will be essential for the BCE to upgrade the level of knowledge and skills to ensure that it is able to operate as the "front line" in environmental management and control on behalf of the Azerbaijan government and people.

e.2.3 Licensing

The licenses for activities within the BCE area which are the responsibility of the SCE are issued by the BCE. However, in some cases the SCE issues licenses directly and clarification is essential. The recommended approach is that activities exclusively conducted within the BCE area, for example discharges from point sources or natural resource abstraction, should be subject to permits and licenses issued by the BCE. Where there is a wider impact or potential impact, for example with hazardous wastes or nuclear materials, it may be appropriate for the licenses to continue to be issued by the SCE.

e.2.4 Enforcement

Within a newly formed Ministry of Environmental Protection, one of the key functions of the branch offices - in this case the BCE - will be to ensure compliance with legislation, using enforcement and sanctions as a last resort. Staff at the BCE will need to balance the "public interest" with rights of individual polluters to carry out their business.

This will require much closer working between the BCE, polluters, the Ministry of Justice and other governmental bodies, all working to a common "agenda". Staff at the BCE will need to be trained in the judicial processes, the economic issues and measurement techniques and limitations in order for the enforcement of legislation to be effective.

A basic problem facing all bodies instigating enforcement action is how to determine which offences should be prosecuted, and which ignored or dealt with in some other way.

Clearly, it will not be possible within the timescale of the plan to eliminate all polluting vehicles, nor to prevent all productive units discharging waste water or other products inappropriately.

This is the type of problem facing every police force and choices - not always easy - have to be made, given the resource limitations for the BCE.

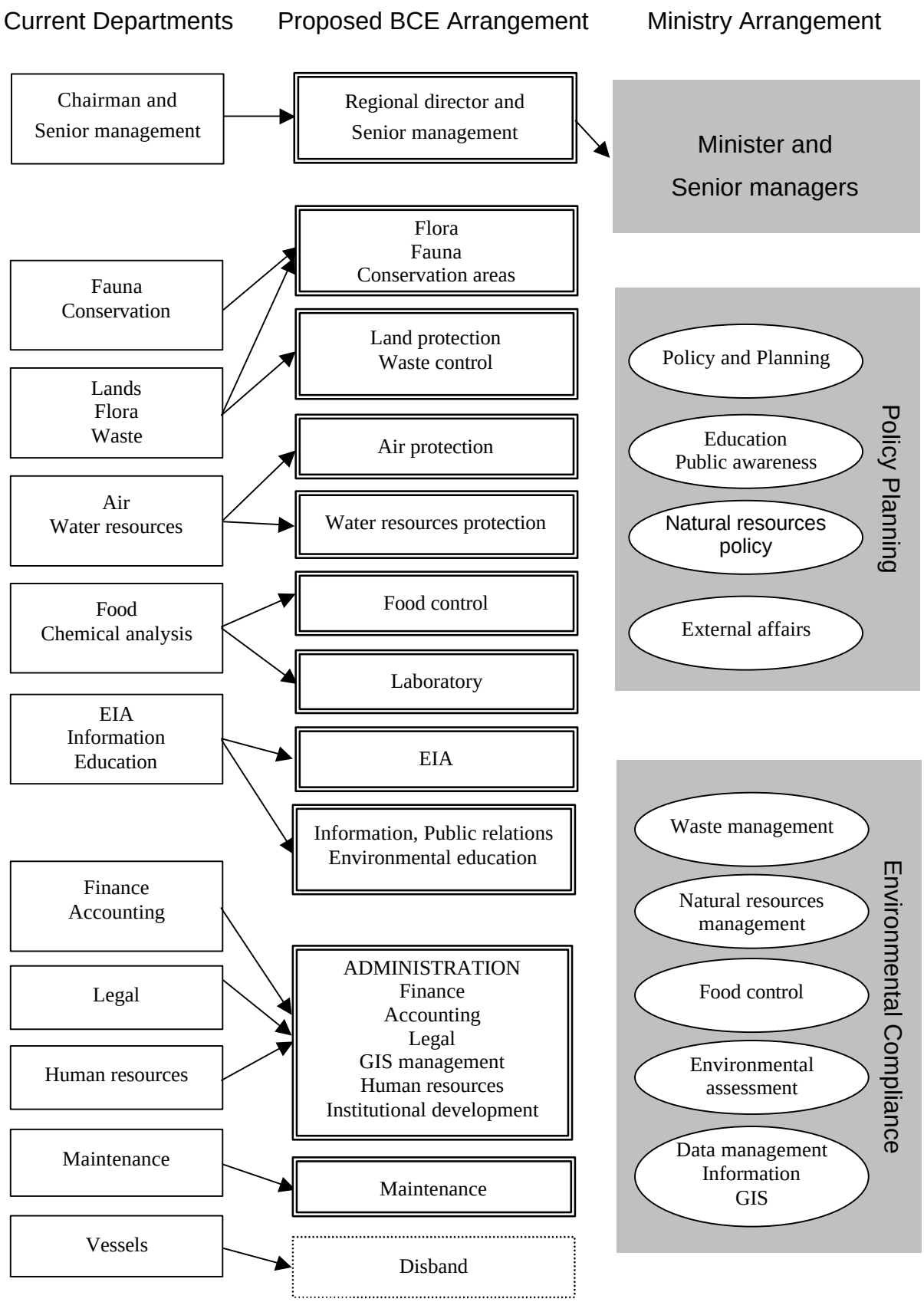


Figure 3-1: BCE Transition to Ministry Branch Office

A method to determine what is fair and in the best interests of the environment will need to be established by the BCE, taking into account the health needs of the population of Baku, the economic imperatives and national and international pressures. If the guidelines for enforcement are widely circulated and understood, there will be much more ready acceptance by producers of the standards required and the consequences of their breach.

e.2.5 Human Resources Development

A number of workshops and seminars have been organised within the master plan development period and it will be essential that further training is undertaken to ensure all staff have the necessary knowledge and skills to conduct the required work. In addition to technical training, there is a need for extensive managerial and functional training within the BCE.

The following programmes are required and should, if possible, be delivered during phase I of the M/P (except as noted). Ongoing training and programmes for new managers will also be required during the M/P period. Topics for training include:

- managing and supervising staff : day-to-day control, job definitions, performance management, reporting, allocation of staff, health and safety (staff and external);
- effective team leadership : motivation, management, delegation, support;
- workflow management : managing peaks, planning scope of work, project management;
- communication and presentation skills (includes web principles) : report writing, presenting to developers and the public, drafting legislation;
- public relations and media handling skills;
- financial management : budgeting, financial control, cost management, obtaining best value for money;
- interviewing and questioning skills : information gathering, challenging data, recruiting staff, surveys and questionnaires, social impact studies (phases I, II);
- environmental economics;
- negotiation skills : dealing with the private sector and the international developer, getting the best for all parties;
- computing skills : Windows, Word, Excel, Access, Powerpoint, GIS;
- data access and management : Internet, database principles, data presentation, researching environmental information, dissemination of information;
- English language skills (all phases);
- prosecution and enforcement (all phases);
- environmental issues for EU accession (Phase III).

3.2 Environmental Management Master Plan

This environmental management master plan (EM M/P) presents the direction and strategies for the improvement of the BCE/SCE in different environment fields that are covered by them. Each section below consists of sub-sections that describe where the BCE/SCE should go by 2010, what has to be done, and what will be the required size of investment for achievement.

3.2.1 Air Protection

a. Directions

a.1 Point Sources (factories etc.)

The SCE will develop policy and legislation, whilst the BCE will monitor and control the polluting activities in Baku, as they do at present. By 2010, The BCE should:

- control pollution sources in a systematic and efficient way with documents provided by the sources and a revised inspection system;
- not only penalise pollution sources but encourage them positively to introduce environmentally friendly operation;
- not only control pollution sources but pay attention to overall ambient air quality.

a.2 Mobile Sources

The SCE will develop policy and legislation. The BCE will monitor air pollution from mobile sources.

The environmental impacts of mobile sources result from the poor condition of vehicles and the stagnation of traffic flow. The former is controlled by Ministry of Internal Affairs and the Police, whilst the latter is a matter of city planning in the responsibility of the BEP.

The SCE, (or MOEP after the reform of government including SCE and Hydromet) and the BCE should understand the scale of environmental impacts caused by car exhaust and work out necessary policies that will be followed by the relevant authorities mentioned above.

b. Strategies

BCE/SCE	Other Organisations	
Work	**Work**	**Organisation**
PHASE I: 2001 - 2003		
1. To improve the inspection of factories by referring to documents. 2. To strengthen the inspection of factories with large environmental impacts. 3. To encourage factories to introduce anti-pollution measures and CPT by developing financial and technical support systems. 4. To strengthen the inspection of mobile sources. 5. To establish a new monitoring station to monitor air quality influenced by car exhausts. 6. To support Hydromet to review its monitoring system.	1. To start to introduce anti-pollution measures and CPT following the BCE/SCE's recommendation. 2. To formulate a traffic improvement plan for smooth traffic flow. 3. To assist vehicle owners to equip vehicles with exhaust pollutant reduction devices. 4. To review a system obliging vehicle owners to periodically obtain an official approval of mechanically and environmentally satisfactory vehicle conditions.	Factories Relevant Ministries BEP Road Police Relevant Organisations Police

monitoring system. 7. To raise computer skills of department staff for GIS data input and data presentation.	5. To rearrange the air monitoring system.	Hydromet
PHASE II: 2004 – 2006		
1. To present practical recommendations to all factories if necessary. 2. To promote air pollution control industry 3. To revise the fines on polluting vehicles.	1. To extend anti-pollution measures and CPT following the BCE/SCE's recommendation. 2. To introduce the license issue process for vehicle repair shops. 3. To implement the traffic improvement plan.	Factories Relevant Ministries Relevant Organisations BEP
PHASE III: 2007 - 2010		
1. To apply the emission standards strictly to existing factories which are changing or expanding their operations. 2. To abolish fines on polluting vehicles. 3. To restructure the air monitoring system.	1. To extend anti-pollution measures and CPT following the BCE/SCE's recommendation.	Factories Relevant Organisation

3.2.2 Water Resources Protection

a. Directions

a.1 Industrial Wastewater

It is currently the policy that industry is responsible for treating its own wastewater, and this should continue. According to the Wastewater M/P, by 2015 all industrial wastewater should be discharged to the city sewerage and treated at the wastewater treatment plant, together with domestic wastewater. Therefore the industry is obliged to treat its wastewater to an extent that is acceptable to the city sewerage.

The fundamental roles of the SCE and the BCE will not change. The SCE must develop policy and legislation, and lead the wastewater dischargers toward environmentally friendly operation. The BCE acts locally to monitor and control the polluting activities in Baku. By 2010, the BCE should:

- control pollution sources that discharge their wastewater to public water bodies (other than sewerage) in a fair, systematic and efficient way with revised discharge standards, documents provided by the sources, and a new inspection system that focuses on main polluters;
- not only penalise pollution sources, but positively encourage them to introduce environmentally friendly operation;
- cooperate with the sewerage authority, which controls wastewater discharge to the sewerage, by fair control over all the wastewater dischargers, paying attention to the overall water quality protection.

a.2 Domestic Wastewater

In the Wastewater M/P all domestic wastewater should be treated by the sewerage authorities and discharged to the Caspian Sea by 2015. The sewerage authority has responsibility to implement projects proposed in the Wastewater M/P. The SCE/BCE should facilitate its implementation.

a.3 Water Resources Protection

ARWC (Absheron Regional Water Company) will play a main role for water resources protection by putting the Water M/P into practice. The SCE/BCE should assist ARWC in the reduction of water consumption in Baku, which relies on water supply from other regions.

The protection of the Jeirantaban reservoir is crucial for the city. By the target year of 2010, the safe water supply from the reservoir should be ensured by the Committee of Amelioration and Water Farm (CAWF) and ARWC, with policy support by the SCE/BCE.

b. Strategies

BCE/SCE	Other Organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To improve the inspection of factories. 2. To strengthen the inspection of factories with large environmental impacts. 3. To encourage wastewater dischargers to introduce anti-pollution measures and CPT by developing financial and technical support systems. 4. To set wastewater discharge standards for each discharge type. 5. To support the implementation of the projects planned in the wastewater M/P. 6. To promote the formulation of a watershed protection plan for the Jeiranbatan reservoir. 7. To encourage the implementation of priority projects of the water M/P. 8. To raise computer skills of department staff for GIS data input and data presentation.	1. To make a water pollution abatement plan consistent with the wastewater legislation. 2. To implement the priority projects in the wastewater M/P. 3. To implement the priority projects in the water M/P. 4. To formulate the watershed a protection plan for Jeiranbatan reservoir and implement the urgently needed projects.	Each pollution source BEP ARWC ARWC and CAWF
PHASE II: 2004 – 2006		
1. To apply the new discharge standards to new factories. 2. To present practical recommendations to all factories if necessary. 3. To promote the full implementation of the watershed protection plan for Jeiranbatan reservoir.	1. To start to implement the water pollution abatement plan. 2. To implement the priority projects identified in the wastewater M/P. 3. To implement the priority projects identified in the water M/P.	Each pollution source BEP ARWC

4. To assist and supervise activities of other organisations for water resources protection.	4. To fully implement the watershed protection plan for Jeiranbatan reservoir.	ARWC and CAWF
PHASE III: 2007 - 2010		
1. To apply the new discharge standards to existing factories which are changing or expanding their operations. 2. To raise awareness concerning the importance of water resource protection among the general public and encourage such actions as the minimisation of water consumption and grey water recycling.	1. To fully implement the water pollution abatement plan. 2. To implement the wastewater M/P. 3. To implement the water M/P.	Each pollution source BEP ARWC

3.2.3 Land Protection and Waste Control

a. Directions

a.1 Municipal Solid Waste Management

The BEP and District EPs will continue to bear the responsibility for municipal solid waste management (MSWM). There will need to be careful and rational consideration to decide whether the operation of MSWM is to be partly or fully contracted out to the private sector. Therefore, there is an urgent need to develop a M/P for MSWM in which a number of options including privatisation are examined. The formulation of the M/P rests with the BEP and District EPs, while the BCE/SCE is responsible for encouraging, supervising and supporting them in the smooth formulation and implementation of the M/P.

The team consider that the following five issues must be taken into account for MSWM M/P formulation:

- because of severe financial restrictions, the improvement of MSWM must be a phased process;
- the main focus of the short- and middle-term improvement must be on (i) the provision of sufficient waste collection service throughout the city, (ii) the prevention of city environment degradation due to illegal waste dumps, and (iii) the execution of sanitary disposal of all collected waste;
- meanwhile, there is a strong need to re-establish waste recycling systems (which hardly function after the collapse of FSU), particularly those for used paper and steel scrap;
- the introduction of intermediate treatment technology for municipal solid waste such as incineration and composting should be carefully examined from the long-term viewpoint. The introduction of treatment facilities for toxic waste and medical waste must be a priority;
- to enable and support the privatisation of MSWM, it will be necessary to develop legislation to promote, supervise and control the private sector, and to strengthen the governmental institution and financial base.

a.2 Hazardous Waste Management

Industrial waste is divided into two types: non-hazardous and hazardous. The former should be covered by the MSWM M/P, while a regulatory framework for the latter is being studied in the sub-component of the UEIP "Technical Assistance for Development of a Hazardous Waste Management System" (UEIP HWM Study) which commenced in July 2000 and will finish in June 2002. Following the UEIP HWM Study, a HWM M/P of the study area will be formulated by the SCE while feasibility study for construction of HW treatment and disposal facilities will be conducted by organisations to be determined by the M/P.

