

Chapter 5

5 Supplementary Studies for Priority Projects

5.1 Development of Absheron Sanctuary Conservation System

5.1.1 Introduction

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

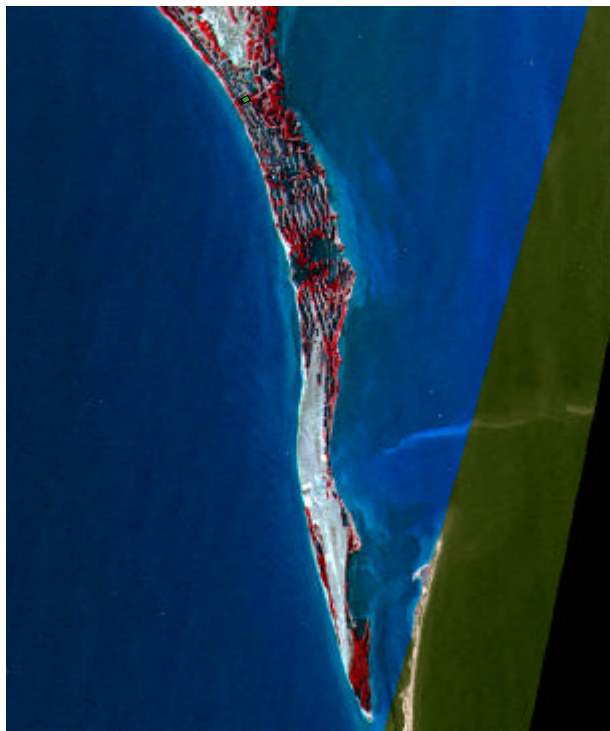
In fact, the BCE does not possess fundamental instruments to accomplish such duties such as fence, lodge, monitoring post and so on. In order to execute the planning for the proper instrument and facilities, the base map of Absheron Sanctuary was produced in this study.

Furthermore, necessary drawings for the future development were prepared.

5.1.2 Absheron Sanctuary Development Plan

a. The Site

The Absheron sanctuary, located at the east end of the Absheron peninsula, was established in July 1969. According to the BCE, the total area is 815 ha, including 364 ha of littoral area (500 m wide off the sea shore), 152 ha of salty area, 95ha of reed-beds and 190 ha of lands with rich soil and groundwater supply, but because of the Caspian sea level fluctuation, the recent land area is reduced to be 300 ha based on a satellite picture taken in May 2000 (shown in Figure 5-1).



A number of long and narrow ponds can be seen in a northern half of the sanctuary. According to the BCE staff, those are the artificially excavated fields where watermelons were planted before. Due to the fluctuation of the water level of Caspian Sea, the salinity in water increased and cultivation was ceased. Based on the analysis of this satellite image, current land use was mapped as in Figure 5-2 and summarised as follows.

Figure 5-1: Satellite Image of Absheron Sanctuary

Table 5-1: Current Land Use

Land Use Title	Area (ha)
Vegetation	80
Bare land (desert)	152
Water	66
Road	2
Total	300

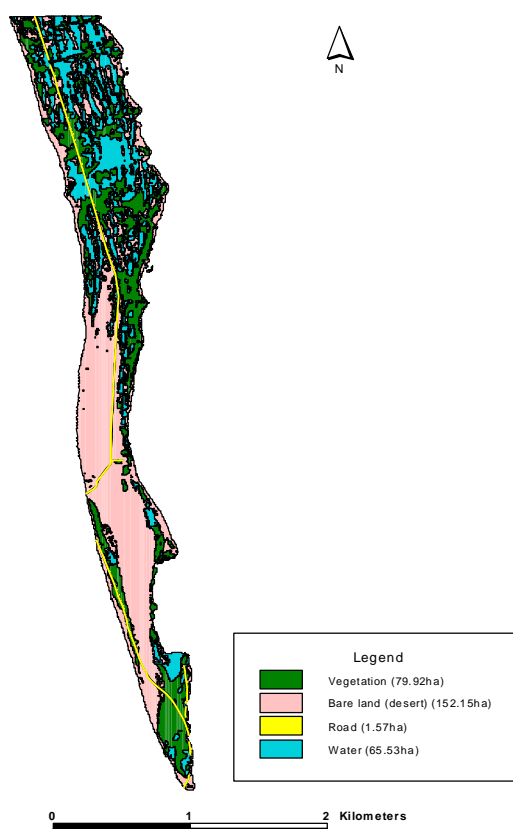


Figure 5-2: Current Land Use

(See also Figure 10-4 of the Main Report.)

b. Basic Policies of Park Development

The team developed a park development plan which is based on the following basic policies.

- The safety of the visitors must be secured.
- The natural conditions in the sanctuary should be maintained as far as possible.
- Educational value should be maximised.

c. General Layout

The team planned to develop an area of about 0.5 ha in the sanctuary to locate main facilities. A nature trail starts and ends this area, and the visitors are allowed to enter only this area. The access to the area is arranged from existing road passing in the north-south direction. Close to the access at west of existing road, it is planned to set a parking lot for 15 vehicles. On the opposite side, there will be a park with following facilities for education of nature conservation. General Layout is shown in Figure 5-3.

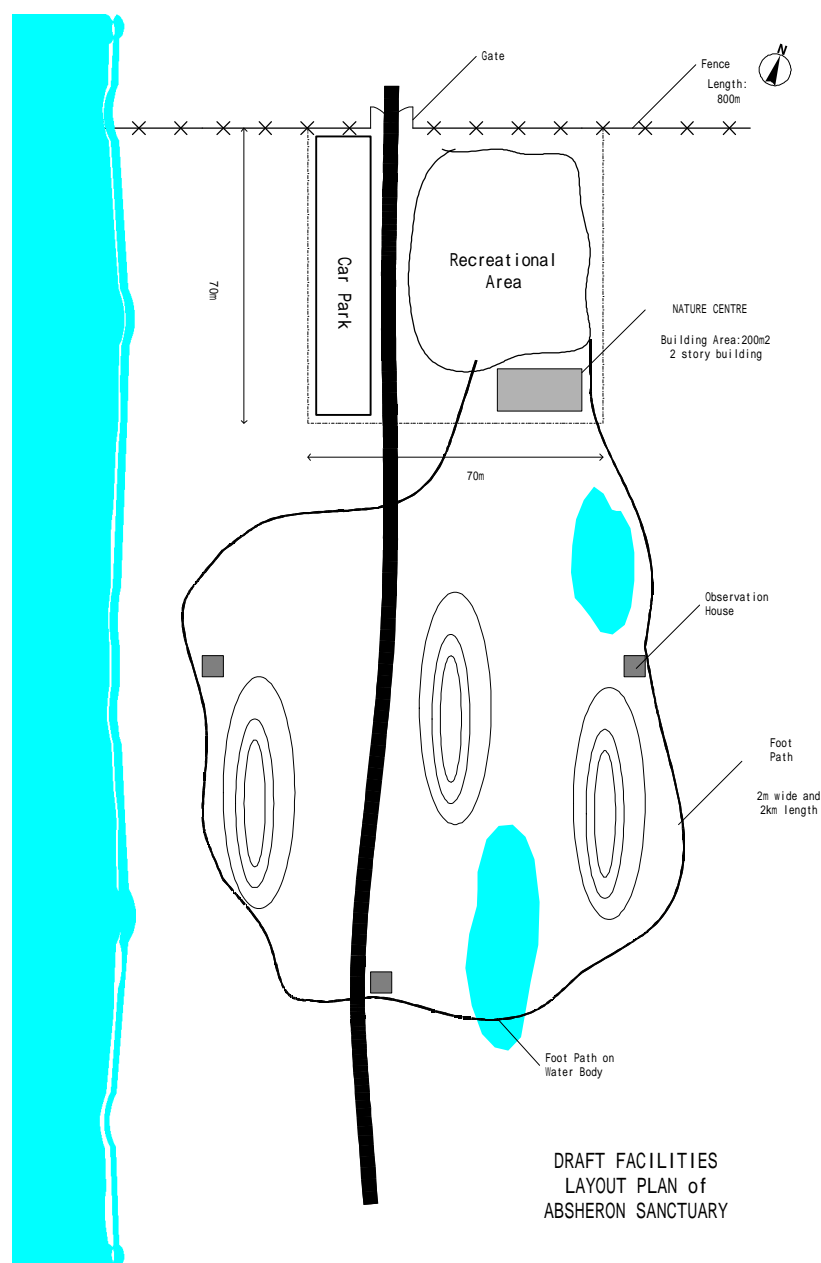


Figure 5-3: General Layout of the Park

In the sanctuary park, the following facilities are to be developed. It should be noted that all facilities should have appearance that fits the landscape of the sanctuary.

c.1 Fence, Entry Gate and Guard Post

A fence is installed on the west boundary of the sanctuary. At the entrance there are a guard post and a gate with a clear and attractive sign of the park and an information board. The information board should present the following information together with the illustration of the sanctuary layout:

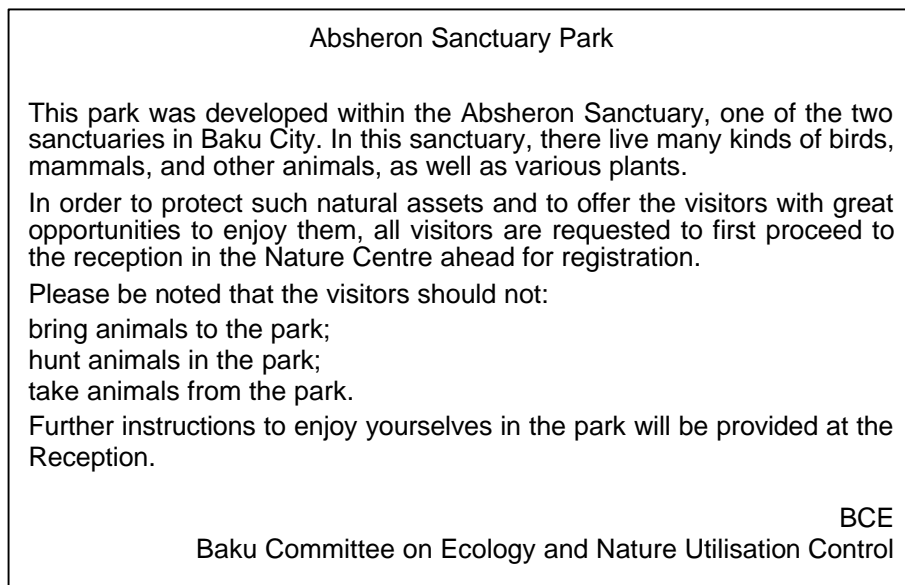


Figure 5-4: Example of Information Board

A gate and fence are shown in Figure 5-5

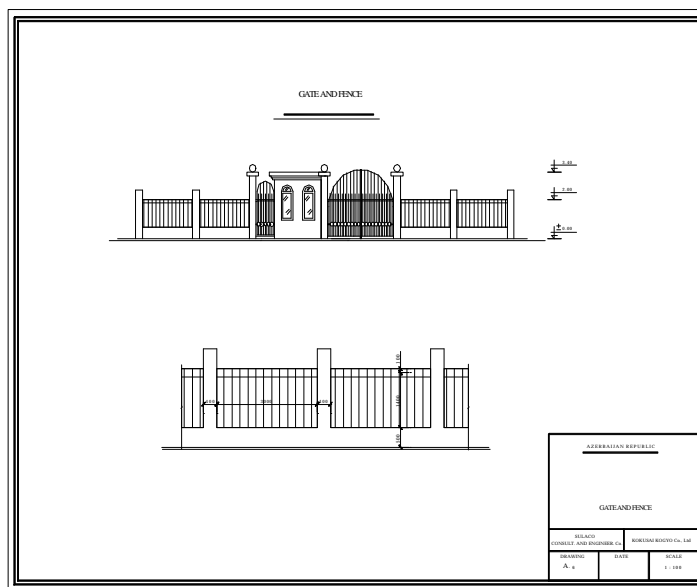


Figure 5-5: Gate and Fence

c.2 Parking Area

The parking area for 15 vehicles is located near the gate. The surface shall be paved with asphalt concrete and details of the pavement is shown in Figure 5-9

c.3 Nature Centre

A nature centre will be a two-storied building with the total floor area of 400 m² for the purposes of environmental education and park management. The proposed design is shown in Figure 5-7. The first floor is a management space. There are:

- a reception and inquiry counter where sits a nature guide(s) who registers the visitors, receives questions and other inquiries, instructs the visitors “dos and don’ts”, distributes booklets/leaflets, gives first aid, lends binoculars in exchange of ID cards, etc.;
- an office room where the BCE staff, nature guides and other relevant park staff work;
- a dining kitchen and a bedroom for the guards.

The second floor is an educational space. There are:

- panels presenting information on:
 - history of the sanctuary and the park;
 - maps showing the sanctuary as a whole, park layout, vegetation, and which animal species are likely found where and when;
 - description of ecological characters and photos of animals and plants that can be found in the sanctuary and the park.

Section 6.3 of the Supporting Report will be of great help to prepare such materials. The visitors will also be able to participate information presentation, for example, by writing a message about what they found where and when for the next visitors. Questions from the visitors and answers by the nature guides will be also presented.

- materials to explain the sanctuary ecology (specimens of feathers, models of bird nests, pictures, reference books);
- a lecture room.

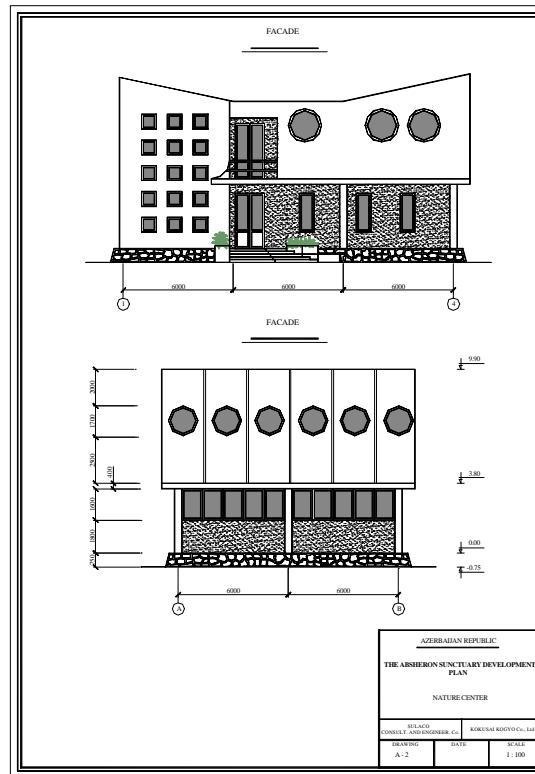


Figure 5-6: Elevation of Nature Centre

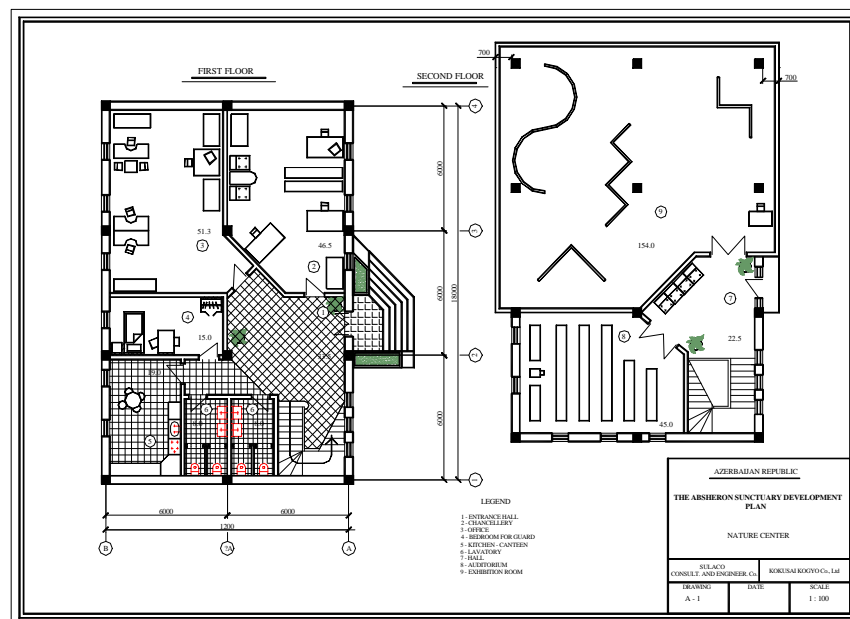


Figure 5-7: Proposed Design of Nature Centre

c.4 Observation houses

The observation houses are the place where the visitors enjoy bird watching and become familiar to the nature world. Three of them are located along the nature trail near the water body and have observation rooms with a wide view of waterfront. See Figure 5-8 and Figure 5-12.

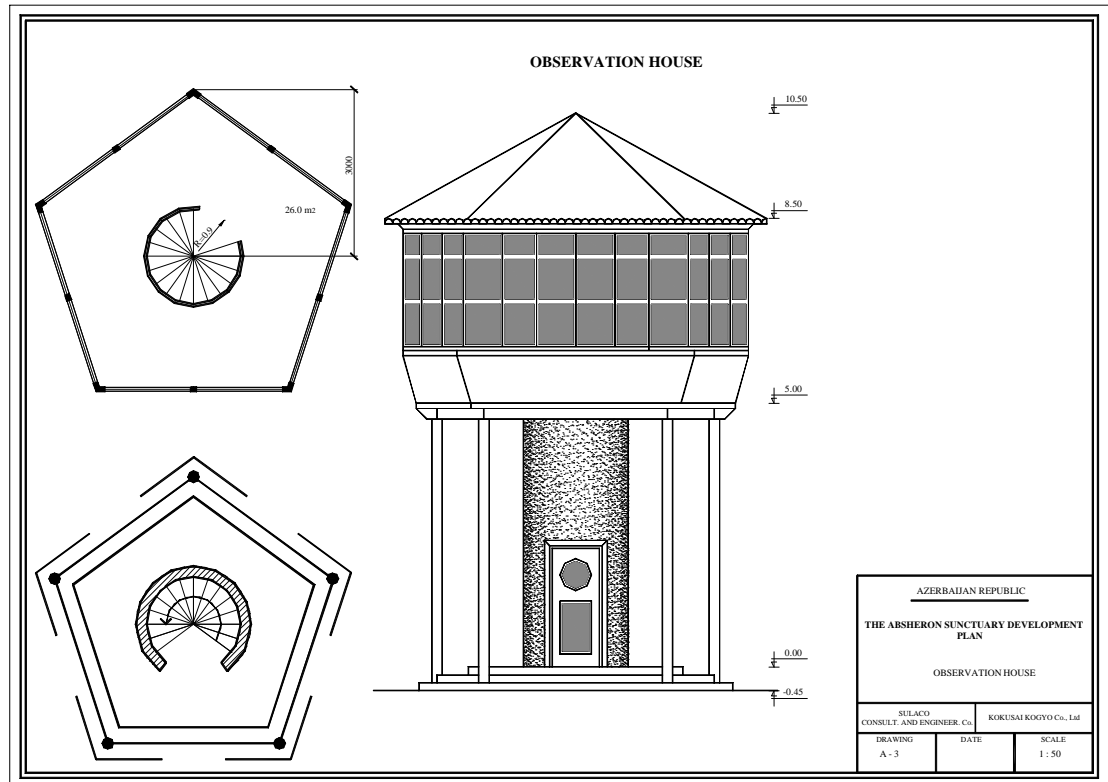


Figure 5-8: Observation House

c.5 Nature Trail (Footpath)

Footpath with total length of about 4 km is arranged in the park. The path allows visitors to see different features of the area (sand dune, wetland, reed bed, and sea). It is in principle to be paved with stone, but is partly provided with flyovers if the land is vulnerable to inundation. See Figure 5-9 and Figure 5-12.