That HW generators are responsible for disposal (from collection to final disposal) is the fundamental principle at present and for the future. The SCE must develop national policy, legislation and have a planning function, following the UEIP HWM Study, whilst the BCE should supervise and controls the facilities for HWM. Recognising that there are no HW treatment and disposal facilities available to HW generators outside their premises (e.g. factories), the following must be the critical issues for proper HWM:

1. establishment of appropriate HW control and disposal systems within factories;
2. establishment of HW management systems including collection, transport, treatment and final disposal of HW discharged from factories, particularly establishment of HW disposal executing bodies;
3. establishment of the governmental structure to promote, supervise and control the above mentioned.

Whether an implementing body for point (2) above will be private or governmental must be one of the more difficult questions. It is an established international practice to leave it to the private sector. However, certain types of governmental intervention will be inevitable in order to promote private enterprises of HW treatment and disposal, as there are no such enterprises in Azerbaijan at present.

a.3 Medical Waste Management

The "Sanitary Regulations for Maintenance of Residential Areas, SanPiN 42-128-4690-88" prohibit medical waste disposal (infectious/hazardous from medical institutions) at a landfill without treatment. According to the Opinion Survey for Medical Institutions conducted by the team, some of medical institutions discharge their medical wastes without treatment and those wastes are disposed of at landfills with municipal waste. A M/P for medical waste management is therefore urgently needed. The M/P has to be developed by the BEP and Ministry of Health, while the BCE/SCE will be responsible for encouraging, supervising and supporting the M/P formulation in order to execute its overall responsibility for environmental management.

The team considers that the M/P for medical waste management must take the following into account:

- the amount of medical waste generated in the study area is small. The team surveyed 40 medical institutions and estimated based on the survey results that total amount of medical waste from 239 medical institutions in the study area was 12.9 ton/day in 1999 and would be 15.0 ton/day in 2010. Therefore, the

strict separation of medical waste from general municipal waste at all the generation sources is a key prerequisite for the establishment of proper medical waste management;

- the next question is whether medical waste is to be treated at source or collected for centralised treatment. For the latter, the introduction of a medical waste collection system that is independent from a municipal solid waste collection system will then be needed. It is to be noted that small incineration facilities for medical waste treatment are nowadays being phased out in many countries, as it is a major source of dioxins[15];
- because medical waste generation amount is small, the introduction of a toxic waste incinerator or incineration at cement kilns will be the appropriate option.

a.4 Illegal Dump Control

The BEP and each District EP will control illegal dumps, as they do at present. They should work out an illegal dump control system with consideration of the following conclusions, which were drawn from a pilot cleanup at the site behind the Sport Palace and a public awareness campaign:

1. the cost for illegal dump cleanup is beyond the affordability of the BEP and District EPs considering their current financial situation. Their limited finance should be, therefore, first concentrated on the prevention of new illegal dumps arising;
2. the most urgently needed preventive measure is to provide an adequate waste collection service to the whole city;
3. public awareness campaigns must be repeated, following which the illegal dump control system with public participation will be strengthened.

The details of the illegal dump control system will be investigated in the MSWM M/P. Based on experience leant from the pilot project, the BCE/SCE needs to help the BEP and District EPs to obtain public cooperation. In addition, it should integrate information on severe illegal dumps on the GIS and provide some of useful information to the public and governmental bodies.

a.5 Contaminated Land Restoration

The restoration of oil-contaminated land should be undertaken by relevant organisations following the on-going two projects: onshore oil field cleanup within UEIP by the WB and oil contamination cleanup by Tacis. The SCE/BCE will organise a national work group in co-operation with other organisations in order to facilitate the restoration of oil contaminated area cleanup.

Land contaminated from other sources should be restored, based on the "polluter pays" principle. However, the field investigation of land contamination is expensive and polluters are unlikely to study their land unprompted. The BCE/SCE, with the cooperation of other research agencies, should focus on land, which is so contaminated, that significant environmental impacts are anticipated, as at the site

[15] In general a small incinerator does not work continuously and is not equipped with an emission gas treatment facility for dioxins. Discontinuous operation is difficult to avoid combustion temperature of 300 to 400 °C, in which temperature dioxins generate.

contaminated with mercury in Sumgait. When a new development activity is planned, the BCE/SCE should oblige the developer to carry out a land contamination study ("the baseline survey"), to assess the positive or any adverse impacts on the land contamination after development, and to take necessary measures to avoid environmental impacts including project cancellation (where that would be detrimental to the environment). The BCE/SCE should evaluate the EIA reports prepared by the developers recognising that the acceptable level of land contamination depends on type of development activity (e.g. land should be less contaminated with volatile toxic substances if housing development is planned than if the site is required for new industrial building construction).

The BCE will be the centre for contaminated land information in Baku. Since researching and collecting soil quality data of contaminated land represents large workloads and considerable cost, it will involve many other organisations including the State Land Committee, Institute of Soil Science and study teams of UEIP by the WB and of Oil Contaminated Cleanup project by Tacis as it does at present. The BCE should then integrate the data and information, enter those into the GIS, and provide them to the public and other organisations to promote contaminated land restoration.

a.6 Mineral Resources Protection

In order to prevent public beaches and other recreation areas and eliminate a large number of pits and illegal dumpsites caused by illegal mining of sand, clay and gravel, it is necessary to strengthen the BCE's capacity to control and cope with illegal mining operations. In addition, the enforcement mechanisms should be improved in order to prevent such activity. For the enforcement coordination with police is essential.

Regarding the problems caused by authorised limestone mines, the first step of the improvement shall be establishment of the system to avoid improper mining operation. The system includes a careful evaluation of EIA for mining development plans, enforcement of proper operations that shall be the conditions for operational permits and coordination with the BEP regarding permission for the operation of them. Rehabilitation of current damaged areas by improper mining operation and recycling of associated waste shall be carefully examined and planned considering economic viability, degree of the environmental damage, social needs, etc.

b. Strategies

BCE/SCE	Other Organisations	
Work	**Work**	**Organisation**
PHASE I: 2001 – 2003		
1. To encourage, supervise and support the formulation of an MSWM M/P. 2. To strengthen legislation to control hazardous waste treatment and disposal, in accordance with the UEIP HWM Study. To assist financially and technically the construction of a HW disposal site for mercury contaminated waste.	1. To formulate the municipal waste management M/P. To provide sufficient refuse collection services to all districts in Baku. 2. To construct the HW disposal site for mercury contaminated waste, which may be used for the disposal of other type of HW than mercury.	BEP and each district EP To be determined.

3. To encourage, supervise and support the formulation of a medical waste management M/P. 4. To encourage, supervise and support the development of an illegal dump control system. 5. To organise a national work group in co-operation with other organisations for oil contamination cleanup. To integrate data of contaminated land into GIS database. 6. To strengthen the BCE's capacity to control and cope with illegal mining and improper mining operation. 7. To raise computer skills of department staff for GIS data input and data presentation. To strengthen the department with equipment necessary to accomplish their works.	3. To formulate the medical waste management M/P. To strengthen primary treatment at medical institutions and separate collection. 4. To develop a system to prevent illegal dumping. 5. To develop cleanup method of oil contaminated land. To research soil contaminated area and develop restoration method. 6. To develop enforcement mechanisms to prevent illegal mining and improper mining operation. 7. To designate sites for the disposal of HW and MSW in the land use plan of the Baku city.	MOH, BEP and each district EP, and medical institutions BEP and each district EP WB, TACIS and others Police, BEP, SCMS BEP and each district EP
PHASE II: 2004 – 2006		
1. To encourage the implementation of the priority projects following the MSWM M/P. 2. To formulate a HWM M/P and develop a HWM system following the results of the UEIP HWM Study. To encourage feasibility studies for the construction of HW treatment facilities. 3. To encourage the implementation of the priority projects (separate collection and final disposal) following the medical waste management M/P. 4. To encourage illegal dump cleanup by developing technical support systems. 5. To encourage oil contaminated area cleanup. To enforce soil investigation in EIA for development of possibly contaminated area. 6. To develop a control system of illegal mining and improper mining operation. 7. To promote large waste generators (factories) to minimise waste (e.g. to introduce CPT) by developing financial and technical support systems.	1. To implement priority projects (sanitary landfill, strengthening recycling system, etc.) following the MSW management M/P. 2. To conduct the feasibility study for construction of HW treatment facilities following the result of the UEIP HWM Study and the construction of the HW disposal site. 3. To implement priority projects following the medical waste management M/P. 4. To establish the system to monitor and prevent illegal dumping and to cleanup existing illegal dump sites. 5. To commence oil contaminated area cleanup. To conduct soil investigation for EIA for development of possibly contaminated area. 6. To control, supervise and enforce the control system of illegal mining and improper mining operation. 7. To reduce waste by introduction of CPT, etc.	BEP and each district EP To be determined. MOH, BEP and each district EP BEP and each district EP To be determined. Police, BEP, SCMS Factories
PHASE III: 2007 - 2010		

1. To encourage the introduction of waste minimisation and waste recycling systems of MSW. 2. To encourage the construction of the HW treatment facilities. 3. To encourage central treatment of medical waste. 4. To further encourage illegal dumpsites cleanup. 5. To organise a national work group in co-operation with other organisations for soil contaminated area cleanup in industrial areas. 6. To encourage rehabilitation of damaged areas by illegal mining and improper mining operation. 7. To further encourage factories to minimise waste (e.g. to introduce CPT and to manufacture recyclable products).	1. To implement the MSW management M/P (e.g. promotion of recycling and reduction of waste.) 2. To construct the HW treatment facilities. 3. To implement the medical waste management M/P (central treatment, etc.). 4. To continue to cleanup the illegal dumpsites. 5. To commence soil contamination cleanup in industrial areas. 6. To examine and commence rehabilitation of damaged areas by illegal mining and improper mining operation. 7. To minimise waste generation (e.g. by applying CPT and manufacturing recyclable products.)	BEP and each district EP To be determined. MOH, BEP and each district EP BEP and each district EP To be determined. Mining companies, BEP, SCMS Factories.

Note: SCMS: State Committee for Mining Supervision

3.2.4 Fauna and Flora Protection and Conservation Areas Management

a. Fauna Protection

a.1 Directions

The BCE will be the centre for fauna information in Baku. Since keeping records of fauna species entails a large workload, this process will involve Institute of Zoology within the Academy of Sciences as it does at present. The BCE should then integrate the record, enter data into the GIS, and provide data to the public and other organisations to promote nature conservation awareness.

Fauna protection has been carried out by the BCE using three key approaches: i) control of illegal fishing; ii) control of illegal hunting; and iii) controlled issue of hunting licences. Responsibility for hunting and associated permits and licenses will remain the responsibility of the BCE.

However, the issues related to fish are more complex. Within the Caspian Sea there are Azerbaijani regional borders and international boundaries, all within close range of the coastline. Devolving control directly to *regional* committees of the SCE may therefore cause territorial disputes if vessels are followed over boundaries or into international waters. Control of fish catches should therefore be the responsibility of the SCE. However, in practice, the observation of individual vessels should be undertaken by the marine police, with whom the SCE should work closely. In the event that the SCE wishes to inspect a specific vessel whilst at sea, the marine police should arrest the vessel and assist the SCE inspector to conduct such searches and examinations as are appropriate. Examination of fish catches at ports and harbours in the Baku region can be undertaken by the BCE without direct involvement of the marine police.

In other words, the work associated with illegal fishing will be allocated as follows:

- catching suspected fishing boats: Marine police;
- identifying whether fishing is illegal or not (eg excess of the permissible catch, catching rare species, etc.): SCE/BCE;
- punishing illegal fishermen according to the penal regulations, or taking another appropriate actions: SCE/BCE together with the prosecutors' office.

Accordingly, the vessels which currently belong to the BCE and cost the BCE substantial sums for maintenance, should be abolished or transferred to other organisations.

Where the SCE suspects that a vessel is fishing illegally, it may be necessary to produce aerial photographic evidence or satellite images to validate the claim. Clearly, the required equipment will be beyond the financial resources of the BCE within the M/P period.

In the plan for the restructuring of the SCE, whereby the environmental management aspects of fishery resources management would be devolved from different organisations in the country to be integrated in the MOEP, the SCE (MOEP) should have comprehensive capacity for research based fishery resources management enabling it to determine appropriate levels of catch. Since fishery resources management is a concern of not only Azerbaijan but also Caspian littoral countries, the SCE (MOEP) will need close communication with them following the initiative of the Caspian Environmental Programme.

a.2 Strategies

BCE/SCE	**Other Organisations**	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To review and improve legislation to protect fauna. 2. To raise computer skills of department staff for GIS data input and data presentation. 3. To strengthen the institution with equipment for fauna protection. 4. To widely publicise the legal hunting procedure.	1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern. 2. To co-operate with the BCE/SCE for fauna protection.	GoAz BEP, district EP, others.
PHASE II: 2004 – 2006		
1. To integrate species record and enter data to the GIS. 2. To disseminate the species data in the GIS to the public. 3. To utilise the data integrated in the GIS for an appropriate hunting license system.	1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern. 2. To co-operate with the BCE/SCE for fauna protection.	GoAz BEP, district EP, others.
PHASE III: 2007 - 2010		

1. To complete a routine procedure of data input to the GIS. 2. To improve the data presentation skill to effectively disseminate the species data on the GIS to the public. 3. To assess the fishery resources and to encourage sustainable fishery production.	1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern. 2. To co-operate with the BCE/SCE for fauna protection.	GoAz BEP, district EP, others.

b. Flora Protection

b.1 Directions

The BCE currently recognises that its responsibility is to detect those who illegally cut trees in the city. What it then does is to claim a compensatory payment from the offender for the damage to flora. However, this is not environmentally effective as the payment is not actually used to restore the lost greenery. Recognising that the main reason for people cutting trees is to obtain a land plot to start or expand a business, it is a matter of not just greenery protection but of land allocation procedures.

The main focus should be to prevent such violations, by developing and enforcing a land use control mechanism, rather than to blame people after the event has taken place. Such land use controls must be formally recognised by all governmental sectors, particularly the BEP, as well as the general public. The BCE should support the execution of land use control by applying the EIA process more rigorously. The Flora unit of the BCE will then require a new emphasis for its work - from looking at individual trees to managing the city's overall flora environment.

Greenery development in Baku has been instigated mainly by the BEP, and by Production Association of Forestry (Azerbmeshe) and Ministry of Road Construction to a limited extent. The BEP runs six nurseries and closely cooperates with the Botanical Garden where research on flora species suitable for the city and greenery maintenance has been carried out in cooperation with the Institute of Botany and the Institute of Microbiology within the Academy of Sciences. The greenery development plans are to be developed and put into practice by those implementing organisations. The roles of the BCE are to integrate its plans into the GIS, monitor its achievement, understand the overall greenery conditions of the city, and give suggestions to the implementing organisations by providing information from the GIS for their planning processes.

In order to introduce a more widespread culture of flora protection, there is a need for awareness by the general public that increasing city greenery to the current level follows a long history of cultivation: furthermore that greenery as an important element of city landscape is vital not just visually but as an environmental asset. The BCE should put considerable effort into public awareness raising in this area. By doing so, people should be urged to take care of plants and to control illegal cutting among themselves.