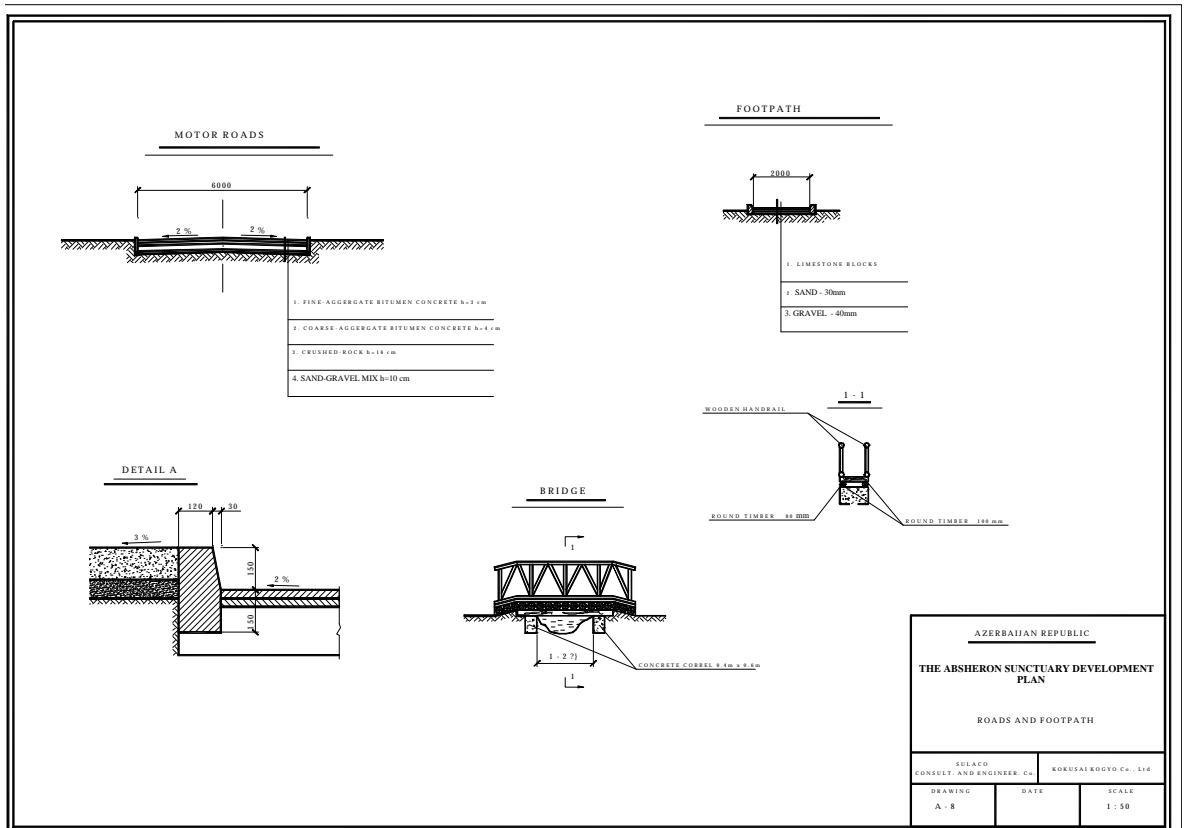


Figure 5-9: Typical Design of Footpath and Car park

c.6 Signboards

Along the footpath, signboards should be placed with 100m to 200m intervals. They have to be made of tolerable material and well visible. The expression of information on the signboards should be simple and easy for children.

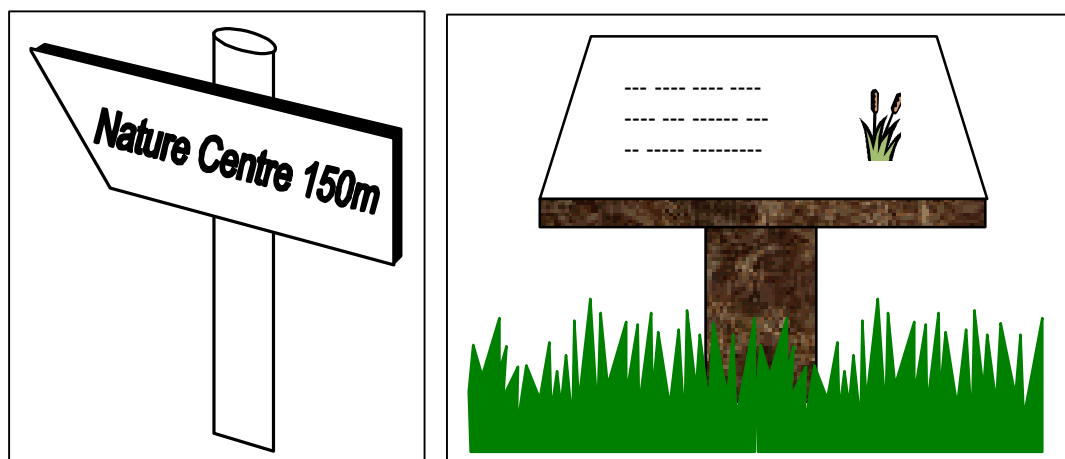


Figure 5-10: Example of Signboards

The signboards will provide the visitors with following information.

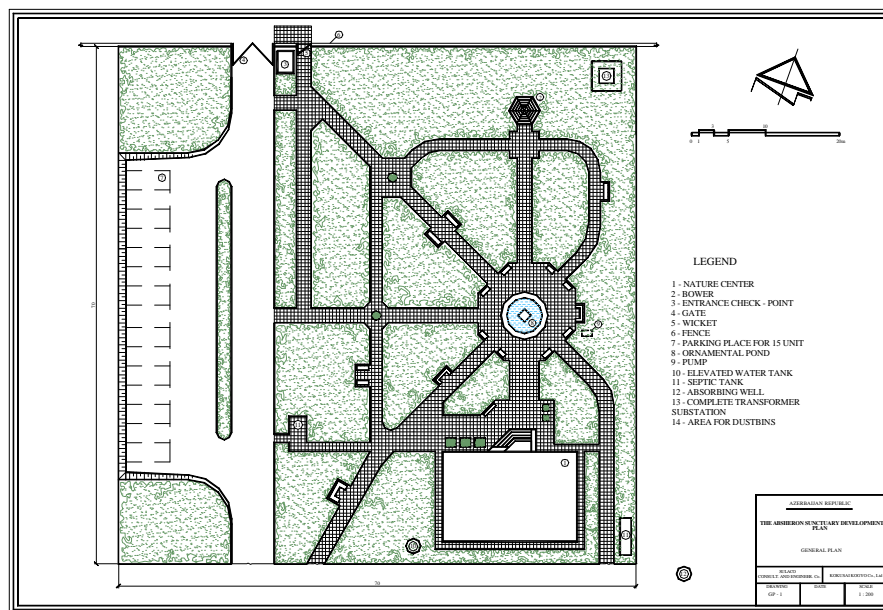
- park map and the location of the signboard;
- direction;
- distance to the observation houses and/or the Nature Centre;
- species likely found at the point;
- ecological characters at the point;
- cautions (eg “watch your step”, “do not enter”, “do not litter”, etc.).

c.7 Open Space and Benches

An open space with benches is located beside the Nature Centre. Benches will be also placed along the nature trail.

d. Layout

Figure 5-11 shows a layout plan of sanctuary park facilities and Figure 5-12 shows a



layout of footpath and observation houses.

Figure 5-11: Layout Plan of Absheron Sanctuary

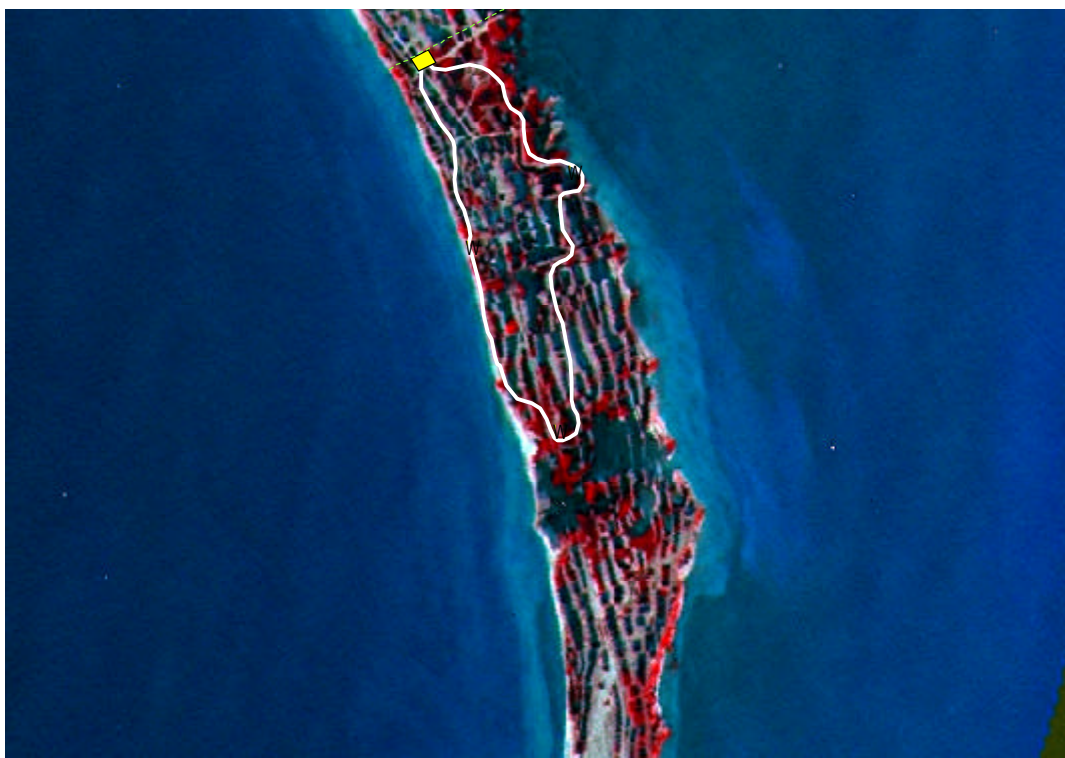


Figure 5-12: Layout Plan of Footpath and Observation Houses

5.1.3 Operation

a. Opening Seasons and Hours

When to open the park to the public will by and large depends on how many visitors will be and how many park staff are available. In the early stage after the park is developed, the park may open only limited time, and the more widely it is known to the public, the longer it will open.

b. Operational Body

The BCE bears the responsibility to operate the park, but it may entrust actual operational works to private bodies including NGOs on a contract basis.

c. Personnel Management

One BCE staff will look over the overall management of the park, and three BCE staff work as guard. External human resources should be utilised as:

- nature guide(s) --- at least one every opening day, who will instruct the visitors how they can enjoy themselves in the park, what is likely found and where, and answer questions from the visitors, (in phase 3, a guide will be employed by the BCE);
- extra nature guides --- who will work when an occasional event is planned;
- technicians to maintain the park facilities (In phase 3, a technician will be employed by the BCE).

d. Educational Activities

In general, education at a nature park will be in two types: self-guiding and guided. In the former, the visitors are supposed to learn nature by themselves with a help of presented materials; in the latter, they are guided by a nature guide and listen to his/her explanation. In the earlier stages, the main education type at the Absheron Sanctuary park will be the self-guiding one because the guided type requires an input of experienced guides.

The self-guiding type, however, needs thorough preparation of educational materials (signboards, panels, leaflets, etc.). They have to be well organised, interesting and easy to understand even for school children. They should be reviewed and partly replaced every a few months (probably by season) to provide timely information and for the benefit of repeated visitors. Results of species registration works by the BCE, with cooperation of Academy of Sciences and other organisations, should be reflected to the materials.

The preparation of educational materials will be a good exercise for the prospective nature guides who will, after obtaining enough experience and knowledge about the park, provide the visitors with services such as guided tours, lectures and instructions.

e. Publicity

The opening of the park has to be widely and repeatedly publicised. Schools will be the main target of publicity. The BCE may need to organise a park visit tour after the park is opened.

5.1.4 Maintenance

For the enjoyment and safety of the visitors and the protection of ecological values, the park facilities should be properly maintained. The visitors are encouraged to bring back their waste with them and not to dispose waste in the park.

The table below presents a proposed maintenance plan.

Table 5-2: Park Maintenance - Items and Frequency

	Facilities	Check Items	Frequency
1.	Fence	Breakages and collapses	Twice a year
2.	Entry gate	Breakages and collapses	Yearly
3.	Nature centre	Utilities, safety, convenience	Twice a year
4.	Observation houses	Collapses, water facility	Twice a year
5.	Nature trail	Collapses, safety, convenience	Monthly
6.	Signboards, information boards at the gate	Collapses, fade of colour, visibility	Yearly
7.	Benches	Collapses	Monthly
8.	Park as a whole	Cleanness	Every day

5.1.5 Descriptions of Work

Descriptions of the work are summarized as follows.

No	Items	unit	Quantity
1	2 story building "Nature Centre"	M2	400
2	Water supply and sewerage system(septic tank)	Ls	1
3	Electricity Supply from nearest sub-station (1,500m)	Ls	1
4	Fence	m	800
5	Gate	no	1
6	Guard house	no	1
7	Observation house	no	3
8	Foot Path	m	4,000
9	Landscaping for the park	Ls	1

5.2 Waste Amount and Composition Survey

5.2.1 Objectives and Definitions

a. Objectives of the Survey

The Waste Amount and Composition Survey (WACS) intended to provide an overview of the solid waste situation in the target area, based on data from sample representative sectors. The sectors subject to the study were households, which were divided further into three income groups (low, middle and high), commercial units, markets and streets, which compose the cross-section of waste generators in the municipality. They are also considered the major contributors to the city's day-to-day waste generation.

The survey sought to find out the types, amount and composition of wastes generated by those representative sectors. The results of the survey is expected to be used to clarify the waste stream in the target area and to formulate an appropriate system of solid waste management, specifically in formulating effective collection and disposal systems, developing waste utilisation plans and strategies, planning multi-sectoral involvement and designing a workable mechanism for managing the system.

b. Definition of Waste

For purposes of proper execution of the WACS and identification of a waste stream, the words used in the Study were defined as follows.

b.1 Household Waste

Also referred to as residential waste, this category comprises wastes that are generated as a consequence of household activities such as food preparation, sweeping, cleaning, gardening, etc.

b.2 Commercial Waste

Waste in this category is divided into two. The first is waste discharged from catering business such as restaurants and food shops. The second is waste from other commercial shops such as stationery shops, book stores, electric appliance shops, etc. The wastes from the latter are mainly discharged through commercial activities.

b.3 Market Waste

This is waste generated in and discharged from markets including markets at fixed places, mobile markets (*pazar*) and wholesale markets.

b.4 Street Sweeping Waste

Waste of this category includes all waste generated by the street sweeping cleansing service.

5.2.2 Survey Method

a. Methodology

In this survey totally 74 sampling points were selected from each sector in order to obtain the waste amount discharge rate by generation sources. The number of samples are summarised in Table 5-3.

Table 5-3: Generation Source and Number of Waste Samples

Generation Source		Number of Areas	Samples Per Area	Samples Per Day	Survey Days	Total Samples
Residential (by income levels)	High	4	5	20	7	140
	Middle	4	5	20	7	140
	Low	4	5	20	7	140
Commercial Area	Restaurants	1	5	5	7	35
	Other Shops	1	5	5	7	35
Markets		2	1	2	7	14
Streets		2	1	2	7	14
Total		---	---	74	---	518

b. Selection of Sampling Points for WACS

b.1 Household Waste

As described above, the household waste sector is further divided into the following income groups;

- household waste generated in high income residential areas;
- household waste generated in middle income residential areas;
- household waste generated in low income residential areas.

For the residential sector, such classification of income levels was also used for the Public Opinion Survey (POS, see 3.5).

b.2 Commercial Waste

Commercial waste was sampled from restaurants and shops, as waste from these two commercial types quite differs in terms of amount and composition. The areas for commercial waste sampling were selected from 4 central districts of Baku City (Narimanov, Yasamal, Sabayil and Nasimi).

b.3 Market Waste

Large and busy markets were chosen for sampling because these were clearly considered to be representative of the typical market in the target area.

b.4 Street Sweeping Waste

One street was selected in each district as a sampling point to represent street sweeping waste data (Sabayil district and Yasamal district).

c. Method of Waste Amount Survey

The WACS was conducted for seven days. It was necessary that sampling be conducted for the duration of seven days not to be influenced by the fluctuation of waste amount in a week. Before the execution of the survey, plastic bags of required number were distributed to all selected sampling points except the markets. Waste samples discharged from the markets were collected by plastic collection buckets.

After waste was collected from the sampling points, labels were stuck on the plastic bags according to the generation sources, so that there was no intermingling of the samples. Then, the amount of waste was measured at the collection point by weighing plastic bags containing samples with a spring balance and recorded in a waste amount recording sheet.

The market waste was transported by bus and the plastic collection buckets were measured by a large balance before the waste composition analysis.

d. Method of Waste Composition Survey

After transporting wastes from the sampling points to a waste sorting place, waste samples from each representative sector were gathered and mixed together. Then, the volume of the mixture of waste was reduced through a reducing method until the volume became 20-30 liters, as shown in Figure 5-13.

The process above was continued until the volume of the remaining waste was reduced to the amount designated for the waste composition analysis (20-30 litre). Then, the waste was loaded into a plastic bucket. The plastic bucket containing the waste was dropped three times from a height of 30 cm to the ground, then the volume was measured visually and the total weight by a platform balance.

The Apparent Specific Gravity (ASG) was calculated through the following formula.

$$\text{ASG} = \text{Weight of Waste (kg)} / \text{Volume of Waste (l)}$$

Then, the physical composition of waste was sorted into the following 10 items:

- kitchen waste (food);
- paper;
- textile;
- grass and wood;
- plastics;
- rubber and leather;
- metal;
- bottles and glass;
- ceramic, stone and bones;
- miscellaneous (soil, etc.).

The results of the physical composition were presented as percentages.

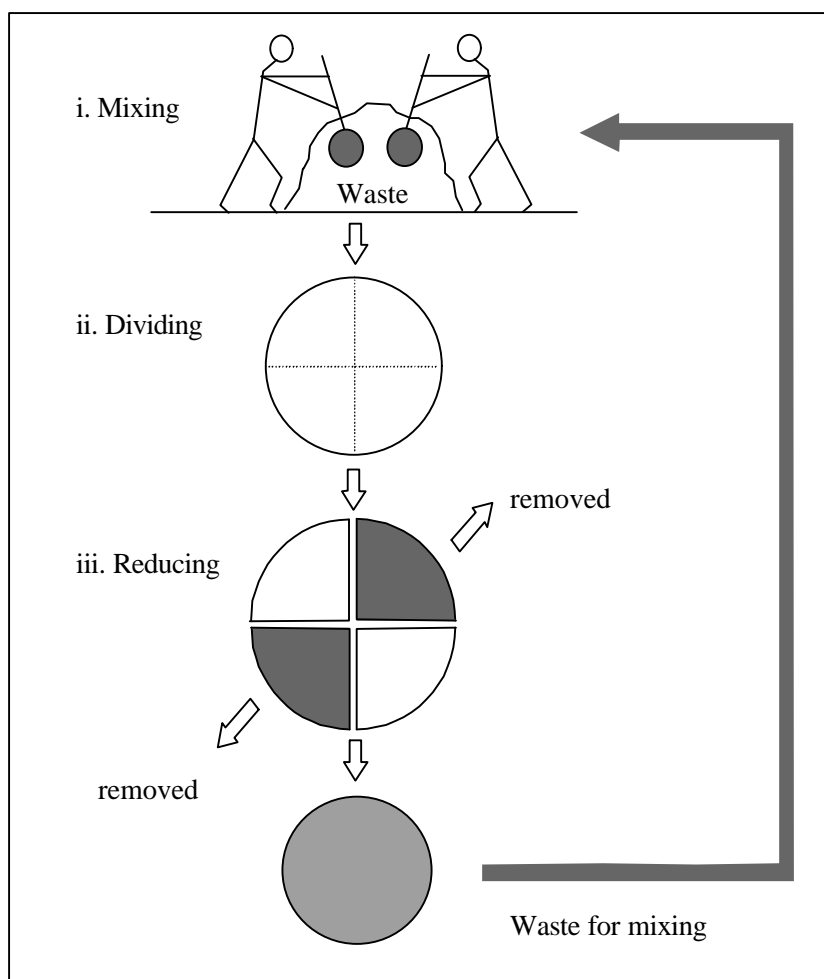


Figure 5-13: Waste Reduction Method

e. Period and Schedule of the Survey

The survey was conducted as shown in Table 5-4.

Table 5-4: Survey Period of the WACS

Items	Survey Period
Delivery of plastic bags and instruction papers	Oct. 2nd
Waste collection from each generation source	Oct. 3rd - Oct. 9th
Waste amount and composition survey	Oct. 3rd - Oct. 9th

5.2.3 Results of the Survey

a. Waste Amount

a.1 Household Waste

Before the WACS was conducted, the study's assistants instructed to each sampling point to discharge all of wastes including recyclable materials to the plastic bags provided by the study team. However, during the WACS period, the study team observed waste collected from the sample representative sectors and noticed that recyclable items such as newspaper, magazine, aluminium cans, glass bottles, etc. were hardly found in waste samples. This may suggest that the sampling points were

usually accustomed to do recycling as their daily life. For example, glass and bottles would be deposited in a certain place until they became enough amount, and they were to be sold to middleman or given to someone.

This observation was confirmed by the study team at the sampling points. Therefore, all the waste stream components were modified and estimated taking this observation and survey results into account. From this observation, the study team considered the results of WACS as discharge rate. The generation ratio was estimated by adding recycling amount to discharge amount.

Based on the above-mentioned, the summary of the waste amount survey is shown in Table 5-5.

Table 5-5: Household Waste Discharge rate in the Target Area

Unit: g/person/day

Item	High Income	Middle Income	Low Income
Average value	298	196	243
95% confidence	± 51	± 34	± 45
Maximum value	529	400	457
Minimum value	131	96	86

The average discharge rate of solid waste differs by different socio-economic groupings. The average discharge rate was 298 g/person/day for the high income, 196 g/person/day for the middle income, and 243 g/person/day for the low income households.

Due to the fact that most of the residents in the study are living in apartments or condominiums, household waste rarely contained garden waste. Probably for this reason, the waste discharge rate in the target area is low.

a.2 Commercial, Market and Street Sweeping

The results of the waste amount survey are shown in the following table.

Table 5-6: Discharge Rate of Other Types of Waste

Item		Unit	Discharge Rate
Commercial waste	Restaurants	g/table/day	1,770
	Other shops	g/shop/day	540
Market waste		g/stall/day	1,110
Street sweeping waste		g/km/day	70,600

For the restaurants, waste discharge rate is 1,770 g/table/day while other shops generate 540 g/shop/day.

The average discharge rates in market and from street sweeping are 1,100 g/stall/day and 70,600 g/km/day, respectively.