When trees have to be cut down for urban development, the BCE should carefully assess the degree of damage in its EIA process from the viewpoint of city greenery management. If there is damage, the BCE should enforce its power to cancel or

amend the development plan, or to oblige the developer to plant trees either in or around of its premises in accordance with a quantified plan.

b.2 Strategies

BCE/SCE	Other Organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To clarify the tasks of BCE for city greenery. 2. To review and improve the legislation for the BCE to execute its tasks. 3. To raise computer skills of department staff for GIS data input and data presentation. 4. To review the greenery data on the GIS.	1. To formulate a plan on tree plantation (the area, tree species, tree numbers, etc.). 2. To construct nurseries 3. To carry out research on flora.	BEP, PAF, MORC BEP and/or others. Academy of Science, universities, Botanical gardens, others.
PHASE II: 2004 – 2006		
1. To communicate with greenery implementing agencies. 2. To enter greenery information into the GIS. 3. To promote public awareness and participation in greenery development.	1. To plant trees. 2. To carry out research on flora.	BEP, PAF, MORC Academy of Sciences, universities, Botanical gardens, others.
PHASE III: 2007 - 2010		
1. To keep the GIS data updated. 2. Monitor overall city greenery and give suggestions on greenery development to the implementing agencies. 3. To cooperate with the EIA personnel of the BCE/SCE to prevent trees from being unnecessarily felled. 4. To promote public participation in greenery development.	1. To plant trees. 2. To carry out research on flora.	BEP, PAF, MORC Academy of Sciences, universities, botanical gardens, others.

Note: PAF: Production Association of Forestry (Azerbmeshe)
MORC: Ministry of Road Construction

c. Conservation Areas Management

c.1 Directions

c.1.1 Nature Reserves

The only nature reserve in Baku, the Gobustan Nature Reserve, has been under the control of Ministry of Culture. This organisation structure should remain, recognising that the value of the reserve is in its cultural importance. The contribution of the BCE will be to keep location data of the reserve in the GIS and to control land use near the area.

c.1.2 Sanctuaries

In Baku (where its arid climate hampers diversified flora growth), two sanctuaries are the unique zones for people to have an opportunity to become aware of "nature values". The role of the BCE should therefore not be limited to the protection of sanctuaries from human influences, but extend to the encouragement of people's nature consciousness. Taking account of the current management capability of the BCE, Absheron sanctuary development will be the first step. The development of the Gil island sanctuary will follow in future, but it will require the examination of natural resources in the neighbouring islands as the region forms a habitat for waterfowl as a group of islands.

c.1.3 National Park

Boulevard Park was newly designated as a national park and the BEP should take full responsibility for managing it. The BCE's GIS will help ensure rational land use around the park. The BCE, together with the SCE and the Caspian Inspectorate, should also promote its recreational importance through the environmental improvement of the Caspian Sea.

c.1.4 Natural Monuments

The management of all natural monuments is the responsibility of local authorities, and the work of BCE is restricted to supervision. With this understanding, the directions below should be followed by relevant bodies.

Binagadi Deposit

A long-term excavation plan should be formulated to execute academic research and improve the Natural History museum, where excavated fossils are displayed. A signboard should be installed at the site which describes the academic significance of the deposit. Visits of school children to the site and the museum will be then promoted.

Yasamal Valley

There should be a compulsory land use control system to restrict large-scale construction works and land disturbance. Because of its beautiful scenery, the area may need to be designated as a landscape reserve area in which human activities that may degrade the scenery will be prohibited.

Lokbatan Mud Volcano

The poor accessibility to the site has kept people from visiting the site and it is therefore well preserved. Protection will not be the main issue but the BCE should promote land use control in order to avoid possible damage by volcanic activities.

Korgoz Mountain

For the protection of its scenic beauty, land use control at the area must be enhanced to limit the development of large construction and land disturbance, for example by quarry development. The area may need to be designated as a landscape reserve area in which human activities that may degrade the scenery will be prohibited.

Greater Kanizdag

Land use control needs to be enforced to avoid large-scale construction and land disturbance, and also to prevent negative influences on people by volcanic activities.

Beyuk Dash

A fence should be installed to limit the entry of people, as the area is not safe due to the presence of many craters. Academic research will be necessary, based on which the area's importance may become recognised and an appropriate management plan formulated.

Ayrantekan Mud Volcano

Land use control needs to be enforced to avoid large-scale construction and land disturbance, and also to prevent negative influences by volcanic activities.

Dashkil Mud Volcano

Land use control need to be enforced to avoid large-scale construction and land disturbance, and also to prevent negative influences by volcanic activities.

Baku Layer

The land use at and near the site must be strictly controlled because of its scientific importance and for disaster prevention. In particular, construction on the slope should be totally prohibited. Engineering works will be also necessary in part of the site to prevent landslides.

Bayil Rocks

Because these are below the water surface and not visible, there is a risk of them being crushed by ships. A warning sign should be installed.

c.2 Strategies

BCE/SCE	Other Organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To raise computer skills of department staff for GIS data input and data presentation. 2. To urge the relevant local authorities to formulate a conservation plan and/or land use plan for Gobustan Nature Reserve, Boulevard Park, and each natural monument and to report those plans to the BCE. 3. To put the Absheron sanctuary development plan into practice.	1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern. 2. To co-operate with the BCE/SCE for natural conservation area management.	GoAz BEP, district EP, others.
PHASE II: 2004 – 2006		
1. To enter the land use plans for Gobustan Nature Reserve, Boulevard Park and natural monuments into the GIS. 2. To urge relevant organisations to implement the conservation plans for	1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern.	GoAz

implement the conservation plans for some of the natural monuments. 3. To complete the Absheron sanctuary park development and start its operation.	2. To co-operate with the BCE/SCE for fauna protection and nature conservation area management.	BEP, district EP, others.
PHASE III: 2007 - 2010		
1. To provide information on natural conservation areas to the public for awareness raising. 2. To utilise land use plans for nature conservation areas in the EIA process. 3. To start to examine the Gil Island sanctuary development plan.	1. To promote international co-operation activities to protect migratory birds, fish in the Caspian Sea and other fauna communities of international concern. 2. To co-operate with the BCE/SCE for fauna protection and natural conservation area management.	GoAz BEP, district EP, others.

3.2.5 Laboratory (Chemical Analysis)

a. Directions

The laboratory is a technical focal point for environmental control and law enforcement, which is the responsibility of the BCE. The practical work involved in air protection, water resources protection, EIA and food environmental control departments/units of the BCE largely depend on laboratory work. Therefore a long-term laboratory development plan for effective operation and sound finance is necessary.

By the target year 2010, the BCE laboratory will:

- analyse emission gas and wastewater from factories when the BCE inspectors identify a violation of permissible normative standards
- analyse emission gas and wastewater from factories that can not analyse these by themselves;
- analyse soil samples from land plots where a development project is planned, on the request of a developer;
- analyse the potential contamination of food;
- analyse air quality at a newly established monitoring station that monitor the influence of mobile sources.

b. Strategies

BCE/SCE	**Other Organisations**	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To improve techniques to analyse wastewater and soil by utilising the existing laboratory facility. 2. To install a minimum level of equipment for factory emission gas	1. To co-operate with the BCE/SCE in training laboratory technicians by providing technical instructions.	Academy of Sciences, Land Committee, Hydromet.

equipment for factory emission gas and food analysis. 3. To obtain additional equipment for wastewater and soil analysis. 4. To participate the establishment of a new monitoring station.	2. To provide monitoring data to the BCE/SCE. 3. To exchange technical information.	Hydromet, MoH, Land Committee. Academy of Sciences, Land Committee, Hydromet.
PHASE II: 2004 – 2006		
1. To start analysis of factory emission gas, and of food. 2. To start air monitoring at the new monitoring station. 3. To strengthen the laboratory facility for factory emission gas and food analysis.	1. To exchange technical information	Academy of Sciences, Land Committee, Hydromet.
PHASE III: 2007 – 2010		
1. To develop manuals for quality assurance and quality control of analysis. 2. To establish training programmes for laboratory technicians. 3. To take part in environmental projects.	1. To exchange technical information	Academy of Sciences, Land Committee

3.2.6 Food Environment Control

a. Directions

In order to support economic growth, humans have been using various chemical substances which are now widespread in the environment. On the other hand, in recent decades humans also started to recognise that their health is in danger of being affected through food intake by those substances that are now dispersed in the environment.

The BCE/SCE will have the responsibility for (i) analysis of heavy metals, pesticides, phenol and radioactivity associated with food and (ii) toxicological control of chemical substances, on condition that a new Presidential decree is issued. In the case of pesticides, analysis is already the legal responsibility of the BCE/SCE[16]. The extension of responsibilities for the BCE/SCE is an indication of today's concerns about human risks of chemicals mentioned above.

The important point is that food contamination with such substances is the consequence following from a contaminated environment. The BCE/SCE should reflect the results of the food analysis and toxicological knowledge in its own environmental management approach. For example, once cadmium contamination in a fish is observed, the BCE should investigate its source, the pathway from the outlet of cadmium to the fish, cadmium contamination in other seafood, and the level of health risk to humans. The BCE/SCE also should inform the general public of how serious the event is/was and what people should do or not do. The findings from

[16] However, the SCE/BCE do not have equipment to analyze pesticides at this moment.

toxicology analysis of chemical substances must be incorporated in the wastewater discharge standards, air emission standards, and/or ambient quality standards reviewing their behaviour in the environment.

In other words, food control must not be undertaken simply by discarding the food concerned. Instead, the BCE should regard food control as an impetus to cope with a newly revealed environmental issue.

Considered in this way, the control by the BCE/SCE of contamination of imported food (which is also to be stipulated in a new Presidential decree) will require international intervention. On finding imported food contaminated with heavy metals, pesticides, phenol or radioactivity, disposal of the food is easy to arrange, but the cause of contamination should be investigated and countermeasures must be taken. It should be the SCE, which urges the country of origin to take appropriate actions.

On the other hand, toxicology analysis of chemical substances has a different implication. The results of toxicology analysis must be incorporated in the wastewater discharge standard, air emission standard, ambient quality standard, and any other standards or guidelines. Toxicology analysis of dioxins is a typical example, in that newly found toxicological features of dioxins have induced the government of many countries to set new ambient quality standards, air emission standards and guidelines of maximum dioxin intake levels from food consumption. Therefore toxicology is of national importance and a matter for the SCE to oversee.

However, toxicology analysis requires enormous inputs. The concern of modern science has shifted to the impact of chemicals at trace level (nano or pico units) in the long term. The type of the impact concerned has also changed from a high-level one (disease and/or death) to a hormonal or genetic level. A number of time-consuming laboratory studies are necessary to reach a reasonable conclusion. Therefore the role of the government, in the form of the SCE, should be to promote research activities at different institutions and to gather information on toxicology analysis from various organisations in the country and abroad, rather than to carry out fundamental analysis by itself. This information should be used in the determination of appropriate food safety standards.

b. Strategies

BCE/SCE	Other Organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To promote a proper legislative arrangement. 2. To clarify the tasks of the BCE and the SCE. 3. To review and improve the institution for the defined tasks.	1. To promote a proper legislative arrangement. 2. To develop a clear procedure for food import. 3. To carry out food control within each jurisdiction.	MoH, MoA, others. Port/airport authorities, others. MoH, MoA, others.

4. To develop a sampling procedure. 5. To develop laboratory facilities of the BCE. 6. To collect scientific research results to understand the environmental impact on food and health impact of contaminated food. 7. To assess the current impact of poor environment quality on food quality. 8. To study toxicological researches abroad and in Azerbaijan.	4. To carry out scientific research.	Academy of Sciences, universities, others.
PHASE II: 2004 – 2006		
1. To carry out food sampling, analysis, and assessment. 2. To develop a system within the BCE to respond to the detection of contaminated food. 3. To strengthen the laboratory facility for food control. 4. To consider the necessity of adding or revising existing regulations.	1. To enforce legislation within each jurisdiction. 2. To carry out scientific research.	MoH, MoA, others. Academy of Sciences, universities, others.
PHASE III: 2007 - 2010		
1. To improve laboratory work standards and processes. 2. To review and revise the food control system if necessary. 3. To revise/add regulations as necessary. 4. To provide information on the possible risks of food contamination to the public. 5. To keep the SCE itself updated with toxicological research.	1. To enforce legislation within each jurisdiction. 2. To carry out scientific research.	MoH, MoA, others. Academy of Sciences, universities, others.

MoH: Ministry of Health
MoA: Ministry of Agriculture

3.2.7 EIA

a. Direction

The ultimate goal of the integrated environmental management master plan is to contribute to the sustainable growth of Baku City giving due to attention to the environment. The EIA process is one of the tools to achieve this goal effectively. Therefore, by 2010, the EIA process must be fully in effect and its fundamental purposes, i.e. to predict environmental impacts of given development activities, to take countermeasures to avoid negative impacts beforehand, and to develop the city in a sustainable way, should be pursued. The GIS database, which is to be developed by the team, will be fully utilised in order that EIA may take account of natural and social conditions and environmental zoning in particular.

According to the Environment Protection Law of 1992 (and its amendment of 1999), the preparation of EIA reports is not compulsory. However, an EIA review for large and major projects has been conducted by the SCE, even where the project is in the BCE's territory. The BCE has so far evaluated only small projects for which the

developers submit only the project design documents. Therefore the experience of the BCE in the EIA review for large projects is still limited. The BCE's capabilities in environmental project evaluation should be developed sufficiently to conduct large-scale projects that require EIA.

b. Strategies

BCE/SCE	Other organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To review the demarcation between the SCE and the BCE for environmental review. 2. To clarify the screening process. 3. To develop a manual for EIA report preparation. 4. To review the fee structure for EIA. 5. To improve the environmental review documents. 6. To raise computer skills of department staff to use information on the environment of Baku in the GIS in order to facilitate EIA review. 7. To promote public involvement in the EIA process.		
PHASE II: 2004 – 2006		
1. To develop a manual for environmental project review. 2. To have the previous EIA reports available for use as reference.		
PHASE III: 2007 - 2010		
1. To introduce a system to trace implemented projects in order to compare the assessed environmental impacts and those that have taken place, and to reflect these on the EIA of similar projects. 2. To improve the efficiency of EIA review.		

3.2.8 Information

a. Directions

a.1 Information Centre

This department was established about one year ago. Its main job at present is the compilation of information on activities in the BCE. Environmental information dissemination to society is still on a limited scale, although it puts articles on environmental issues in newspapers from time to time. In the coming years, it should widen its activity, which includes information compilation and information diffusion.

The fundamental role of the Information and Environmental Education Department should be to act as an information centre for the BCE and the Baku environment. Therefore it is proposed to rename the department "Information Department". The department has so far been compiling information on the BCE's activities, but it should aim to be a focal point to which information - not only about the BCE itself but also the environmental status of Baku - is gathered from the BCE and other organisations, and from which such information is diffused.

For this purpose, the GIS established by the team in this study is a powerful vehicle and the department should make the best use of it. The data input of environmental information available to sector departments of the BCE will be done by departments themselves, as already described previous sections. This department then integrates information, processes it for presentation, and makes it accessible for industries, schools, the general public and any others who need it. The Internet will be the prime means for information diffusion.

The department also bears the responsibility for the overall maintenance of the GIS facilities, including hardware and software. The department staff must have an intensive training input to gain the wide knowledge of computers, networks and the Internet.

The major purposes of information compilation and diffusion will be to strengthen public relations and to promote environmental education.

a.2 Public Relations

The public in general is not well informed about environmental matters. The education system does not include a developed environmental curriculum, although some work is now being advocated. The aim is to develop an understanding of the importance of the environment in the processes of economic and social development - "to put the environment on the political and social agenda".

Publicity for environmental initiatives has been restricted by a lack of resources and a shortage of skilled public relations experts. Much publicity has relied on the printed mass media reporting press releases from the SCE/BCE.

The media has an important role in promoting environmental awareness and policy, which should not be overlooked. The media can be used effectively to disseminate information about actions being undertaken which could be duplicated or replicated elsewhere, whether within or outside Baku (for example the clean up of illegal solid waste dumps).