5.2.4 Waste Stream

a. Waste Discharge Amount

a.1 Household Waste

The results of the WACS and data obtained from district regarding population by income level are shown in Table 5-7.

Table 5-7: Population by Income Level & Household Waste Discharge rate

Item	Population by Income Level* ¹	Discharge Rate (g/person/day)
High Income Household	9.7%	298
Middle Income Household	33.6%	196
Low Income Household	56.7%	243
Weight Average	---	233

note : *1. Population Census (January – February 1999)

The generation rate of household waste in the target area, 233 g/person/day, is small in comparison with those of the other countries as shown in Table 5-8. As explained before, this will be because the housing style of the target area is mainly apartments or condominiums. Therefore, wastes from some activities such as sweeping, cleaning, gardening, etc. were absent from daily waste discharge.

Table 5-8: Comparison of Generation and Discharge of Household Waste in the Study Area and Other Areas

Items		Population	Study Year	GNP per Capita in 1997	Generation Rate of Household Waste	Discharge Rate of Household Waste* ¹	Generation Rate of MSW	Discharge (Collection) Rate of MSW
Country/City	Unit	Person	Year	US\$/Year	g/person/day	g/person/day	g/person/day	g/person/day
* ⁵ Malaysia	Penang	559,300	1989	4,680	N/A	504	N/A	726
* ⁶ Laos	Vientiane	142,700	1991	400	753	653	970	105
* ⁷ Poland	Poznan	590,500	1992	3,590	N/A	654 (470, 913)* ²	N/A	721
	Lublin	352,500	1992	3,590	N/A	399 (336, 542)* ²	N/A	501
* ⁸ Paraguay	Asuncion	510,500	1994	2,010	961	883	1,312	834
	F.Mora	99,201	1994	2,010	961	883	1,098	454
* ⁹ Philippines	Quezon	1,989,400	1997	1,220	423	388	565	508
* ¹⁰ Tanzania	Dar es Salaam	2,030,000	1996	210	698	321* ³	873	70 (141)* ⁴
* ¹¹ Honduras	Tegucigalpa	848,859	1998	580	375	352* ³	566	341
Turkey	Adana	1,196,620	1999	3,130	498	473* ³	696	671
	Mersin	634,850	1998	3,130	473	439* ³	703	669

Note MSW : Municipal Solid Waste

*1: The discharge rate is the number of households receiving collection services.

*2: The figures in parentheses are discharge rates of Central Heat Supply household and Non-heat Supply household respectively.

*3: The discharge rate is all the households including non-collection service area.

*4: The figure in parenthesis is the rate including the collection service done by informal sector which does not transport the waste collected to the municipal landfill but results illegal dumping.

Sources :

*5: Solid Waste Management Study for Pulau Pinang and Seberang Perai Municipality, Final Report, August, 1989

- *6: The Study on the Solid Waste Management System Improvement Project in Vientiane, Lao People's Democratic Republic, Final Report, August 1992
- *7: The Study on the Solid Waste Management for Poznan City, the Republic of Poland, Final Report, May 1993
- *8: The Study on the Solid Waste Management for the Metropolitan Area of Asuncion in the Republic of Paraguay, Final Report, August 1994
- *9: The Study on Solid Waste Management for Metro Manila in the Republic of the Philippines, March 1998
- *10: The Study on the Solid Waste Management for Dar es Salaam City, Final Report, September 1997
- *11: The Study on Solid Waste Management of the urban area of Tegucigalpa's Central District in the Republic of Honduras, Final Report, March 1999

The total household waste discharge amount was calculated by multiplying the average weight by the number of population in the target area. The number of population that was applied for waste stream calculation is described *Population* (Section Main Report 2.2.4).

Therefore, the study team calculated the discharge amount of household income as shown below:

$$2,051,600 \times 233 \times 10^{-6} = 478.0 \text{ ton/day}$$

In the WACS, the households sampled were asked about their recycling activities. Glass bottles are the almost only item recycled at households, and its recycling volume is as below.

Table 5-9: Population by Income Level & Recycle Rate

Item	Total Amount (g/day) *1	Nos. of Persons (person) *2	Average Amount per person (g/person/day)
High Income Household	300	74	4
Middle Income Household	800	81	10
Low Income Household	1,100	72	15
Weight Average	---	---	12

note *1 : total amount of recycled bottles by 20 sampled households.

*2 : total number of persons in the 20 sampled households.

The study team calculated the recycling amount of household income as shown below:

$$2,051,600 \times 12 \times 10^{-6} = 24.6 \text{ ton/day}$$

a.2 Commercial, Market and Street Sweeping

The total waste generation amount of the other categories were calculated by multiplying discharge rate of each category by the number of units of that category.

The team considered general waste from general and medical institutions as well as waste from households, commercial units, markets and street sweeping. Unit discharge of waste from general institutions were assumed to be same as that from commercial units (other shops). The amount of general waste from medical institutions were obtained from the opinion survey of medical institutions.

All the results of these considerations were then summed to get the total waste discharge amount in the whole city as shown in Table 5-10.

Table 5-10: Daily Waste Discharge Amount (2000)

Discharge Source	Unit	Number of Discharge Sources	Discharge Rate	Daily Discharge Amount (ton/day)
Household Waste	g/person/day	2,051,600* ¹	233	478.0
Commercial Waste (Restaurant)	g/table/day	4,035	1,770	7.1
Commercial Waste (Other Shop)	g/shop/day	11,438	540	6.2
Institution	---	---	---	6.2
Market Waste	g/stall/day	3,393	1,110	3.8
Street Sweeping Waste	g/km/day	1,105	70,600	78.0
General waste from Medical Institutions	---	---	---	24.5
Total				603.8

Note: *1. population forecast for the year 2000 (refer to Main Report 2.2.4.a: *Population*)

c. Self-disposed Waste Amount

The result of POS stated that 12.7% of the studied households does not receive a collection service. Among these people without the refuse collection service, 45% disposed of their waste by themselves by burning or burying waste in their premises or vacant lot. The results of the questionnaires used in the WACS and POS were considered to determine the amount of household waste disposed by a self-disposal method.

The study team calculated self-disposed waste amount as shown below:

$$2,051,600 \times 0.127 \times 0.45 \times 233 \times 10^{-6} = 27.3 \text{ ton/day}$$

d. Illegally Dumped Waste Amount

From the observation of the study team, illegally dumped waste was so often found in the target area. As same as the method to estimate self-disposed wasted amount, the results of the questionnaire used in WACS and POS were applied to find amount of illegally dumped waste amount in the target area.

In case of study area, 55% out of 12.7% of POS's samples which does not receive the waste collection service clarified that they dump their waste in a vacant lot. Therefore, the study team calculated the amount of illegally dumped waste as shown below:

$$2,051,600 \times 0.127 \times 0.55 \times 233 \times 10^{-6} = 33.4 \text{ ton/day}$$

e. Collected Waste Amount

The Ballakhani disposal site, operated by UP Azerbaijan, is equipped with a weighbridge but it is out of order at present. The KASCO's Lokbatan disposal site¹ does not have a weighbridge. At both sites, therefore, incoming waste amount is not weighed but estimated from the number of trucks. The waste discharge rate based on their information was resulted in an unlikely high figure.

¹ later it was closed.

Therefore, the data from UP Azerbaijan or KASCO were not used as collected waste amount. Instead, the results of the current study were applied, although waste is limited to waste from households, commercial units, markets and street sweeping.

f. Recycled Waste Amount

Recycling activity is concerned in many parts of the waste stream, from the discharge source, collection and final destination at the disposal site. In order to obtain data for recycled waste amount in each part concerned in waste stream, many efforts were made by the study team to access data with all related parties. The discharge sources, street waste pickers, site waste pickers (i.e. people who pick up valuable waste at the final disposal sites), middlemen and final users were interviewed by the study team. The outcome from the survey is concluded as the following table.

Table 5-11: Daily Recycled Waste Amount*¹

Recycling Source	ton/day
Generation Sources	24.6
Street Waste Pickers	5.4
Site Waste Pickers	8.9

note : *1. from the result of recycling market survey.

g. Final Disposal Amount

The final disposal amount was calculated from data on collected waste amount, other wastes and recycled amount at disposal site. In conclusion, the study team estimated final disposal amount at 504.2 ton/day. It should be noted, however, that this amount includes waste from households, commercial units, markets and street sweeping but excludes waste from other sources such as construction, demolition, hospitals (medical waste) and industries.

h. Waste Stream

In final conclusion, the waste stream is tabulated in Table 5-12.

Table 5-12: Waste Stream

Waste Stream Component	ton/day
Waste Generation Amount	603.8
Recycling by Discharge Source	24.6
Discharge Amount	579.2
Illegally Dumped Waste Amount	33.4
Self-Disposed Amount	27.3
Recycling by Street Waste Pickers	5.4
Waste Collection Amount	513.1
Recycling by Site Waste Pickers	8.9
Other Wastes	?
Final Disposal Amount	504.2 + ?
Total Recycled Amount	38.9

5.2.5 Waste Composition Analysis

a. Physical Composition

The results of the waste composition survey are summarised in Table 5-13.

a.1 Household Waste

The characteristics of the composition of the household waste are described as follows.

- Kitchen waste is the most dominant constituent in all the generation sources of household waste, which occupies 59% of the total. This is possibly because the housing style in the target area is mainly apartment and people take a lot of vegetables and fruits. In addition, the use of package for sales is not so popular in the target area. Therefore, waste from kitchen after food preparation shares much more than the other types of waste. On the other hand, waste from another activities such as sweeping, cleaning and gardening is quite small.
- Glass and paper constitute the second and third large percentages of waste in household waste. Glass and paper in household waste were 9.1% and 8.9%, respectively.
- Plastic is also the main component in household waste, which occupies 8.7% calculated from the study result of recycling activities in the three household groups and their population ratio.
- Households in Baku consume a large volume of bread, but bread was hardly found in household waste.

a.2 Commercial Waste

The general result of waste composition from commercial units is as follows:

- Kitchen waste accounts for about 60% of waste from the restaurants.
- Paper was about 70% of waste from “other shops”.

a.3 Market Waste

- Kitchen waste, paper and glass account for 63.9%, 19.6% and 6.0 % respectively in market waste.

a.4 Street Sweeping Waste

- Overall, glass and wood is the most common items in street sweeping waste, accounting for 24.7% of the street sweeping waste, followed by paper (19.2%), miscellaneous (19.0%) and plastics (13.6%).