The department should ensure it works actively with the media (printed, radio and TV media) to ensure maximal coverage for work undertaken and planned by the BCE. In particular it would be helpful if the BCE is able to supply "stories" to the media on a regular basis, which describe what is planned and ongoing.

The BCE should form close working relationships with the major oil companies operating in Baku each of which has a public relations department. Whilst the main focus of their work will be to promote their own activities, informal discussion indicates that these companies may well be willing to enhance the work of the BCE. Seminars and discussions with other sectors of industry on different topics will be also promoted.

NGOs, if properly consulted and directed can work with the BCE to ensure that proactive environmental interventions are successful and well publicised. Their role will be to act as a communication vehicle, able to explain their actions in terms the community can understand.

a.3 Environmental Education

The Ministry of Education is currently undertaking a comprehensive programme of curriculum review. Many of the materials used, in several subjects are considered out-of-date and need radical overhaul. The BCE should liaise with the education sector to ensure that environmental affairs are included at all appropriate levels.

Environmental education will be divided into two types: school and higher education, and public education. Public education will then be performed in two tranches: a "pro-active" and a "reactive" form.

In the reactive form, the BCE purely provides information related to the environment. How to act on that information in the interests of the environment is left to the information receivers.

The GIS, which will be further enhanced by the contribution of each department of the BCE and others, will be a major tool for this form of environmental education. Access to the information on the GIS should be possible through the internet so that the widest population understands the environmental situation. For educational purposes, not only the environmental information but also the BCE's activities, rôles of the general public in environmental conservation, regulations, information on environmental facilities in Baku (e.g. botanical garden, Baku zoo, sanctuaries, natural monuments) and others should also be available on the internet. These kinds of information can be also printed in newspapers, pamphlets and signboards, and broadcast on TV.

In the pro-active form, the BCE should organise events and urge the public to be involved in real actions. Events might include voluntary tree planting, city cleanup, public open days demonstrating the GIS, tours of the Absheron sanctuary and visits to polluted sites. The actual execution of such events does not need to be done by the BCE itself and can be entrusted to NGOs.

These educational measures are to be extended to school education. There is currently a proposal under review for an environmental education component to be implemented under the World Bank funded Azerbaijan education reform project. This programme is being managed by the SCE in conjunction with the Ministry of Education.

BCE's information provided on the Internet, printed forms and on TV should be utilised in classes, and environmental activities should be incorporated into school life (e.g. excursions to the sanctuary). For this purpose, the BCE should have a close link with school teachers, local education committees and the Ministry of Education in order to promote environmental education at schools strongly.

The BCE should also discuss the required skills of graduates and post graduates with Ministry of Education and relevant authorities of universities so that their higher education becomes more environmentally focussed, practical and enables future knowledge based support for environmental management.

b. Strategies

BCE/SCE	Other organisations	
Work	**Work**	**Organisation**
PHASE I: 2001 - 2003		
1. To reorganise the department to cover public relations. 2. To gain journalist skills. 3. To obtain computer skills. 4. To open the BCE's homepage. 5. To establish an environmental data sharing system among environmental management related organisations. 6. To develop a framework to promote environmental education. 7. To promote the establishment of a taskforce with the education sector. 8. To meet the environmental NGOs on an annual basis to promote publicity and education	1. To provide the BCE/SCE data necessary for environmental management. 2. To publicise information relevant to illegal waste dumping in order to promote the illegal dump monitoring system. 3. To establish a taskforce to strengthen environmental education. 4. To develop the NGO capacity	organisations involved in environmental management BEP and each district EP Ministry of Education NGO forum, ISAR*
PHASE II: 2004 - 2006		
1. To broaden the information in the BCE's homepage. 2. To organise public events. 3. To support the education sector by providing environmental information. 4. To work more closely with environmental NGOs	1. To instruct the public how to contribute and participate in environmental management e.g. by minimising waste generation, protecting natural resources, and keeping the city clean. 2. To include environmental subjects in primary/secondary school education 3. To promote environmental higher education.	BEP and each district EP Ministry of Education Ministry of Education
PHASE III: 2007 - 2010		
1. To broaden the information in the BCE's homepage. 2. To organise public events. 3. To evaluate the progress of environmental education	1. To continue to instruct the public how to contribute and participate in environmental management.	BEP and each district EP, others.

*ISAR: A humanitarian aid agency of the USA.

3.2.9 Administration Department

a. Direction

The administration of the BCE should be streamlined in order to achieve two key objectives:

- provision of an *effective* support service to the BCE;
- provision of that service in an *efficient* manner, using up-to-date support facilities to minimise the cost burden.

Administrative services within the BCE are currently provided by separate units concerning legal, human resources (personnel), finance and accounting, and maintenance functions. As is common practice within Azerbaijani government departments, there is no single function within the BCE clearly responsible for general administration.

At present the administrative overhead (including maintenance) comprises 18 percent of the staff headcount. The M/P aims to bring this overhead down to less than 11 percent of the total staff numbers.

The BCE management should conduct an annual review throughout the M/P period to determine whether there are any functions in the administration department which should be privatised, for example maintenance, cleaning or driving. The BCE should consider the standard of work required, the current total cost (including salaries, materials and other expenses) and the cost of the work done externally.

Where it is more appropriate for the work to be carried out externally, a contract should be drawn up with the proposed supplier

The finance unit will assume responsibility for computing and related equipment management. It will need to use external suppliers for specific technical problems which may arise with computers and the GIS system.

Revised methods of working should be in place by the end of the first phase, (ie by 2003) if there is no transition to MOEP status. In the event that there is an earlier transition, new administrative operations and processes should be introduced as an integral part of that transition.

All administration functions will report to a deputy chairman within the BCE/MOEP structure.

b. Strategies

BCE/SCE	Other Organisations	
Work	**Work**	**Organisation**
PHASE I: 2001 - 2003		
1. To improve financial information and support to senior managers. The SCE/MOEP to provide clear instructions regarding its financial administration requirements 2. To provide a comprehensive human resources development service for all BCE management and staff 3. To develop a set of operating guidelines to enable staff to understand the legal issues connected with their work 4. To raise computer skills of accounting and HR unit staff 5. To manage the computing and related equipment (including GIS) within the BCE	1. The CoM to ensure SCE/BCE staff rewarded appropriately for work done	CoM

6. To streamline the work of the maintenance unit to operate a system of preventative maintenance	2. The Prosecutor's department and sectoral ministries to review procedures	Prosecutor, Sectoral Ministries
PHASE II: 2004 - 2006		
1. To transfer maintenance and office cleaning work from the BCE to a stand-alone function operating under a service contract 2. To Increase use of computers to enable staff reductions		
PHASE III: 2007 - 2010		
1. Continue personal development of all staff with skills and knowledge training inputs as required.		

3.2.10 Financial Management

a. SCE

a.1 Directions

The SCE should have a sustainable finance basis to enable itself to improve the environment adequately by the target year 2010. This implies that the SCE must acquire the necessary budget from the nation and minimise the necessary budget by institutional reform.

The foremost issue for the SCE is the implementation of the NEAP, in order to improve the state of the environment. For this purpose, the SCE requires a large investment and close coordination with other governmental bodies such as the Cabinet of Ministers, Ministry of Finance, Ministry of Economy, SOCAR and Azerenergy. In the initial stage, project implementation would be only possible with financial assistance from international aid agencies including the World Bank, Tacis and IDA[17]. By the target year, however, there should be a system by which country's environmental management is executed with appropriate allocation of the national budget, Environmental Protection Fund (EPF) and Oil Fund.

The EPF, which should be a key instrument for the "polluters pay" principle in Azerbaijan, is, however, small in scale and not generally used for environmental purposes. The charges on polluters remain at the 1992 level, thus no longer motivate industries to operate environmentally. It is vital to increase the EPF charges to meet the inflation of the country, which is about 250 times during 1992 to 2000[18], and effectively utilise the EPF for environmental improvement. Cooperation with other state organisations and continuous discussion with the Ministry of Finance are inevitable.

Due to the limited budget from the state, the operation and maintenance (O&M) cost of the SCE has largely relied on "off budget" funds at present. The budget source

[17] International Development Association, which provides soft-conditioned credit.
[18] US$ 1.00=4,547 manat at the end of October 2000 according to National Bank of Azerbaijan and US$ 1.00=18.4 manat in 1992 in *Statistical Yearbook of Azerbaijan 2000* by State Committee of Statistics.

should be shifted from the "off budget" fund to the general national budget, EPF and the Oil Fund by 2010.

The SCE also has to dismiss excess personnel or reallocate them to other responsibilities, strengthen the international cooperative relationships, improve work skills of the staff and raise the wage level, so that it transforms itself into a small and sophisticated organisation with professionalism and competence in decision making on environmental management in the country.

a.2 Strategies

SCE	Other Organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To formulate a long-term financial plan. 2. To obtain international financial assistance. 3. To improve organisational efficiency. 4. To promote the increase of the EPF charges. 5. To promote the allocation of the EPF for environmental improvement projects. 6. To obtain support of the population.	1. To oblige newly invested industries to operate environmentally. 2. To increase the EPF charges. 3. To introduce economic incentives for anti-pollution measures, eg tax exemption and/or soft loans for anti-pollution devises. 4. To disburse the EPF for environmental projects.	COM COM, Ministry of Finance Ministry of Finance Ministry of Finance
PHASE II: 2004 – 2006		
1. To promote the further increase of EPF charges. 2. To promote the allocation of the Oil Fund for environmental projects. 3. To obtain finance from the EPF for enhancement of the SCE's facility. 4. To obtain international financial assistance. 5. To raise the transparency of "off budget" funds. 6. To utilise the EPF for environmental improvement projects.	1. To oblige existing industries to rehabilitate and operate environmentally. 2. To revise the EPF charges. 3. To disburse the Oil Fund for environmental projects.	COM Ministry of Finance, COM Ministry of Finance, SOCAR
PHASE III: 2007 – 2010		
1. To obtain necessary budget from the state (investment fund from the EPF and Oil Fund; operation and maintenance cost from the national budget). 2. To cease the dependence on the "off budget" funds. 3. To promote the environmental use of the Oil Fund. 4. To utilise the EPF for various environmental projects.	1. To allocate the EPF and Oil Fund for environmental management. 2. To develop a new wage system.	COM, Ministry of Finance Ministry of Finance

COM: Cabinet of Ministers

b. BCE

b.1 Directions

The BCE should have a sustainable finance basis to enable itself to control the environment adequately by the target year 2010. This implies that the BCE must acquire the necessary budget from the SCE and minimise the necessary budget by institutional reform.

The present environmental management M/P necessitates finance for i) initial investment and ii) continuous O&M cost.

The Republic has been facing financial difficulties since independence. Financial supply for environmental management through general loans is often restricted since it is not considered profitable. Therefore international financial sources will be inevitable for the time being, including soft loans from international development banks. It is, however, preferable to arrange finance for the future expansion domestically and replacement of facilities after their initial investment. Therefore, the BCE should strongly advocate the revision of the EPF charges and environmental use of the EPF and Oil Fund to the COM and the Ministry of Finance together with the SCE.

The national general budget cannot currently cover all the O&M cost of the BCE. The enlargement of the "off budget" fund is inevitable for the coming few years, but the BCE should not rely on the "off budget" fund by the final phase of the M/P (Phase III).

b.2 Strategies

SCE	Other Organisations	
Works	**Works**	**Organisation**
PHASE I: 2001 - 2003		
1. To formulate a long-term financial plan. 2. To obtain international financial assistance. 3. To improve organisational efficiency. 4. To improve the collection rate of the EPF charges. 5. To assist industries for environmental operation.	1. To increase the EPF charges.	COM, Ministry of Finance
PHASE II: 2004 – 2006		
1. To obtain finance for enhancement of the BCE's facility. 2. To improve laboratory analysis services. 3. To raise the transparency of "off budget" funds. 4. To assist rehabilitation of existing industries for environmental operation.	1. To revise the EPF charges.	Ministry of Finance, COM
PHASE III: 2007 – 2010		

1. To obtain necessary budget. 2. To cease the dependence on the "off budget" fund. 3. To promote the environmental use of the Oil Fund. 4. To utilise the EPF for various environmental projects.	1. To obtain necessary budget. 2. To develop a new wage system.	SCE Ministry of Finance

3.2.11 Personnel Plan

The implementation of the above EM M/P will require the development of a range of management and technical skills not currently available within the BCE. A personnel plan is made as shown in the table below in order to meet with the requirement, which will need shift of current staffs and employment of additional employees.

Table 3-7: Personnel Plan

Phase Department or Unit	Present	Phase I	Phase II	Phase III
Air Protection	10	10	10	10
Water Resources Protection	11	11	11	11
Land Protection/Waste Control	6	8	8	9
Fauna Protection	15	6	6	6
Flora Protection	6	6	6	6
Conservation Area Management	6	7	7	9
Laboratory	9	9	10	14
Food Environmental Control	7	7	7	7
EIA	6	6	8	10
Information	4	6	6	7
Administration	17	18	12	11
Total	97	94	91	100

3.3 Implementation Plan and Evaluation of the Master Plan

3.3.1 Implementation and Investment Plan

Taking the targets and strategies into consideration, the EM M/P should be implemented in a step-by-step manner. An implementation plan proposed by the JICA team is presented in Table 8-1 of the main report.

Based on the implementation plan an investment plan for the EM M/P is proposed and presented in Table 3-8.

Table 3-8: Investment Plan

Categories	Main Purpose	Investment
1. Office equipment	• Improvement of environmental data management • Institutional capacity building	Procurement of: • PC and its appurtenances • Copy and fax machine • Other office appurtenances
2. Equipment for inspection	• Development of environmental monitoring system • Institutional capacity building • Establishment of illegal dumping and mining control system	Procurement of: • Vehicle for inspection • Inspection boat and its appurtenances • Sampling tools for air • Sampling tools for water, sediment and soil • Other appurtenances (camera, etc.)
3. Air quality monitoring station	• Development of environmental monitoring system • Institutional capacity building	Construction of • Building and its appurtenances for fixed station Procurement of: • Mobile monitoring station • Equipment for air monitoring
4. Equipment for chemical analysis	• Development of environmental monitoring system • Institutional capacity building	Procurement of equipment for: • Air quality analysis • Water and sediment quality analysis • Food quality analysis • Common use Expansion of • Laboratory building
5. Equipment for information department	• Improvement of environmental data management • Institutional capacity building	Procurement of equipment for: • GIS and its appurtenances • Public education (video projector, etc.)
6. Absheron Sanctuary development	• Development of natural conservation system	Construction and procurement of: • Nature centre and its appurtenances • Footpath and its appurtenances
7. For human resources development (O&M cost)	• Development of environmental monitoring system • Institutional capacity building • Improvement of environmental data management	Implementation of: • Seminar • Training

3.3.2 Financial Planning and Evaluation

a. Financial Planning for Master Plan

a.1 Pre-condition for Financial Planning

a.1.1 Investment Costs

The investment costs are summarised as Table 3-9. Totally US$ 7 million is needed.

Table 3-9: The Investment Costs for Master Plan

Unit: 1000 US$

	Phase I	Phase II*	Phase III*	Total
1. Office equipment	80	33	47	160
2. Equipment for inspection	1,118	110	1,228	2,456
3. Air quality monitoring station	1,254	482	602	2,338
4. Equipment for chemical analysis	867	744	0	1,611
5. Equipment for information	22	40	62	124
6. Absheron Sanctuary development	553	0	0	553
Total	3,894	1,409	1,939	7,242

Note: * including investment costs for equipment replacement

a.1.2 Operation and Maintenance Costs (O&M Costs)

The O&M costs in the years 2003, 2006 and 2010 to implement the M/P are summarised as below.

Table 3-10: The O&M Costs for the Master Plan

Unit: 1,000 US$

	Present (2000)*	2003	2006	2010
1. BCE management	0	0	3.6	3.6
2. Inspection	0	0	6.7	23.1
3. Air quality monitoring station	0	0	5.0	16.4
4. Chemical analysis	0	1.0	9.8	52.3
5. GIS	0	1.2	1.4	1.8
6. Absheron Sanctuary	0	0	9.5	9.5
7. Human resources development**	0	9.0	9.0	9.0
8. Personnel Costs	98.8	109.7	139.8	218.3
9. Utilities and etc.	76.9	58.0	32.7	32.7
Total	175.7	178.9	217.5	366.7

Notes: * Initial plan of BCE (general budget + off budget)
** The cost of seminars to be held by the BCE budget is included. In addition to it, it is necessary to receive training with financial assistance of international agencies.

In the target year, about US$ 370,000 is needed. About 60% is for the personnel costs including social funds and welfare for the employees.

a.1.3 Other major assumptions

It is assumed that the national general budget and the Oil Fund will increase in proportion to GDP.

Table 3-11: Assumed Amount of National General Budget and Oil Fund

Unit: billion manat

	2000	2003	2006	2010
National General Budget	3,931*	5,021	6,592	9,651
Oil Fund	1,365**	1,743	2,289	3,353

Note: * Main Macroeconomic Indices of Azerbaijan, 1999, TURAN News Agency
** "Baku Sun" (08, Sep., 2000) reported that the Oil Fund will be $300 million at the end of 2000. An exchange rate is assumed to be US$1.00=4,550 manat in 2000.

a.2 Revenues Plan

a.2.1 Financial Resources for Investment Costs

The financial resources for initial investment required in Phase I are examined in the following two alternatives:

- long term loan;
- grant.

The investment costs for expansion and replacement will be covered by the EPF and/or Oil Fund in Phase II and Phase III.

It is assumed that the number of factories to be charged for the EPF will increase in proportion to GRDP. The revision of the EPF charges is assumed as follows in order to motivate factories to operate environmentally.

- In 2003: 50 times the amount of the present EPF charges;
- In 2006: 5 times the amount of the EPF charges in 2003.

It is also assumed that the collection rate of EPF charges will be raised gradually up to 95% by 2010 through the enhanced use of the GIS database.

Table 3-12: EPF Charges

		2000	2003	2006	2010
Invoices to charge	Nos.	509*	653	862	1,266
Average charge	million manat	0.772**	38.6	193	193
Collection rate	%	40***	56	73	95
Collected amount	million manat	157	14,115	121,447	232,121

Notes: * The BCE issued 382 invoices, totalling 295 million manat from January to September 2000. The total number of invoices can be estimated as382 x 4/3 = 509.
** The average charge is 295 million manat divided by 382.
*** The actually collected amount divided by charged amount until September 2000.
Source: Financial Department of BCE

a.2.2 Financial Resources for O&M Costs

The revenues are examined by revenue sources, such as the national general budget and the "off budget" funds raised from services by the BCE, e.g. EIA (project evaluation), analysis in the laboratory and the GIS.

It is assumed that all the personnel costs including the social funds and welfare for the employees, and the costs for the BCE office, such as telephone, electricity, water and heat supply, will be covered by the national general budget by 2004. And it is assumed that all the O&M costs of the BCE will be covered by the national general budget by 2010.

The share of the budget received by the BCE to the national general budget is calculated as in the following table.

Table 3-13: BCE Budget from National General Budget and its Share

Unit: million manat

	2000	2003	2006	2010
BCE Budget*	427	620	1,012	1,668
Share (%)	0.011	0.012	0.015	0.017
Cf. National Budget (billion manat)	3,931	5,021	6,592	9,651

Notes: * From the necessity to motivate the BCE staff, alternative 2 of salary level (the gap will be reduced to a certain extent, though not to zero) is proposed in the M/P.

The enlargement of the "off budget" fund is necessary in Phase I, because the national general budget does not cover all the O&M cost of the BCE. The dependence on the "off budget" fund must be phased down in Phase III, and be ceased in 2010.

The "off budget" fund is calculated as shown in the table below.

Table 3-14: Revenue Plan of Off Budget

Unit: million manat

Services	Present (2000)	2003	2006	2010
EIA		125.2	164.8	0
Laboratory (water)		41.0	54.1	0
Laboratory (air)		0	36.2	
GIS		23.2	35.9	0
Total	385.0*	165.0	291.0	0

Note: * Initial Plan in 2000.

a.3 Expenditures

a.3.1 Total Expenditure

The yearly expenditure is shown in Figure 3-2.

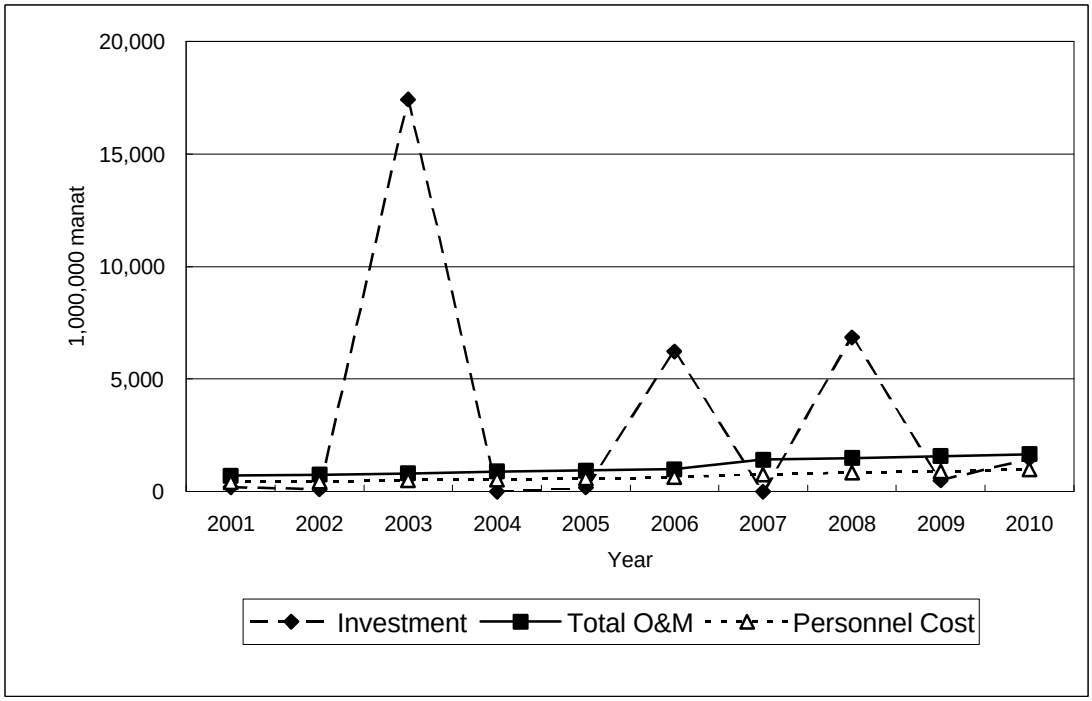


Figure 3-2: Yearly Expenditure

Note: Total O&M includes personnel cost.

a.3.2 Personnel expenses

Considering the necessity to motivate the BCE staff, three alternatives are examined.

Alternative 1:

The gap between the salary levels in the public sector and the private sector will remain, though the salary in the public sector will increase in proportion to GRDP/capita

Alternative 2:

The salary gap between the public sector and the private sector will be reduced to a certain extent but not to nil..

Alternative 3:

The gap will be reduced to nil and the salary in the public sector catches up with that in the private sector.

The result of calculation of the overall personnel costs is shown below.

Table 3-15: Changes of Personnel Costs

Unit: million manat

	Present(2000)	2003	2006	2010
Alt1	423*	484	598	895
Alt2		499	636	993
Alt3		635	1,031	2,219

Notes: *: Calculated result after summing up personnel costs of 5 classes.
Source: Based on the initial budget of BCE in 2000.

To motivate the BCE staff and to make the plan realistic, the salary level of Alternative 2 (the salary in the public sector become closer to, but does not catch up with, that in the private sector) is proposed in the M/P (see below).

b. Financial Evaluation

The six alternatives are presented by combining the above 3 salary levels and cases of loan or grant. They are examined on the assumptions that:

- all the O&M costs including financial costs will be covered by the national general budget;
- the investment costs in Phase II will be covered by the EPF;
- the investment costs in Phase III will be covered by the EPF and Oil Fund;
- the contribution of the EPF is half of the investment costs, though the Oil Fund is more than 14 times or more as large as that of the EPF in size in 2010.

Table 3-16: Calculation Results by Alternatives

Unit: million manat

Case		L-1	L-2	L-3	G-1	G-2	G-3
Financial source		Loan			Grant		
Salary level		Alt1	Alt2	Alt3	Alt1	Alt2	Alt3
Total costs in 2010 including depreciation costs		3,999	4,097	5,324	3,714	3,813	5,039
Portion of general budget allocated		1,855	1,953	3,179	1,570	1,668	2,895
Investment costs in Phase III		8,822	8,822	8,822	8,822	8,822	8,822
FIRR*	%	1	1	-3	51	49	31
Share in general budget	%	0.0192	0.0202	0.0329	0.0163	0.0173	0.0300
Share in EPF	%	0.91	0.91	0.91	0.91	0.91	0.91
Share in Oil Fund	%	0.13	0.13	0.13	0.13	0.13	0.13

*FIRR: Financial internal rate of return.

FIRR differs considerably depending on whether the financial source of initial investment is loan or grant. It will be, however, possible to implement the M/P with loan, if its interest rate is fairly low, because the total balance from 2001 to 2010 is more than zero and the BCE is a state organisation not seeking financial surplus.

In regard to salary alternatives, it will be difficult to raise the salary level in the public sector enough to catch up with that in the private sector. This is because the personnel expenses are major items in the national general budget and the changes in salary table effects not only BCE but also other agencies of the government, resulting in an abrupt heavy burden to the government.

Because the difference between Alt1 and Alt2 is not so distinct, it is proposed in the M/P to adopt Alt2.

The cash flow in Case L-2 (i.e. a loan is given, and Alternative 2 of the salary level is adopted) is shown in the following figure.

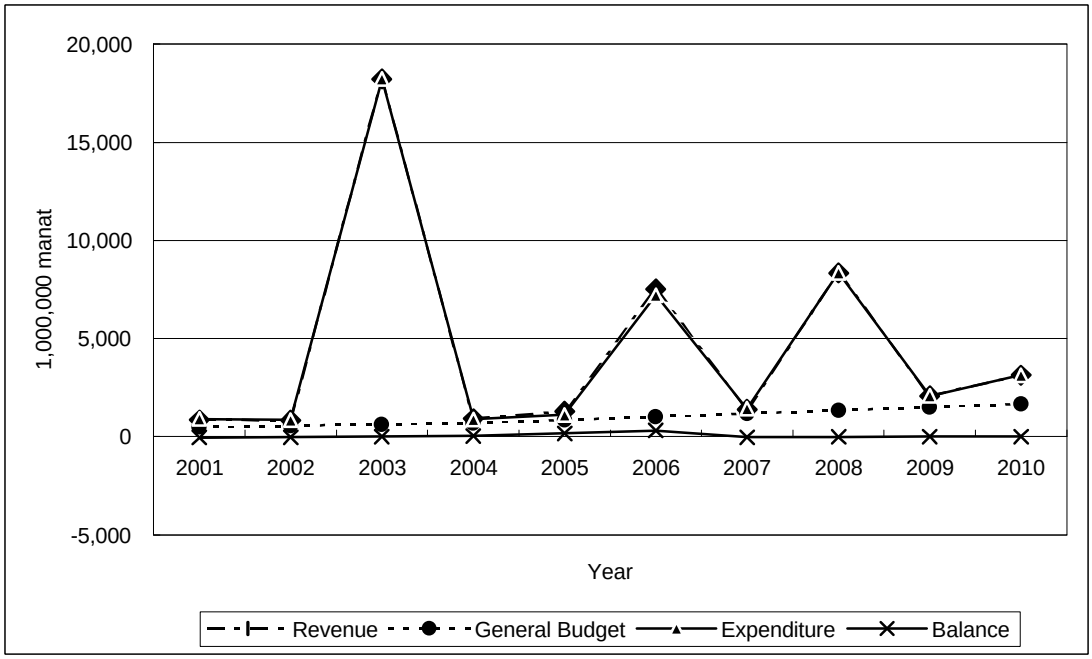


Figure 3-3: Cash Flow in Case L-2

Note: General Budget is part of Revenue.

It has to be stressed, however that this calculation was done on the following major aggressive assumptions:

- the allocation amount from the national budget will increase gradually to be large enough to cover the O&M costs of BCE in 2010;
- the "off budget" fund will increase until 2006, and it covers the O&M costs including personnel costs and other materials;
- the investment costs for expansion and replacement will be allocated from EPF and/or oil fund in Phase II and Phase III.

If any of the above assumptions are not fully satisfied, the FIRR will become minus. Therefore, the BCE should try to receive some grants for the initial investments from donor agencies.

The team also emphasise that the BCE should be eventually financially sustained with domestic sources in order to execute the environmental management M/P, and be a sound governmental body without dependence on the "off budget" fund in Phase III.

4 Implementation Programme for Priority Projects

4.1 Pilot Projects

4.1.1 Plan of Pilot Project

a. Objectives

The implementation of the plans proposed in the M/P may encounter many difficulties. To determine the problems that may arise and how to overcome these difficulties, pilot projects were carried out during the course of this study with the close co-operation of the counterparts. The objectives of the pilot projects are summarised below:

1. confirm the feasibility of the technical system proposed in the M/P (e.g. feasibility of the BCE laboratory improvement, etc.);
2. acquire base data to devise the design outline for the priority projects implementation programmes (e.g. development of environmental monitoring system, development of illegal dump control system, etc.);
3. raise public awareness and increase public participation in environmental management;
4. demonstrate improvement measures to residents and authorities concerned with environmental management.

b. Selection of Pilot Projects

The JICA study team and counterparts identified the following two pilot projects during the 1st study work in Azerbaijan.

b.1 Experiment on Enhancement of the BCE Laboratory

The BCE planned to construct a new laboratory with an area of about 500 m^2, but the construction was halted due to shortage of funds from the SCE. The structure was completed but there are no doors, windows or piping.

The BCE has laboratory equipment but it was stored in the Academy of Science and not used at all. Without the opportunity to observe the laboratory activities of the BCE, it was impossible for the team to examine its capability to carry out laboratory analysis, which is necessary for monitoring and inspection.

In this pilot project, it was planned that the laboratory facility was arranged, the BCE staff actually conduct chemical analysis, and the team assessed their practices. Through the pilot project, the team would investigate:

- an enhancement plan for the BCE laboratory organisation;
- laboratory equipment needs;
- a training and instruction plan for analytical skill development.

b.2 Experiment on Development of Illegal Dump Control System

There are a great number of illegal dumps in Baku city. There is no doubt that illegal dump cleanup is one of the essential tasks to be accomplished for the amenity of the city.

Therefore, the team and counterparts decided to carry out a pilot project entailing illegal dump cleanup campaign, which included cleaning up at one of the illegal dumps as a main component of the campaign. It was planned that the campaign would be carried out in close co-operation with the residents, the district authority and other relevant bodies, and the team would then attempt to develop a system to keep illegal dumping from taking place again.

c. Implementation Schedule

The pilot projects have been conducted during the second study work in Azerbaijan (middle of August 2000 to end of November 2000). However, chemical analysis in accordance with team's advice is being continued by the BCE laboratory staff. Park construction at the clean up site behind the Sports Place was continued by the BEP.