Table 5-13: Results of Waste Composition Survey and MSW

Classification			Household				Commercial		Market	Street Sweeping	MSW*1		
			High Income	Middle Income	Low Income	Weight Average	Restaurant	Other Shop					
Physical Composition (Wet Base)	Apparent Specific Gravity (ASG)		Kg/l	0.25	0.29	0.24	0.26	0.49	0.07	0.31	0.20	0.25	
	Combustible Wastes	Kitchen Waste		(%)	55.1	63.2	57.9	59.4	61.0	8.2	63.9	6.9	51.8
		Paper		(%)	11.7	7.8	9.1	8.9	9.7	70.6	19.6	19.2	11.1
		Textile		(%)	2.8	4.3	2.7	3.2	1.3	0.8	0.3	5.1	3.3
		Grass and Wood		(%)	2.5	1.1	1.5	1.5	1.7	0.0	2.6	24.7	4.5
		Plastic		(%)	8.0	11.7	7.1	8.7	5.3	15.5	4.6	13.6	9.2
		Leather and Rubber		(%)	1.6	1.2	0.8	1.0	0.2	1.1	0.1	0.0	0.9
		Sub-total		(%)	81.7	89.3	79.1	82.7	79.2	96.2	91.1	69.5	80.8
	Incombustible Wastes	Metal		(%)	4.4	1.9	2.2	2.3	2.4	2.9	1.7	3.5	2.5
		Bottle and Glass		(%)	8.4	4.6	11.9	9.1	8.5	0.9	6.0	4.8	8.7
		Ceramic and Stone		(%)	4.4	4.2	6.7	5.7	8.9	0.0	0.1	3.2	5.3
		Miscellaneous		(%)	1.1	0.0	0.1	0.2	1.0	0.0	1.1	19.0	2.7
		Sub-total		(%)	18.3	10.7	20.9	17.3	20.8	3.8	8.9	30.5	19.2
	Total			(%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note : *1. Waste Composition of MSW is calculated as composition ratio multiplied by total amount of waste in each category divided by total amount of waste generation, i.e. $[\sum[(\text{composition rate of waste from each category}) \times (\text{total waste amount of each category})]] / \text{total waste amount}$, where \sum means the sum for all the categories.

b. Apparent Specific Gravity (ASG)

ASG of household wastes ranged from 0.24 to 0.29, and the weighted average was 0.26. ASG of the other wastes excluding household ranged from 0.07 to 0.49.

c. Moisture Contents

The moisture contents by cartogies are as in the table below.

Table 5-14: Moisture Contents

	unit : %									
	Food	Paper	Textile	Grass	Plastics	Rubber	Metal	Glass	Ceramics	Mics.
High income	76.3	39.8	36.0	44.6	5.6	3.3	1.4	0.9	22.0	---
Middle income	72.7	42.6	44.3	42.9	9.8	1.3	0.9	0.6	22.0	---
Low income	74.9	50.8	50.3	47.5	6.3	3.5	0.9	0.4	25.8	---
Household weight AVERAGE	74.3	47.0	46.9	45.7	7.4	2.7	0.9	0.4	24.2	---
Restaurant	65.8	52.8	26.9	26.1	8.5	---	1.0	0.6	29.3	2.9
Shops	59.3	16.7	---	---	2.3	---	---	---	---	---
Market	61.1	47.6	---	45.8	3.9	---	0.5	0.6	---	7.5
Sweeping	59.0	48.0	19.0	50.0	4.0	---	1.0	---	15.0	15.0

d. Chemical Analysis

The results of chemical analysis for kitchen, paper and grass/wood wastes are shown in Table 5-15.

Table 5-15: Results of Chemical Analysis

Classification for Chemical Analysis		Analysis Types						
		Three Components				Ultimate Analysis		
		Combustible	Moisture	Ash	Total	Carbon	Nitrogen	C/N Ratio
		RESULT						
Kitchen Waste	High income	22.4	76.3	1.3	100	---	---	---
	Middle income	26.4	72.7	0.9	100	30.8	2.5	12.3
	Low income	24.4	74.9	0.7	100	---	---	---
	Restaurant	32.3	65.8	1.9	100	31.4	2.6	12.1
	Shop	38.6	59.3	2.1	100	---	---	---
	Market	37.9	61.1	1.0	100	30.4	2.2	13.8
	Sweeping	39.8	59.0	1.2	100	---	---	---
Paper Waste	High income	55.7	39.8	4.5	100	---	---	---
	Middle income	50.3	42.6	7.1	100	40.9	0.3	136
	Low income	43.7	50.8	5.5	100	---	---	---
	Restaurant	42.8	52.8	4.4	100	41.9	0.2	210
	Shop	77.4	16.7	5.9	100	---	---	---
	Market	40.8	47.6	11.6	100	66.4	0.2	332
	Sweeping	43.7	48.0	8.3	100	---	---	---
Grass/wood	High income	46.2	44.6	9.2	100	---	---	---
	Middle income	48.4	42.9	8.7	100	71.8	0.2	359
	Low income	46.5	47.5	6.0	100	---	---	---

Waste	Restaurant	46.6	39.1	14.3	100	28.1	0.1	281
	Shop	---	---	---	---	---	---	---
	Market	46.8	45.7	7.5	100	64.5	0.1	645
	Sweeping	39.0	50.0	11.0	100	---	---	---

c.1 Combustible/Ash

The average ratio of dry components of kitchen waste, paper waste, and grass/wood were 96.0, 87.8, and 83.9 %, respectively. It shows all these contains high ratio of combustibles (ash).

c.2 C/N ratio

The average C/N Ratios were 12.7, 226 and 428 for kitchen waste, paper and grass/wood, respectively. They vary considerably, but are standard values for those waste types. .

The C/N ratio is one of the most important factors when examining biodegradability. It compost production from organic waste is to be planned, waste with a C/N ratio over 30 is inappropriate, since nitrogen is too low.

The overall C/N ratio of the mixture of kitchen waste, paper waste and grass/wood is estimated at 18, thus it can be a material for compost production.

5.2.6 Waste Discharge Amount Forecast

Municipal solid waste (MSW) is always associated to the people's daily lives and has grown in volume as the country's population has grown and the city become more and more urbanised.

Therefore, in order to formulate a master plan with a target year 2010, future waste discharge amount needs to be predicted.

a. Forecast Frame

The results of the WACS were used as a basic reference to forecast MSW discharge amount in the target area.

The forecast frame included estimation for the years 2000, 2003, 2006 and 2010 in the planning period of the master plan. The types of waste to be forecasted are described below. The definition of each type of waste is referred to 5.2.1, *Objectives and Definitions*.

- household waste;
- commercial waste (from restaurants);
- commercial waste (from other commercial units);
- institution waste;
- market waste;
- street sweeping waste;
- general waste from medical institutions.

b. Factors in Waste Discharge Amount Increase

The waste discharge rate largely depends on the economic and cultural background, lifestyle of people, consumption trends in societies, etc. Among these, economical condition will highly influence waste discharge amount. Therefore, in order to

estimate future waste amount, it is necessary to take the key indicators as the following into account:

- population growth rate;
- economic growth rate;
- social welfare and purchasing power of the consumers/families.

b.1 Population Growth Rate

The most direct influence on waste discharge amount is the increase of population and the number of other discharge sources. The projected population in the target area for the planning period is tabulated in the following table (refer to Main Report 6.1.4, *Population Forecast*).

Table 5-16: Population Forecast

Year	Population (1000)	Population Ratio (2000=1.000)
2000	2,051.6	1.000
2001	2,078.3	1.013
2002	2,105.3	1.026
2003	2,132.7	1.040
2004	2,160.4	1.053
2005	2,188.5	1.067
2006	2,221.3	1.083
2007	2,254.6	1.099
2008	2,288.5	1.115
2009	2,322.8	1.132
2010	2,357.6	1.149

b.2 Relation Between GDP and Waste Discharge Amount

To determine the relation between economic growth and waste discharge amount, the statistic regarding the relationship of those in Japan from year 1963-1988 was examined.

An increase in the GDP (as an economic growth rate) is expected to have a larger impact on the generation of waste per capita in developing countries than in developed countries. Also, at a certain welfare level, increase in GDP will remarkably change the composition of waste.

Japan has fine statistics allowing the analysis of the relation of GDP and waste generation in a developing economy (1963-1970) and a developed economy (1975-1988). The years 1970-1975 are excluded due to fluctuations in data resulting from a new waste treatment law and economic recession and instability caused by the oil crisis.

b.2.1 Developing Economy

Based on the data of Japan for the period 1963-1970, its developing economy can be characterised as follows:

- average increase in discharge amount/capita 5.789 %/year;

- average increase in GNP² 10.438 %/year.

b.2.2 Developed Economy

Based on the data of Japan for the period 1975-1988, its developed economy is characterised as follows:

- increase in waste generation per capita 1.276 %/year;
- increase in GDP 4.415 %/year.

b.2.3 Conclusions

Based on these figures, the study team assumed that the elasticity of waste discharge amount to change in GDP will be as follows;

- elasticity under developing economy 0.55 of GDP - change in %
- elasticity under developed economy 0.29 of GDP - change in %

This means that, for example, an 8 % annual increase in GDP would result to increase in waste generation due to increased welfare, 4.4% (8% x 0.55) and 2.3% (8% x 0.29) under developing economy and developed one, respectively.

Applying these figures will depend on the estimated actual capacity of the economy. Although the increase in the GDP ratio may be high, the actual value could be low, thus having a lower impact ratio than those shown in the data of Japan.

According to the estimation of the study team regarding economic growth rate (6.1.5, *Economic and Industrial Development*), the average of GRDP in the target area is estimated to be as follows:

- 2000-2004 +8.5 %;
- 2005-2010 +10 %

The study team concluded that economy in the target area is reaching from developing economy to developed economy in year 2011. Therefore, the increase in waste discharge per capita per year is estimated as follows:

- 2000-2004 $8.5 \times 0.55 = 4.675$ %/year;
- 2005-2010 $10 \times 0.55 = 5.5$ %/year.

Based on the above figure, the team estimated the increase in waste discharge per capita per year is as follows;

- Phase 1 (2000-2003) : 4.7 %/year;
- Phase 2 (2004-2006) : 5.2 %/year;
- Phase 3 (2007-2010) : 5.5 %/year.

However, the assumptions used above will not apply to waste from the public cleansing services such as street sweeping and park cleansing. Those will implicitly increase in accordance with the growth of population, expansion of the city, etc.

c. Forecast of Waste Amount

Based on the above-mentioned assumption, the forecast of MSW and other wastes amounts in Baku is described below.

² GNP was used due to the unavailability of a GDP.

c.1 Forecast of Waste Discharge Rate

The result of forecast of waste discharge rate is shown in the following table.

Table 5-17: Forecast of Waste Discharge Rate

Category	Unit	2000	2003	2006	2010
MSW					
Household	g/person/day	233	267	311	385
Restaurant	g/table/day	1,770	2,030	2,370	2,940
Other Shop	g/shop/day	540	630	730	900
Market	g/stall/day	1,110	1,270	1,480	1,840
Street Sweeping	g/km/day	70,600	70,600	70,600	70,600

c.2 Forecast of the Number of Discharge Sources

The team assumes that the number of waste discharge sources will increase in accordance with the population as shown in the following table.