4.1.2 Experiment on Enhancement of the BCE Laboratory

a. Plan of the Experiment

The laboratory is a technical focal point for environmental law enforcement. Therefore the BCE laboratory should be enhanced to support the monitoring activities of other departments in the BCE with reliable analysis. In order to analyse chemical substances accurately, the whole processes of analysis including sample pre-treatment and reagent preparation must be appropriately carried out.

A pilot project of the enhancement of the BCE laboratory was planned in order to:

- assess the accuracy of BCE's laboratory works by observing their analysis practices, and
- make a recommendation for the enhancement of the BCE laboratory.

The work responsibilities were demarcated into two parties, the BCE and the JICA study team, as in Table 4-1 for collaborative execution. The experiment was conducted as presented in Plate 6.

Table 4-1: Descriptions and Responsibilities of the Project

Work Items	Work Responsibilities
1. Internal Finishing of a New Laboratory	BCE
2. Mechanical and Electricity Work	BCE
3. Lab Furniture Procurement	JICA
4. Installation of Lab Equipment	BCE
5. Training and Instruction of analysis	JICA
6. Chemical Analysis	BCE
7. Assessment	JICA

b. Findings and Recommendations

There are many problems observed in the experiment. Among them the following two problems should be resolved immediately:

- shortage of analysis equipment and materials such as glassware, reagent, etc.;
- insufficiency of basic knowledge for pre-treatment such as sampling, washing of glassware, chemical balance, filtration, filling of reagent, etc.

Although expendable supplies like glassware and reagent should be obtained by the laboratory itself, there is no budget for it. Not only major equipment but also glassware and reagent may be provided by bilateral or multi-lateral cooperation.

As for the insufficient basic knowledge of pre-treatment for chemical analysis, it may be difficult for each analyst to change his/her habitual practice immediately. Therefore an intensive training programme should be conducted over several months. Training in foreign countries might be helpful.

4.1.3 Experiment on Development of Illegal Dump Control System

a. Plan of Experiment

The objectives of the experiment are summarised as follows:

- to let people know the presence of a number of illegal dumps in the city and recognize their possible environmental and health risks;
- to involve people in an illegal dump control system in order not to have another new illegal dumps;
- to let people know how costly waste cleanup is.

A campaign with two components, i.e. public meetings and a campaign tour, was organised in order to achieve the above first and second objectives and the cleanup of a large dump was organised to achieve the second and third objectives.

The experiment was conducted in collaboration with BCE, BEP and the JICA study team as in Table 4-2. The experiment was conducted as presented in Plate 7.

Table 4-2: Work Division of Experiment

Work Items	Work Responsibilities
1. Selection of Site	C/P
2. Logo contest	JICA and C/P
3. Campaign tools	JICA
4. Public meetings	C/P and JICA
5. Visit tours	C/P and JICA
6. Cleanup large dump site	C/P and JICA
6-1. Cleanup of wastes	JICA
6-2. Import of fertile soil	JICA
6-3. Planting trees and shrubs	JICA
6-4. Irrigation	C/P
6-5. Masonry work	C/P
6-6. Benches, fences.	C/P
6-7. Assessment	JICA
7. Publicise to TV, News paper, NGOs	JICA

b. Findings

b.1 Public Meetings

- It might have been the first experience for the BCE staff to organise such kinds of meetings, but they worked hard to prepare for the meetings, calling for audiences, finding places for the meetings, and discussing agendas. In the meetings, they played active roles to chair and freely discuss issues with the audiences;
- the BCE staff gained valuable experience and this pilot project served as an on-the-job training for them to be able to organise same kind of activities in future.

b.2 Questionnaires

A questionnaire survey was executed for the audience of the public meetings. The tour participants filled out post-tour questionnaires. The following are the results:

- most respondents felt that the city is not clean and the illegal waste dumps are the major reason;
- the main cause of illegal dumps is that there are already a number of illegal dumps in the city and the people have accepted them as an ordinary condition;
- most are waiting for somebody to clean the illegal dumps. Few people think that they have to clean these themselves;
- nearly half of respondents think that they have no responsibility for cleaning the waste collection points by themselves;
- it was observed that the one-day campaign tour did not sufficiently raise the percentage of the respondents who consider that they are responsible for keeping their waste collection points clean. There will need to be continuous promotion to let people know that proper waste disposal by every resident every day is the only solution to the problem.

b.3 Cleanup of the Large Illegal Dump

- The cost of clean up of this large illegal dump was over US$ 80,000 including fertile soil, plants and shrubs but excluding the construction of the park.
- It is said that over 800 illegal dump sites exist in Baku City. If 10 % of those are assumed to be the same size as this site, it will cost over US$ 6 million to clean only those.
- Therefore people should be aware that illegal dump control and prevention is the cheapest way to clean the city.

4.2 Priority Projects

4.2.1 Plan of Priority Projects

Through the careful examination both the C/P and the team selected six projects with high priority from those of the EM M/P. The projects should need urgent actions and have high priority for implementation.

The priority projects are planned and summarized in Table 4-3.

Table 4-3: Plan of Priority Projects

Priority projects	Targets	Plan
1. Development of environmental data management	1.1 Strengthening the capability of the GIS and data management among the BCE personnel; 1.2 Promotion of data collection, digitalisation and sharing.	1.1 Installation of facilities: • Telephone line, air conditioner. 1.2 Training for individual needs: • Programmes for operational skills (primary, middle and advanced level) and managerial skill 1.3 Procurement of equipment: • DVD-ROM (5.2 GB), modem, LAN equipment, software.
2. Institutional capacity building for the BCE	2.1 Adaptation to the transition of SCE to MoEP status and integration of policy responsibilities from other government bodies 2.2 Internal reorganization 2.3 Manager and staff training and development 2.4 Improved financial management 2.5 Development of relations with other organisations and individuals	2.1 Transition of all departments and units to the new structure (diagram in Figure 3-1 refers). Completion by end 2002. 2.2 Allocation of existing BCE and newly absorbed staff to new posts, release of surplus staff and recruitment of new staff where appropriate. 2.3 Manager training to ensure professional management and leadership. Staff training to ensure relevant and up-to-date knowledge, competencies and skills. 2.4 Budget planning and financial control procedures to be better developed 2.5 Development and implementation of education and public relations programmes 2.6 Procurement of office equipment: • Photocopier, PCs with external projection facility, overhead projector, etc.
3. Development of environmental monitoring system	3.1 Air protection • Factories are systematically controlled with evidence. • Law is enforced to likely polluting factories. • The BCE obtains data of air quality influenced by vehicle exhausts.	3.1 Comprehensive review of analytical procedure. 3.2 Procurement of equipment and installation of facilities for air quality monitoring • For emission gas analysis: nitrogen oxides analyser, carbon monoxide analyser, sulphur oxides analyser, etc. • For a new monitoring station of vehicle exhausts: cabinet,

Priority projects	Targets	Plan
	• The BCE understands the level of air quality in Baku. 3.2 Water resources protection • Factories and WWTPs (wastewater treatment plants) are systematically controlled with evidence. • Law is enforced to likely polluting factories and WWTPs. • The safety of the Jeiranbatan reservoir as a water source is ensured. • The BCE understands the level of water quality in Baku. 3.3 Contaminated soil and mineral resources • The understanding of the BCE about soil quality is increased. • The work efficiency of the BCE staff in charge of mineral resources control is improved. 3.4 Fauna and flora protection and conservation areas management • Fauna registration work is strengthened. • The BCE understands the current situation of city greenery. • The conservation plans are developed. 3.5 Food environment control • The BCE understands the current food environment in Baku. • The basis for food analysis is established.	nitrogen oxides analyser, hydrocarbon analyser, diesel generator, etc. 3.3 Procurement of equipment for water quality monitoring • Sediment sampler, pH meter, chemical oxygen demand meter, DO meter 3.4 Procurement of equipment for contaminated soil and mineral resources monitoring • Vehicle (shared in the BCE). 3.5 Procurement of equipment for fauna and flora protection and conservation areas management • Motor boat, trailer to tow the boat, etc. 3.6 Procurement of equipment for food environment control • Radionuclides analyser, multipurpose radiometer, etc. 3.7 Procurement of equipment for common use in the laboratory • Electric furnace, liquid chromatograph, diesel generator, etc.
4. Development of nature conservation system	• To enhance BCE's nature conservation work in Baku City • For the citizens to experience and learn the nature • To encourage close relationships between humans and the nature	• Site: Absheron Sanctuary of total area about 300 ha • Year of construction: 2003 • Year of operation: 2004 Outline of the sanctuary park development (see Plate 8): • Main facilities area about 0.5 ha with a nature centre (400 m^2), a guard house, fence and a gate, water supply and sanitation system and electricity supply. • Nature observation facilities: 4,000 m long footpath and 3 units of

Priority projects	Targets	Plan
		observation house.
5. Development of illegal dumping control system	• The BCE/SCE work out a plan in order to prevent further illegal dumps • The BCE/SCE encourage, supervise and support the BEP and District EPs, which are responsible for managing municipal solid waste.	For control of large dumps: • Stringent penalties for illegal dumps • Public participation for illegal dump surveillance • Establishment of the database For control of small dumps: • Environmental education • Cleanup campaign • Public meeting • Collaboration of NGO Procurement of equipment: • Campaign and educational tools, vehicles for surveillance, personal computers for database establishment
6. Development of supervision and support system for M/P formulation of MSW and waste recycling	• A MSWM M/P that includes recycling system plan will be formulated by the BEP and district EPs.	The outline of recommended MSWM M/P is prepared and presented in the section 10.6 of the main report based on the data obtained by the Waste Amount and Composition Survey and the Survey on Recycling Activities carried out by the team.

4.2.2 Project Evaluation

a. Project Cost Summary

The estimated project costs summarized in Table 4-4.

Table 4-4: Cost Schedule of the Priority Projects

Unit: US$1,000

Items		2001	2002	2003
1 Office equipment	PC and its appurtenances			43
	Copy and fax machine			4
	Other appurtenances	33		
2 Equipment for inspection	Vehicle for inspection			110
	Inspection boat and its appurtenances			172
	Sampling tools for air			759
	Sampling tools for water, sediment and soil			68
	Other appurtenances			9
3 Air quality monitoring station	Building and its appurtenances			652
	Equipment for monitoring			602
4 Equipment for chemical analysis	For air quality analysis			
	For water quality analysis			45
	For food quality analysis			77
	Common use (Equipment)			677
	Common use (Reagent etc.)	11	23	34
5 Equipment for information department	GIS and its appurtenances			19
	For public education			3
6 Absheron Sanctuary development	Nature centre and its appurtenances			367
	Footpath and its appurtenances			186
	Total	44	23	3,827

b. Technical Evaluation

b.1 Technical Evaluation

Among the six propriety projects, the following five projects are subject ot technical evaluation.

1. Development of environmental data management
2. Development of environmental monitoring system
3. Development of Absheron Sanctuary
4. Development of illegal dumping control system
5. Development of supervision and support system for M/P formulation of MSW and waste recycling

The feasibility of these priority projects was assessed with reference to the present technical capabilities of the BCE.

b.2 Development of environmental data management

The team established a GIS database with sufficient equipment within the BCE in the present study. However, in order to employ the established environmental data effectively, knowledge regarding computers, GIS and data management is required. Since the BCE had little experience of handling digital data, it was necessary to give

training to the BCE staff. The team gave intensive training to the three BCE trainees for about five months regarding the following::

- knowledge necessary for GIS maintenance;
- knowledge necessary for GIS application;
- knowledge necessary for GIS management.

With the above training, the three trainees obtained basic knowledge to operate and maintain the GIS database. However for the further improvement of environmental data management it is necessary to intensively improve the computer skills of the BCE personnel. To overcome this difficulty, training programmes should be made available as appropriate for individual needs and the training should be given to the staff in accordance with their capability.

The development of environmental data management would be feasible by making full use of the three trainees and giving training programmes to the staff. It is strongly recommended to ask aid agencies for training assistance.

b.2 Development of environmental monitoring system

The air monitoring stations and water monitoring points were established by Hydoromet and have been maintained for a long time. If the BCE succeeds in receiving cooperation from Hydromet, the proposed monitoring system will operate smoothly.

The BCE has a laboratory and staff for analysis, although analytical capability is not high enough. In addition through the pilot project on the enhancement of the BCE laboratory, the analytical capability of the BCE staff was improved and the technical shortages to be tackled were clarified. As for food quality analysis, the BCE may need technical assistance from overseas, such as the dispatch of foreign experts and the training of the BCE staff.

Regarding the inspection and enforcement of the pollution sources, now the BCE staff have a summary of the environmental passports of 288 factories, which they did not have before, as an output of the study. Their inspection work is expected to improve sufficiently.

The team concludes that the development of the environmental monitoring system would be feasible with cooperation of foreign and local relevant organisations.

b.3 Development of Absheron Sanctuary

The team designed the sanctuary park in consideration of the availability of local materials and technical simplicity. It believes that the park and associated facilities can be constructed with local input.

For the maximum use of the park facility by the visitors, the BCE will need the assistance of external fauna/flora experts. Institutions within the Academy of the Sciences will be a good source of such experts. By working with them, the BCE will obtain further knowledge of ecological systems of the sanctuary.

Using physical and human resources in Azerbaijan, there should be no technical problems with the development of Absheron Sanctuary.

b.4 Development of illegal dump control system

Based on the pilot project on the development of the illegal dump control system, the C/P and the team identified what is necessary for the control of dumpsites. In addition through the pilot project the BCE staff obtained know-how to raise public cooperation, to give an environmental education and to organise campaign.

It is concluded that the development of the illegal dumping control system is possible by making full use of the experiences gained by the pilot project.

b.5 Development of supervision and support system for M/P formulation of MSW and waste recycling

Proposals made in the present study for the formulation of the M/Ps of MSWM and waste recycling is based on practical field studies, which closely looked at waste generated in the study area by waste generators of different types. Therefore, by making full use of the recommended MSWM M/P prepared by the team, the BCE will be able to supervise and support the BEP and district EPs to formulate the M/Ps

c. Social Evaluation

c.1 Social Evaluation

The priority projects would incur various social positive impacts. The tangible impacts presented below are evaluated:

- Improvements in sanitary and public health conditions of the Baku city;
- Reduction of wage gap between public and private sector;
- Promotion of investment and tourism;
- Increase in land value.

c.2. Improvements in sanitary and public health conditions of Baku city

According to the BCE inspectors, there are as many as 850 illegal waste dumps in Baku city. They may cause environmental and health risks and, at the same time, they have spoiled the dignity and beauty of the city. In addition the number of such illegal waste dumps seems to be increasing year by year.

The priority project (development of illegal dumping control system) will bring various benefits; the number of such illegal waste dumps, which will adversely affects dumpsite and its surrounding area, will not increase. The project (development of supervision and support system for M/P formulation of MSW and waste recycling) will facilitate the formulation of a MSWM M/P, which should contribute to improve the sanitary and public health conditions of Baku city if it is implemented. The provision of sufficient waste collection services to the whole population, which should be one of the major components of the MSWM M/P, will reduce the number of such illegal waste dumps, and change the current open dumping disposal site to a sanitary landfill.

The implementation of the priority projects, therefore, will improve the sanitary and public health conditions of Baku city.

c.3 Reduction of wage gap between public and private sector

At present the salary level of the public sector is quite low compared with the private sector; less than half. This has caused a lack of motivation and inefficient work.

In the priority projects the team proposes that the salary level of the BCE personnel should be raised. Though it will not easy at all to raise it to the level of the private sector, the gradual reduction of the gap between the two sectors will enhance the motivation of the BCE staffs for their works, thus resulting in a functional organisation for the improvement of the environment in Baku city.

c.4 Promotion of Investment and Tourism

In addition to the health effects, the implementation of the priority projects will provide Baku city with a favourable environment that would eventually promote investment and tourism. Since Baku city is the centre of economic and social activities in Azerbaijan Republic, the improvement of its environment will enhance its image and eventually contribute to attracting more investors and tourists to the area.

Furthermore, investors nowadays, particularly those from developed countries, are cautious not to be blamed for breeching environmental regulations. Therefore, output of the priority projects, such as a clear administrative and legislative system and data availability, should be a positive factor for investment promotion.

c.5 Increase in Land Value

Well-managed waste disposal operation will improve the living environment, which in turn will increase the value of the land in the area. A study on the relationship between the living environment and land value suggests that, other factors being constant, housing values rise with distance from a landfill (an illegal dumpsite as well) at an average rate of 6.2 % a mile within a two-mile radius of the landfill.[19] This is presumably because the environmental and aesthetic problems associated with life near the landfill diminish as distance from it increases Thus, the implementation of the priority projects will increase the land value around the present landfills and illegal dumps spreading all over the city.

d. Financial Evaluation

d.1 Aims of Financial Evaluation and Usage of Result

The priority projects proposed in this study are intended to improve the fundamental elements that compose an environmental management system, and do not entail large and tangible development factors, except the Absheron Sanctuary development. Therefore, they are by nature to be implemented in a staged manner within the national budget. In Azerbaijan, however, there are following constraints:

- the investment amount required in Phase I is about 40 times the BCE budget: the investment amount is about US$ 4 million, while the BCE budget is only US$ 100,000 (BCE 1999 actual including off budget);
- it is very difficult to obtain budget for investment because of the present severe financial situations of the Central Government;
- the yearly collected amount of the EPF, which should be allocated for environmental improvement, is only US$ 200,000 (SCE 1999 actual);

[19] Beede, D.N. and Bloom, D.E. 1995, The Economics of Municipal Solid Waste, The World Bank

- there is no institutional framework to use the EPF for environmental improvement investments.

The team considers that the implementation of priority projects proposed in this study is essential in order to improve and to protect the environment in Baku. With the above-mentioned constraints, therefore, it is crucial to secure a financial source for initial investment in order to implement them. In this chapter, financial evaluation was conducted in case where the BCE is financed by loan for the initial investment of Phase I. Proposals for the implementation of the priority projects were then made.

The evaluation term is from 2001 to 2010. The Financial Internal Rate of Return (FIRR) was calculated for reference.

d.2 Major Assumptions for Financial Evaluation

The major assumptions of financial evaluation of the priority projects are as the following table.

Table 4-5: Major Assumptions of Financial Evaluation

Items	Assumptions
Evaluation Term	2001 – 2010
Executive body	BCE
Investment	Items to be invested for the priority projects in Phase I: • office equipment; • equipment for inspection; • air quality monitoring station; • equipment for chemical analysis; • equipment for information department; • Absheron Sanctuary development. The investment costs for replacement are considered based on the life span of equipment/facilities. Salvaged value after 2010 is counted as minus costs in 2011.
Revenue	1) Financial sources for investment: • soft loan with a low interest rate is assumed for the initial investment (repayment term: 25 years including 7-year grace period, interest rate: 1.7% per year.); • EPF is assumed to be used for the replacement of equipment. The revision of the EPF charges (50 times the amount of the present EPF charges) will be done in 2003 in order to motivate factories to operate environmentally. 2) Revenue sources for O&M costs: • general budget from the Central Government; • "off budget" for services such as EIA examination, Chemical analysis in Laboratory and GIS. The revenue for O&M from 2007 to 2010 is assumed to be equal to the total of general budget and off-budget in 2006.
Alternatives of general budget fund	As for the allocation of general budget from the Central Government, two alternatives are examined. • Alt-A: general budget will cover total personnel costs and O&M costs for office (utilities, building maintenance etc.) by 2004, and total O&M costs by 2010, as shown in M/P; • Alt-B: the share of the portion to BCE is as same as present (2000).

Expenditure	Investment costs, personnel costs and other O&M costs are considered. Alt-2 of the salary table examined in M/P is assumed for financial evaluation. The O&M expenses from 2007 to 2010 are assumed to be equal to the expenses in 2006.
Evaluation Method	Total balance from 2001 to 2010 (Total Revenue-Total Expenditure) > 0 The following items are also calculated for reference: • FIRR; • share of BCE budget in the National General Budget; • share of BCE's investment into equipment replacement in the EPF.
Cut-off rate	7–8 %, which is used by the World Bank and European Development Bank.
Inflation	The constant price in 2000 is used (no inflation is considered).

d.3 Off Budget

In M/P, it is proposed that all "off budget" revenue in Phase II should be transferred to Ministry Of Finance and be transparent. For the financial evaluation, it is assumed that the "off budget" is returned to the BCE after being authorised by Ministry of Finance and the BCE can use its full amount. It is also assumed that the total amount of general budget and "off budget" in 2006 will be allocated from the government from 2007 to 2010, while "off budget" will be phased down in Phase III.

The "off budget" revenues are calculated under the following assumptions:

- the number of operating enterprises, the number of projects subject to EIA review by the BCE and the number of factories inspected by the BCE will increase in proportion to GRDP;
- EIA: The average fee for EIA review is calculated at 808,000 manat per case to the EIA process, based on the total number of cases (112) and the amount of collected fee in 1999 (90.5 million manat);
- laboratory: out of enterprises which have a environmental passport (they were 288 according to the factory survey by the team), 30% are assumed to request the BCE for wastewater analysis in a year from Phase I, and 20% are assumed to request for emission gas analysis in a year from Phase II;
- GIS: 30% of the operating enterprises, (which are assumed to number 775 according to the factory survey by the team), will use the GIS of the BCE every year.

The "off budget" revenue calculated under the above assumptions is as follows.

Table 4-6: Revenue of Off Budget

Unit: million manat

	1999	2001	2003	2006
EIA	90.5	106.7	125.2	164.8
Laboratory (water)	0	35.1	41.0	54.1
Laboratory (air)	0	0	0	36.2
GIS	0	23.2	27.3	35.9
Others*	38.9	0	0	0
Total	129.4	165.0	193.5	291.0

Note: These figures are larger than the actual revenue in 1999, 129.4 million manat, but are less than the initial plan of 2000, 385.0 million manat.
* EIA document, which was transferred to Eco-centre in SCE in 2000.

d.4 Expenditure

d.4.1 Investment Costs

The investment costs, replacement costs and salvaged value at the end of 2010 are considered in the table below.

Table 4-7: Investment Costs for Financial Evaluation

Unit: million manat

	2001	2002	2003	Replacement (2004 – 2010)	Salvaged value
Office equipment	150	0	214	364	158
Equipment for Inspection	0	0	5,087	5,087	3,565
Air quality monitoring station	0	0	5,706	2,739	6,109
Equipment for chemical analysis	50	105	3,790	0	2,090
Equipment for information	0	0	100	464	242
Absheron Sanctuary development	0	0	2,516	0	1,280
Total	200	105	17,413	8,654	13,444

Note: 1US$=4,550 manat

The investment costs for replacement are considered according to the life span (usable years) of facilities and equipment as shown in the following table. The salvaged value is also based on the life span.

Table 4-8: Life Span by Facilities and Equipment

	Life Span (year)	Salvaged Value (%)
Civil works and building	30	0
Laboratory equipment, plant facilities	15	0
Vehicles, boats	7	10
Sampling tools, office equipment and others	5	10

d.4.2 Personnel Costs

- Considering the necessity to economically motivate the BCE staff, the personnel costs are calculated based on the scenario; The salary gap between the public sector and the private sector will be reduced to a certain extent but not to zero.

The result of calculation of the overall personnel costs is shown below.

Table 4-9: Personnel Costs for Financial Evaluation

Unit: million manat

	2000	2001	2003	2006
No. of BCE staff	97	94	91	100
Salary	200.2	199.9	237.6	303.0
Personnel cost including Social Fund and welfare for employees	423.4	419.8	499.0	636.3

d.4.3 Other O&M Costs

Other O&M costs except personnel costs are summarized below.

Table 4-10: Other O&M Costs

Unit: million manat

Priority Projects	2001	2003	2006
Office	0.0	0.0	16.4
Inspection	0.0	0.0	30.5
Air quality monitoring station	0.0	0.0	22.8
Chemical analysis	1.4	4.6	44.6
Information (GIS)	5.5	5.5	6.4
Absheron Sanctuary	0	0	43.2
PR & Environmental Education (Seminar etc.)	13.7	41.0	41.0
Sub-total of priority projects	**20.6**	**51.1**	**204.9**
Other O&M for Office (Electricity, Telephone etc.)	149.0	149.0	149.0
Total	**169.6**	**200.1**	**353.9**

d.5 Financial Evaluation

d.5.1 Financial Internal Rate of Return (FIRR)

The FIRR of two alternatives on the general budget fund are calculated as following:

Table 4-11: Result of IRR Calculation

Alternatives of Allocation of General Budget	FIRR
Alt-A	-2.6%
Alt-B	-3.5%

Both alternatives make the FIRR below zero, as far as initial investment is financed by loan.

d.5.2 Sensitivity Analysis

The sensitivity analyses on the following aspects were attempted assuming that the initial investment is financed by the loan and Alternative 2 for the salary table is applied.

- Off-budget revenue;
- Other O&M costs except personnel costs; and
- Revision of the EPF charges in 2003.

d.6 Conclusion

The FIRR calculations make it clear that the implementation of the priority projects is difficult when the initial investment is financed by loan, and grants are necessary to initiate the priority projects. The examinations above also revealed the importance of revenue control of "off budget", control of O&M costs other than personnel cost, and the necessity of revision of EPF charges. If these premises are satisfied, it is judged that the implementation of the priority projects can start to make the first step toward the realisation of the environmental management M/P.

e. Economic Evaluation

e.1 Methodology of Economic Evaluation

Environmental improvement can have many kinds of indirect but positive impacts such as health conditions, beautification of the city, establishment of new environmental industries which raise profit by contributing to the environment, development of tourism, etc. The quantification of such environmental benefits, however, is difficult and is often attempted only arbitrarily.

In this section, the Economic Internal Rate of Return (EIRR) is calculated for reference taking account of only two types of benefit:

- prevention of infectious diseases and respiratory diseases through strengthened environmental monitoring and inspection by the BCE;
- contribution to the tourism development by improved city beauty.

As for other impacts, a qualitative evaluation method is adopted.

The evaluation term is from 2003, when the major investment for the priority projects are to be completed, to 2010, the target year of the environmental management M/P. The salvaged value at the end of 2010 are considered as minus expenditure in 2011 as in the financial evaluation.

e.2 Benefits

e.2.1 Prevention of infectious diseases and those of respiratory organs

There were 18 patients with infectious disease in 1,000 people in 1998 in Azerbaijan, that is less than that in 1990, 30 patients in 1,000 people. 80 patients suffered disease of respiratory organs in 1,000 people in 1998, that is also less than that in 1990, 112 patients in 1,000.

If the environmental monitoring and inspections would be poor in the process of economic recovery in Azerbaijan, the rate of occurrence could be more than the 1998 figure. The priority projects are assumed to bring a benefit to keep the morbidity rate of infectious and/or respiratory diseases of 1998 level until 2010. Although such effects will first appear in 2004, the morbidity rate in 2004 is assumed same as that in 1998. If the priority projects would not be carried out, the morbidity rate would increase in proportion to GRDP/capita after 2004 (infectious disease: 31 patients in 1,000 people and those of respiratory organs: 139 patients in 1,000 people in 2010).

The medical consultation fee is expensive in Azerbaijan. In this study, the fee for infectious diseases is assumed to be US$ 3 per patient, and that for diseases of respiratory organs is assumed to be US$ 10 per patient.

e.2.2 Contribution to Tourism Development

Tourism industry in Azerbaijan has grown drastically in recent years. The revenue from tourism touched US$ 650 million in 1999 (16% of GDP). It is assumed that the impacts of the priority projects induce its increase by 0.01%. The basic revenue of tourism is assumed to increase in proportion to GRDP in Baku.

e.2.3 Quantified Benefit

Under the above assumptions, benefits caused by the priority projects are as in the table below.

Table 4-12: Assumed Benefit

Unit: million manat

	2004	2006	Total (2004 – 2010)
Prevention of disease	136	1,483	5,246
Contribution to Tourism	445	788	4,219
Total	581	2,271	9,465

e.3 Conversion to Economic Prices

The VAT (20%), custom tariff (15% for normal products) and unemployment rate are considered to convert market prices to economic prices.

Table 4-13: Conversion Factors for Economic Evaluation

Items			Conversion rate
Investment	Civil & Construction		0.77*[1)]
	Equipment	Foreign	0.65*[2)]
		Domestic	0.8*[3)]
O&M	Personnel Cost	Skilled	1.0
		Un-skilled	0.54*[4)]
	Other O&M costs		0.8*[5)]

Notes: 1) 30% for personnel x 0.8 + 50% for material x 0.8 + 20% for equipment x 0.65
2) 1 – VAT(20%) – Custom Tariff(15%)
3) 1 – VAT(20%)
4) Wage of Agriculture Sector(65,000manat/month) divided by Salary of C-2 in BCE(120,000manat/month)
5) 1 – VAT(20%)

As for the investment costs, the initial investment in 2003 and the investment into replacement from 2004 to 2010 are calculated.

Table 4-14: Assumed Costs for Investment

Unit: million manat

	2003	Replacement	Salvaged value	Total
Investment costs	11,940	5,291	13,419	3,812

As for the O&M costs, those after 2004 are counted. Those after 2007 are assumed to be equal to that in 2006 as in the financial evaluation.

Table 4-15 Assumed O&M Costs

Unit: million manat

	2004	2006	Total (2004 – 2010)
O&M costs	787	1,176	7,501

e.4 Result of EIRR Calculation

The team only took account of benefits from prevention of infectious and respiratory diseases and contribution of improved city beauty to tourism industry development. On the assumptions that the doctor consultation fee for infectious diseases is US$ 10.00, that for respiratory diseases is US$ 30.00, and improved city beauty increases the revenue from tourism by 0.01%, EIRR is calculated at 8.1%, and on the assumptions that the doctor consultation fee for infectious diseases is US$ 3.00, that for respiratory diseases is US$ 10.00, and improved city beauty increases the revenue from tourism by 0.05%, EIRR is calculated at 15.2%.

e.5 Qualitative Analysis

The improvement of air protection and water resources protection will improve the quality of lifestyles of Baku citizens. The encouragement of the BCE for factories to introduce CPT will turn to be their financial benefit. Land protection and waste control will result in the increased land value and opportunities of other land use.

Fauna and flora protection and conservation areas management will provide improved amenity and comfort to the Baku citizen.

The laboratory and the GIS are the strong instruments for the BCE to satisfactorily conduct its responsibility.

Data management using the GIS will increase the work efficiency of the BCE and allow timely and practical decision-making.

Although it is difficult to quantify such benefits, they are presumed to be larger than the impacts, which were quantified above.

e.6 Conclusion

The GRDP of Baku, the study area, in 2003 is estimated at 10,123 billion manat. Investment cost for the proposed priority projects is 11.94 billion manat in economic price and 17.41 billion manat in market price. These figures are equivalent to only 0.12 % and 0.17 % of GRDP respectively. Therefore we conclude the investment cost for the proposed priority projects is in an affordable range of the Baku economy.

Furthermore, there are many benefits, which could not quantified, in addition to the calculated EIRR. Therefore the proposed M/P is judged to be reasonable and recommendable.

f. Overall Evaluation

Based on the above evaluation in terms of technical, social, financial and economic aspects the team concluded that all the priority projects are reasonable and recommendable in technical, social, financial and economic terms.