Table 5-18: Forecast of Number of Waste Discharge Sources

Discharge Source	Unit	2000	2003	2006	2010
Population	person	2,051,600	2,132,700	2,221,300	2,357,600
Restaurant	table	4,035	4,196	4,370	4,636
Other Shop	shop	11,438	11,896	12,387	13,142
Market	stall	3,393	3,529	3,675	3,899
Street Sweeping	km	1,105	1,149	1,197	1,270

The following data are general characteristics of objects selected for investigation.

Restaurant : According to a reference book “Kompas”, information of 77 working restaurants selected from catering enterprises in the city is available. The average number of tables in those restaurants was 12.4. The JICA team assumed that there are 10 times more small restaurants (770) with 4 tables in average.

Other shops : Number of operating enterprises in the country (19,063), the ratio of sewerage in Baku to sewerage in the country, and the ratio of office workers in Baku to that in the country (the latter two were about 60%) were used to estimate the number of shops in Baku (Statistical Yearbook 2000).

Market : According to the same source, urban markets in Baku are 26 in total that sell agricultural and accompanying products. These markets have 30.5 shops in average. Because this statistics does not include small markets or mobile markets, the study team assumed that there are 10 times more markets (260) and the average number of shops in a market is 10.

Street sweeping : The total length of urban streets and highways are 16,231 kilometres. Around 10% of those are swept. However, the study by the team showed that the total length of highways, roads and streets was 2,209 km. Taking those two figures into account, the team assumed that the total length of roads where street sweeping takes place is 50 % of 2,209 km. It also assumed that the street sweeping waste includes waste from gardens attached to the apartments or condominiums.

Institution : Waste from institutions was not sampled, but included in the identification of a waste stream. The team assumed that the amount of institutional

waste is the same to the waste amount from shops (commercial units other than restaurants).

General waste from Medical Institutions : the result of the opinion survey of medical institutions was used.

c.3 Forecast of Waste Discharge Amount

From the results of the above tables, finally, the study team calculated future waste discharge amount and presented in the following table.

Table 5-19: Forecast of Waste Discharge Amount

unit : ton/day				
Category	2000	2003	2006	2010
Household	478.0	569.4	690.8	907.7
Commercial (Restaurant)	7.1	8.5	10.4	13.6
Commercial (Other Shop)	6.2	7.5	9.0	11.8
Institution	6.2	7.5	9.0	11.8
Market	3.8	4.5	5.4	7.2
Street sweeping	78.0	81.1	84.5	89.7
General Waste from medical institutions	24.5	25.5	26.6	28.2
MSW Total	603.8	704.0	835.7	1,070.0

5.2.7 Waste Composition Forecast

Generally, the composition of solid waste depends on characteristics of an area such as lifestyle of people, climate, urbanisation level, culture, etc. Whenever its influential factors in waste composition change, the characteristics of waste will gradually change. Changing in waste composition also depends on new products and a different consumption pattern of people.

Unfortunately there is no existing data on the change of waste composition available in the target area.

The analysis focused on the comparison of the results of WACS and MSW composition in the target area and data from the JICA's study in other cities. The table below compares waste composition in Baku and other cities.

Table 5-20: Waste Composition in Baku and Other Cities

Country	Unit	Azerbaijan	Turkey		Poland		Paraguay	Philippines	Tanzania	Honduras	Japan
		Baku	Adana GM	Mersin GM	Lublin		Asuncion	Manila	Dar es Salaam	Tegucigalpa	Tokyo 1994
					With ash	Without ash					
Kitchen waste	%	51.8	64.41	63.01	33.96	61.11	37.40	45.35	45.03	46.00	2511
Paper	%	11.1	14.80	18.42	19.34	14.18	10.20	16.80	4.07	12.00	35.64
Textile	%	3.3	1.62	2.60	7.27	3.10	1.20	3.88	1.10	3.00	3.44
Grass & Wood	%	4.5	2.66	2.18	5.90	2.33	19.20	15.62	25.11	12.00	4.42
Plastic	%	9.2	5.92	6.69	7.89	4.41	4.20	6.71	2.01	7.00	15.16
Leather & Rubber	%	0.9	0.30	0.25	2.26	2.09	0.60	0.74	0.71	2.00	1.38
Metal	%	2.5	1.40	1.25	3.76	3.29	1.30	5.21	1.65	2.00	6.43
Bottle & Glass	%	8.7	3.08	3.08	15.16	6.69	3.50	3.37	2.90	3.00	5.46
Ceramic & Stone	%	5.3	2.17	1.38	1.53	2.81	2.50	1.12	0.33	13.00	0.40
Miscellaneous	%	2.7	3.64	1.14	2.93	-	19.90	1.20	17.09	0.00	2.56
Total	%	100.0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
ASG	kg/l	0.25	0.29	0.28	---	---	---	0.18	---	---	---

Note: The figure is the composition of MSW (Municipal Solid Waste).

From the above table it can be seen that kitchen waste occupies a relatively large portion in waste in Baku city. Therefore, the team presumed that the portion of kitchen waste would decrease gradually. The decrease in the kitchen waste ratio was estimated to be such that the overall moisture content in waste (51.8% in 2000) drops 0.5% every year reaching 46.8% in 2010. Further, the study team set a condition to forecast that amount of grass and wood waste ratio will not be increased in the future. This condition is also applied to other types of waste such as textile, ceramic and stone, leather and rubber and miscellaneous. The results of forecast on waste discharge amount in the target area are also taken into account in order to calculate future waste composition in each type of waste. Based on these conditions, the study team forecast future waste composition as stated below.

Table 5-21: Results of Calculation of Future Waste Composition Forecast

Type of Waste	Year 2000					Year 2003			Year 2006			Year 2010		
	MSW (%)	Total Discharge Amount (ton/Day)	Total Discharge by Type of Waste (ton/Day)	Population	Discharge Ratio Per Capita (g.)	Population	Total Discharge by Type of Waste (ton/Day)	MSW (%)	Population	Total Discharge by Type of Waste (ton/Day)	MSW (%)	Population	Total Discharge by Type of Waste (ton/Day)	MSW (%)
Kitchen Waste	51.8	603.8	312.9	2,051,600	152.5		354.1	50.3		407.8	48.8		500.8	46.8
Paper	11.1	603.8	67.0	2,051,600	32.6	-	86.3	12.3	-	112.3	13.4	-	159.6	15.0
Textile	3.3	603.8	19.9	2,051,600	9.7	2,132,700	20.7	2.9	2,221,300	21.5	2.6	2,357,600	22.9	2.1
Grass and Wood	4.5	603.8	27.2	2,051,600	13.3	2,132,700	28.4	4.0	2,221,300	29.5	3.5	2,357,600	31.4	2.9
Plastic	9.2	603.8	55.5	2,051,600	27.1	-	71.6	10.2	-	93.1	11.1	-	132.4	12.4
Leather and Rubber	0.9	603.8	5.4	2,051,600	2.6	2,132,700	5.5	0.8	2,221,300	5.8	0.7	2,357,600	6.1	0.6
Combustibles	80.8		487.9		237.8		566.6	80.5		670.0	80.1		853.2	79.8
Metal	2.5	603.8	15.1	2,051,600	7.4	-	19.6	2.8	-	25.5	3.1	-	36.3	3.4
Bottle and Glass	8.7	603.8	52.5	2,051,600	25.6	-	67.7	9.6	-	88.0	10.5	-	125.1	11.7
Ceramic and Stone	5.3	603.8	32.0	2,051,600	15.6	2,132,700	33.3	4.7	2,221,300	34.7	4.2	2,357,600	36.8	3.4
Miscellaneous	2.7	603.8	16.3	2,051,600	7.9	2,132,700	16.8	2.4	2,221,300	17.5	2.1	2,357,600	18.6	1.7
Non-combustibles	19.2		115.9		56.5		137.4	19.5		165.7	19.9		216.8	20.2
Total	100.0		603.8		294.3		704.0	100.0		835.7	100.0		1,070.0	100.0

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5.2.8 Forecast of Waste Stream

The study team estimated a future waste stream in Baku as below.

a. Assumptions

a.1 Primary Assumptions

The following was already described earlier and used as primary assumptions.

- population forecast (refer to Table 5-16)
- waste discharge rate (refer to Table 5-17)
- number of discharge sources (refer to Table 5-18)
- waste discharge amount (refer to Table 5-19)
- waste composition (refer to Table 5-21)

a.2 Conditions of MSWM M/P

Targets of MSWM M/P, as in Table 5-22, serve as conditions for waste stream forecast.

Table 5-22: Targets of MSWM M/P

Items	Present (2000)	Phase I (2003)	Phase II (2006)	Phase III (2010)
Refuse Collection Rate	87.3 % ^{*1}	95 %	100 %	100 %
Ratio of Improper Disposal to Generation Amount	10.6 % ^{*1}	6.4 %	0 %	0 %
Recycle Rate of Metal Scrap	0 %	14 %	35 %	70 %
Recycle Rate of Waste Paper	0 %	10 %	25 %	50 %

Note *1: The figure is estimated based on the results of the POS

a.3 Forecast of Waste Stream Components

a.3.1 Forecast of Improper Disposal

Improper disposal refers to illegal dumping and self disposal. Estimated MSW generation amount and the ratios of illegally dumped waste and self-disposed waste were considered to obtain the amount of the two (second column of Table 5-23). From the recycle market survey by the study team, the team obtained the rate of illegally dumped waste and self-disposed waste to the total waste amount. Using these rate, illegally dumped waste and self-disposed waste in future were forecast as in the table below.

Table 5-23: Improperly Disposed Waste Forecast

Items	Present (2000)	unit : ton/day			
		Phase I (2003)	Phase II (2006)	Phase III (2010)	
Illegal Dumping	33.4	Forecast without M/P	38.7	46.0	58.9
		Forecast with M/P	23.2	0.0	0.0
Self disposal	27.3	Forecast without M/P	31.7	37.6	48.2
		Forecast with M/P	19.0	0.0	0.0
Total of Improper disposal	60.7	Forecast without M/P	70.4	83.6	107.1
		Forecast with M/P	42.2	0.0	0.0

Note: Forecast without M/P: Forecast without achieving the targets in M/P.
Forecast with M/P: Forecast with achieving the targets in M/P.

a.3.2 Metal Scrap Forecast

The amount of metal waste was calculated from estimated MSW generation amount and the proportion of metal in MSW. Using the future recycle rate of metal, the amount of recycled metal was estimated. It should be noted that the present metal recycling rate was assumed to be nil based on the result of the recycle market survey by the team (see Section 5.3).