5 Conclusions and Recommendations

1. Promotion of City Development with Due Attention to the Environment

At present, the city development plan of Baku City is under preparation and there is no clear development policy of city planning yet. The drive for economic development and control of excessive urbanisation must be balanced, but no criteria are given for rational decision making. For the promotion of city development with due attention to the environment, the city development plan has to be formulated as soon as possible.

In the absence of a city plan, the team elaborated an environmental zoning plan as shown in Plate 10 which aims at environmental land use. The team strongly urges the relevant authority to develop a city land use plan incorporating the proposed environmental zoning and officially approve the plan for practical enforcement. Environmental zoning is a powerful means of guiding sound development and protecting the natural environment provided only if it is properly enforced.

2. M/P Formulation for the Management of Municipal Solid Waste and Medical Waste

Water supply, wastewater treatment and waste management are the major common concerns for cities of the world. Among those issues, the M/P for water supply and wastewater treatment was made for Baku with an assistance of the WB and is being brought into effect. A study on hazardous waste management is also on-going under the WB. Municipal solid waste management is, however, laid aside without a M/P or any other form of improvement strategies, although the problems associated with municipal solid waste are diverse, including insufficient waste collection services, non-sanitary final disposal and innumerable illegal dumps. Moreover, the collapse of the FSU heavily damaged the waste recycling system well established in Soviet times. Principal recycling items such as scrap iron and paper are not currently recycled, as recipients of those items disappeared from the country.

A M/P for the management of municipal solid waste including non-hazardous industrial waste must be therefore immediately worked out in order to resolve such problems. The M/P formulation should be lead by the BEP with the district EPs and the BCE should give advises and assistance to them. In this study, the team carried out a waste amount and composition survey, and suggested issues to be covered in the M/P using its result.

There are no plans or policies either for the proper management of medical waste, some of which is at present disposed of together with municipal solid waste. A M/P for medical waste management is also urgently needed. The Ministry of Health should take an initiative for M/P formulation with a support from the BEP and the district EPs, and the BCE should assist them. The result of the survey at 40 medical institutions in this study and generation analysis and forecast of medical waste by the team will be useful for the BCE.

The team recommends the BCE to refer to the study output and to urge the relevant authorities to take necessary actions for the formulation of the M/Ps for MSWM and medical waste management.

3. Enhancement of the Monitoring System

The rate of operation of manufacturing industry in Baku is one-third of that in the Soviet era. Consequently environmental degradation due to industrial pollution seems to be still in a lull. The surveys by the team revealed, however, that the quality of lake water and sediment is partly poor and air quality is threatened by vehicles, 70% of which were found to emit CO exceeding the standard. The data obtained from State Committee for Land proved the soil contamination of some areas.

Therefore, the BCE, with assistance of the SCE, has to enhance its monitoring system as in the M/P and the priority project proposed by the team. Further, data collected in the monitoring system should be entered into the GIS database, distributed to organisations that need them, and be reflected in a process to formulate concrete action plans.

4. Institutional Building of the BCE

The BCE is a governmental body to oversee the Baku environment and promote environmental improvement. Its institutional system is, however, seriously weak. For example, it does not possess the environmental passports or even a list of factories under its control, which should be essential material for inspection. It does not own its transport means and the cost for a factory visit for inspection has to be borne by the inspectors. Furthermore, its salary level is below the standard, discouraging the staff from working for environmental improvement.

Improvement is required in every aspect for institutional building of the BCE. Particularly, the team stresses the following that are also proposed in the M/P and the priority projects:

- the BCE has to obtain tools for law enforcement such as the environmental passports, EIA reports, laboratory, and transport means;
- the BCE has to develop a data management system including data acquisition and data diffusion;
- all the BCE personnel has to develop its capability and work efficiency and be allocated to appropriate positions so that the BCE can cope with diversified and complex work requirements;
- to motivate the BCE personnel, its salary level has to be raised. It will not easy at all to raise it to the level of the private sector, but it is proposed to be equal to overall average salary in 2000 multiplied by the growth rate of GRDP/capita by 2010.

5. Integration and Sharing of Environmental Data

Under the Soviet system, all information was sent to Moscow, where it was strictly controlled, and little was accessible for the general public. The influence of thatsocial system still firmly remains, even after the collapse of the FSU and the independence of Azerbaijan. Data on the environment are kept within the relevant authorities and are closed to the general public. Access to those data requires a troublesome process and costs even state organisations a significant amount.

The acquisition of reliable data is essential to understand the environmental conditions and formulate appropriate environmental improvement plans. Data, after

acquired, then have to be diffused widely to seek for the cooperation of the general public for environmental improvement for the following reasons.

- The pollution experience of Japan in the 60's and 70's proved that environment remediation behind requires huge expenditure compared with prevention or early countermeasures. If the data are integrated and shared, then small signs of environmental degradation will be easily detected and the damage can be minimised without large expense.
- The general public are the victims of the poor environment. It is also, however, often the general public who degrade the environment, either directly or indirectly. Therefore, public involvement is important to find out and cope with environmental problems early enough.

The environmental GIS database established in the present study is an instrument to integrate environmental data scattered across different organisations, and to share those among not only policy planners but also all the citizens. Due to time constraints of the team, the established database is unfortunately not complete. The BCE and the SCE have to keep the database updated, enlarge the database, and make the database more useful for their work execution by closely communicating with other relevant organisations.

6. Effective Use of the Study Products

The development of the BCE's capability, which is necessary for M/P implementation, may not be possible only with the M/P, financial arrangement, facility and equipment. In addition, the BCE has to learn practical skills of environmental management in the field. In the present study, therefore, the team carried out a number of field investigations and pilot projects, through which the BCE gained practical experiences of environmental management. The table below summarises major products of the team and their expected use for environmental management by the BCE.

Table 5-1: Study Products and Their Expected Use

Study Products	Expected Use for BCE's Works
1. GIS Database	1. Public relations and environmental education. 2. Environmental data input to other studies and plans. 3. Evaluation of other studies and plans (e.g. EIA reports). 4. Monitoring, inspection, control and supervision of polluters. 5. Collection of the EPF charges. 6. Understanding of the environmental status and documentation of its assessment.
2. Factories Survey	1. Factory control based on the factory list and the summary of environmental passports. 2. Monitoring, inspection, control and supervision of polluters. 3. Development of environmental improvement policy taking account of opinions from the industry.
3. Environmental Quality Survey	1. Sampling and monitoring. 2. Improved laboratory skills for environmental

	measurement. 3. Understanding of the environmental status.
4. Opinion Survey for Medical Institution	1. Promotion of the formulation of medical waste management M/P. 2. Control, inspection and supervision of medical waste management.
5. Public Opinion Survey	1. Public relations and environmental education. 2. Development of environmental management policy taking account of public opinions.
6. Waste Amount and Composition Survey and Survey on Recycling Activities	1. Promotion of the formulation of municipal solid waste management M/P. 2. Promotion of the formulation of municipal solid waste recycling M/P. 3. Control, inspection and supervision of municipal solid waste management.
7. Experiment on Enhancement of the BCE Laboratory	1. Improved laboratory skills for environmental measurement. 2. Detection and supervision of polluters.
8. Development of Illegal Dump Control System	1. Control of illegal dumps. 2. Prevention of new illegal dumps. 3. Public relations and environmental education

Experience learnt by the BCE from the study should be valuable and the BCE is expected to utilise it fully for the realisation of the M/P.

7. Financial Arrangement for M/P Implementation

The ultimate goal of the integrated environmental management master plan is "to contribute to the sustainable growth of Baku City with due attention to the environment, by the target year 2010." To achieve this, the M/P was formulated by placing the main focus on the improvement of environmental management capability of the BCE, the executive body of the M/P.

The team estimated that for the implementation of the M/P, US$ 7.24 million must be invested by 2010 and O&M cost has to be raised up to US$ 366.7 thousand from the current level of US$ 175.7 thousand.

At present, the budget of the SCE and the BCE is notably small. M/P implementation is far beyond their affordability. Hence securing additional financial sources is a prerequisite. Financial arrangements proposed by the team are based on the following preconditions.

Table 5-2: Preconditions of Financial Arrangement for M/P Implementation

Financial Items \ Phase		Phase I (2001 – 2003)	Phase II (2004 – 2006)	Phase III (2007 – 2010)
Investment		Foreign finance	EPF	EPF Oil fund
O & M	Personnel Expenses	General budget Off budget	General budget	General budget
	Others	General budget Off budget	General budget Off budget	General budget

The current financial sources of the BCE are the general budget from the central government through the SCE and the "off-budget" which the BCE earns by itself.

O&M cost should be covered by the general budget because the BCE is the state body overseeing the local environment. This is set as a final target of the financial M/P. The team, however, understands that because of the financial restriction currently the country faces, the BCE can not help counting on the "off-budget" by Phase II. Therefore, the team proposes that in Phase II, the flow and usage of the "off-budget" should be transparent, it should be handed over to the central budget, and the same amount should be paid back to the BCE. The "off-budget" must be phased out in Phase III and totally abolished by 2010.

For investment, the EPF and/or the Oil fund are the possible sources. However, they are at present still small and there is no mechanism to use them for the enhancement of the BCE or any other environmental purposes. Accordingly in Phase I, finance must be sought from international or bilateral aid agencies. Meanwhile, the EPF should be expanded by drastically revising the EPF charges (namely pollution fee, fine and claim) to follow inflation (50-fold by 2003 and further fivefold by 2006) and a system to use the EPF for environmental projects must be developed. Accordingly, a portion of the EPF should be allocated for investment required in Phase II. In Phase III, the Oil Fund, which should be large enough then, should be also partly allocated as investment fund for the M/P.

8. Implementation of Priority Projects

Through the discussion with the BCE based on the M/P, the team selected six priority projects that are to be implemented by 2003, and examined their implications. The table below is the summary of initial investment necessary for them.

(Unit: 1,000 US$)

	Phase I (2001 – 2003)
1. Procurement of Office Equipment	80
2. Procurement of Equipment for Inspection	1,118
3. Procurement of an Air Quality Monitoring Station	1,254
4. Procurement of Equipment for Chemical Analysis	867
5. Procurement of Equipment for Information	22
6. Development of Absheron Sanctuary	553
Total	3,894

The priority projects were evaluated from technical, social, financial and economical points of view.

The financial evaluation was on the following assumptions.

- The practically softest loan conditions are adopted (repayment term: 25 years (including 7-year grace period); interest: 1.7% per year).
- The general budget covers all the cost for personnel and office by 2004 and all the O&M cost by 2010.

- The EPF charge is raised 50 times higher than the current level by 2003 to follow inflation.
- The "off-budget" raised from the services rendered by the BCE (e.g. EIA evaluation, laboratory analysis, etc.) increases 1.5 times by 2003, and 2.2 times by 2006 compared with the 1999 level.
- To narrow the gap of salary between the public and private sectors, the salary of the public sector increases 1.64 times by 2006, where 1.64 = 1.55 x 1.06, the growth rate of GRDP/capita is 1.55, and the ratio of the present salary of the public sector to the overall average is 1.06.

On those assumptions, FIRR was calculated at –2.6%. The team therefore concludes that investment into the priority projects using a loan will result in financial difficulties.

The quantification of environmental benefits is in general difficult and is often attempted only arbitrarily. The team attempted EIRR calculation only taking account of benefits from (i) prevention of infectious and respiratory diseases and (ii) contribution of improved city beauty to tourism industry development. On the assumptions that the doctor consultation fee for infectious diseases is US$ 3.00, that for respiratory diseases is US$ 10.00, and improved city beauty increases the revenue from tourism by 0.05%, EIRR is calculated at 13.2%. It is well above the threshold value of 8.0% used by the WB and EBRD (European bank for reconstruction and development) in decision making of financing. Furthermore, there should be other large benefits such as timely decision making using the GIS database and increased opportunity to have contact with nature in Absheron Sanctuary, although they are not quantified.

The team concluded that all the priority projects are reasonable and recommendable in technical, social, financial and economic terms.

The BCE is strongly recommended to implement the priority projects immediately as a first step toward the M/P. Securing investment fund from overseas is the first inevitable question to be solved and its financial source should be on a grant base as much as possible.

9. Efficient Use of Water Resources

Baku City stands on arid land with yearly precipitation of some 200 mm and imports almost all water required in the city from a distance of hundreds kilometres. This means that social and economic activities in the city heavily depend on considerably expensive water supply. Nevertheless, ARWC (Absheron Regional Water Company) consumption data indicates domestic consumption levels of 580 litre/person/day (for comparison, 391 litre/person/day[20] in 1996 in Japan) and unaccounted-for-water (UFW) at 50 % of water produced.

Inefficient water use brings economic loss by wasting expensive water and also environmental burden by increasing wastewater volume to be treated. To solve this problem, the citizens should recognise that they are exhausting valuable water resources and they have to be stimulated to cooperate for water resources

[20] Annual Report on Health and Welfare 1998 – 1999, Ministry of Health and Welfare of Japan, March 2000

conservation. The BCE is urged to promote publicity and educational activities in cooperation with ARWC, BEP and other organisations.

10. Public Awareness Raising

When an environmental issue is addressed, attention tends to be paid to sensational problems such as land contamination of oil and high SOx emission. Those are usually caused by a limited part of population mainly engaged in industrial activities, and the most people are indifferent, considering that they are out of the picture, unless they are affected by the problem.

However, there are environmental problems of another type, such as littering. An empty cigarette box on a street and blowing the car horns constantly, which are attributed to daily habits of the general public are symptoms. In Baku, although they may appear small at a first glance, such problems are so widespread that they are major problems. However, because these arise from people's own behaviour, it is difficult for them to recognise that they *are* actually the cause of the problem.

An environmental issue is, in plain words, a question as to how the condition of surroundings of our daily lives is. Everybody should be eager to live in a favourable surrounding and this is possible only if all the members of the society care about and make efforts to better the surroundings. If society changes in that way, the industry will also change because society starts to impose sanctions on polluters. There are state bodies that bear responsibilities to protect the environment, but their performance eventually depends on the support of the general public (i.e. tax payers).

Therefore the BCE has to seriously work on public awareness raising. It requires laborious, time-consuming and difficult works that must be attempted continuously even though their effect will not be easily visible. The campaign carried out in the study is one of the public awareness raising activities, but it should not be a one shot event. The BCE is strongly recommended to make the best use of the experiences obtained during the campaign, the GIS database, Absheron Sanctuary that is proposed to have recreational facility, and other outputs of the present study to tackle this challenging task.

11. Monitoring of M/P Implementation

The BCE should not leave the M/P as a plan drawn on paper but bring it into effect steadily. The team recommends the BCE to develop a system to monitor the progress of the M/P as below:

- a monitoring team should be formulated within the BCE headed by the BCE chairman;
- the BCE chairman should submit a M/P monitoring report to the SCE chairman (or the Minister of Environmental Protection, if the SCE is transformed to a Ministry) every year. After review and approval by the SCE chairman (or the Minister), Cabinet of Ministers and the Parliament, the report should be publicised;
- the report should describe the progress of the environmental projects to be undertaken by other organisations as well as the progress of the M/P itself (i.e. improvement of the BCE/SCE). It should also state accomplished environmental improvements as quantitatively as possible;

- in 2003 and 2006, i.e. at the end of Phase I and Phase II of the M/P, the report should include the overall evaluation of each phase, and review and revision of the M/P for the next phase if necessary, in addition to the progress in that year;
- the report of the year 2010 should contain the overall evaluation of the M/P and proposals for further actions to be taken in the following decade.