Table 5-24: Amount of Metal Waste and Its Recycle

unit : ton/day

Items	Present (2000)	Phase I (2003)	Phase II (2006)	Phase III (2010)
Amount of Metal Waste	15.1	19.6	25.5	36.3
Forecast Amount of Recycled Metal	0.0	2.7	8.9	25.4

a.3.3 Waste Paper Amount Forecast

The amount of paper waste was calculated from estimated MSW generation amount and the proportion of paper in MSW. Using the future recycle rate of paper, the amount of recycled paper was estimated. Based on the results of the recycle market survey, the current paper recycle rate is set to be zero.

Table 5-25: Amount of Paper Waste and Its Recycle

unit : ton/day

Items	Present (2000)	Phase I (2003)	Phase II (2006)	Phase III (2010)
Amount of Paper Waste	67.0	86.3	112.3	159.6
Forecast Amount of Recycled Paper	0.0	8.6	28.1	79.8

a.4 Other Assumptions

The other assumptions are that:

- the recycle amount by waste pickers on streets and at the final disposal site is stable;
- the rate of recycle amount at the discharge sources (eg households) to the total waste does not change.

b. Results of Forecast

The forecast of the amount of each waste stream was resulted as in Table 5-26, followed by the estimated waste stream in 2000, 2003, 2006 and 2010. "Recycling activities" refers to recycling of metal and paper that will newly start.

Table 5-26: Forecast Waste Stream

Unit : ton/day

Waste Stream Component	Present (2000)	Phase I (2003)	Phase II (2006)	Phase III (2010)
Waste Generation Amount	603.8	704.0	835.7	1,070.0
Recycling by Discharge Source	24.6	28.9	34.3	43.9
Discharge Amount	579.2	675.1	801.4	1,026.1
Illegally Dumped Waste Amount	33.4	23.2	0.0	0.0
Self-Disposed Amount	27.3	19.0	0.0	0.0
Recycling by Street Waste Pickers	5.4	5.4	5.4	5.4
Waste Collection Amount	513.1	627.5	796.0	1,020.7
Recycling activities	---	11.3	37.0	105.2
Recycling by Site Waste Pickers	8.9	8.9	8.9	8.9
Other Wastes	?	?	?	?
Final Disposal Amount	504.2 + ?	607.3 + ?	750.1 + ?	906.6 + ?
Total Recycled Amount	38.9	54.5	85.6	163.4

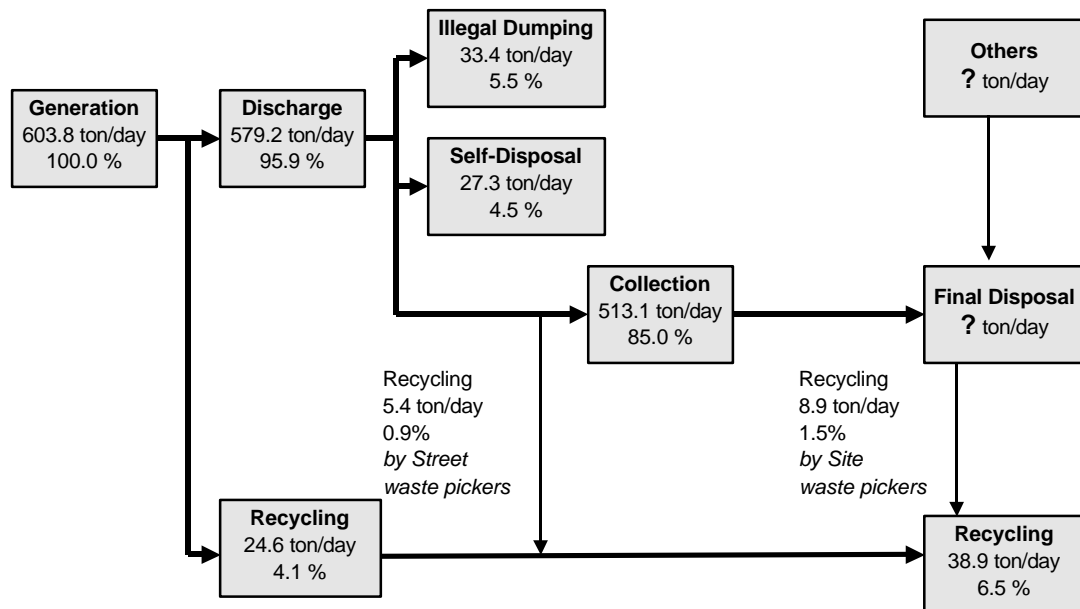


Figure 5-14: Present Waste Stream (2000)

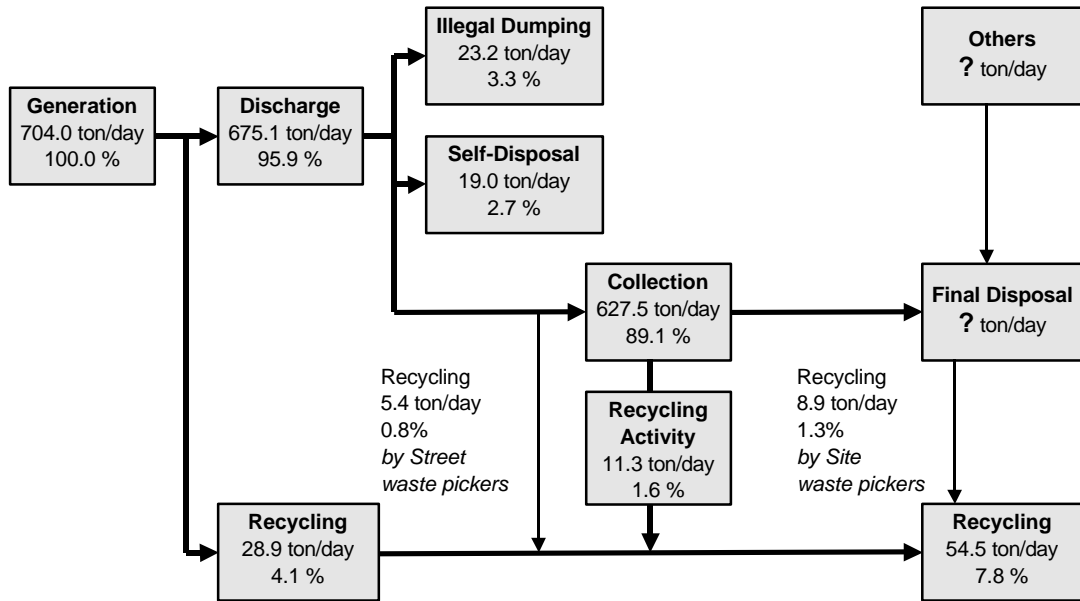


Figure 5-15: Forecast Waste Stream (2003)

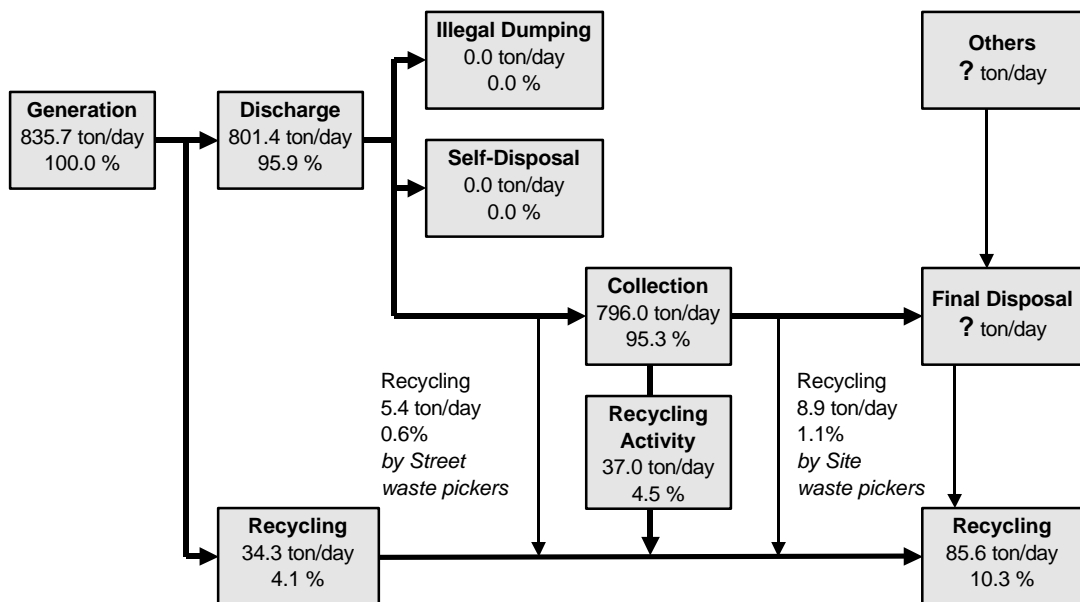


Figure 5-16: Waste Stream (2006)

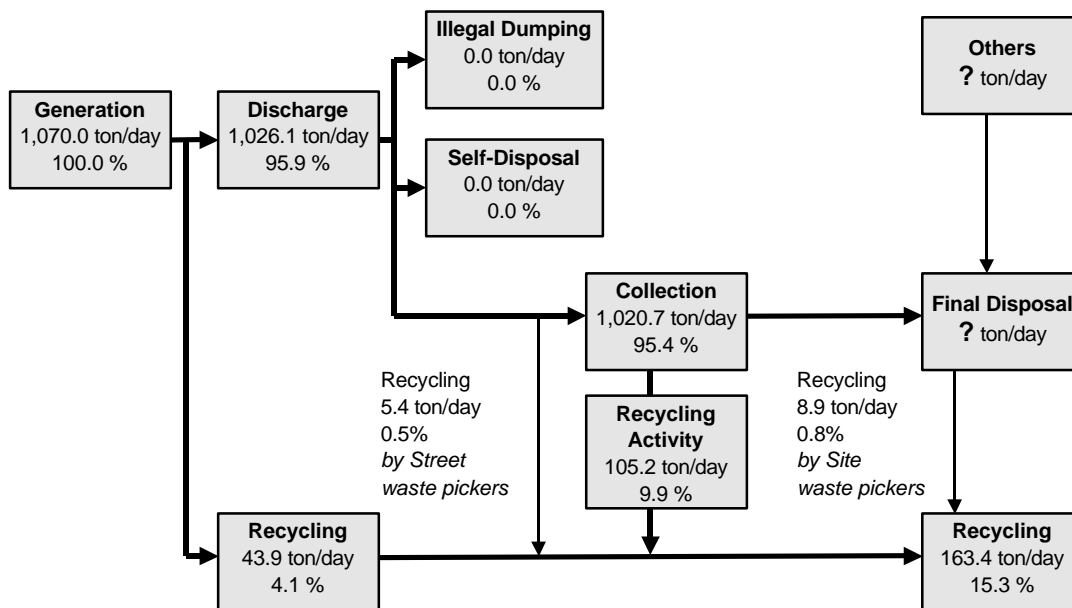


Figure 5-17: Waste Stream (2010)

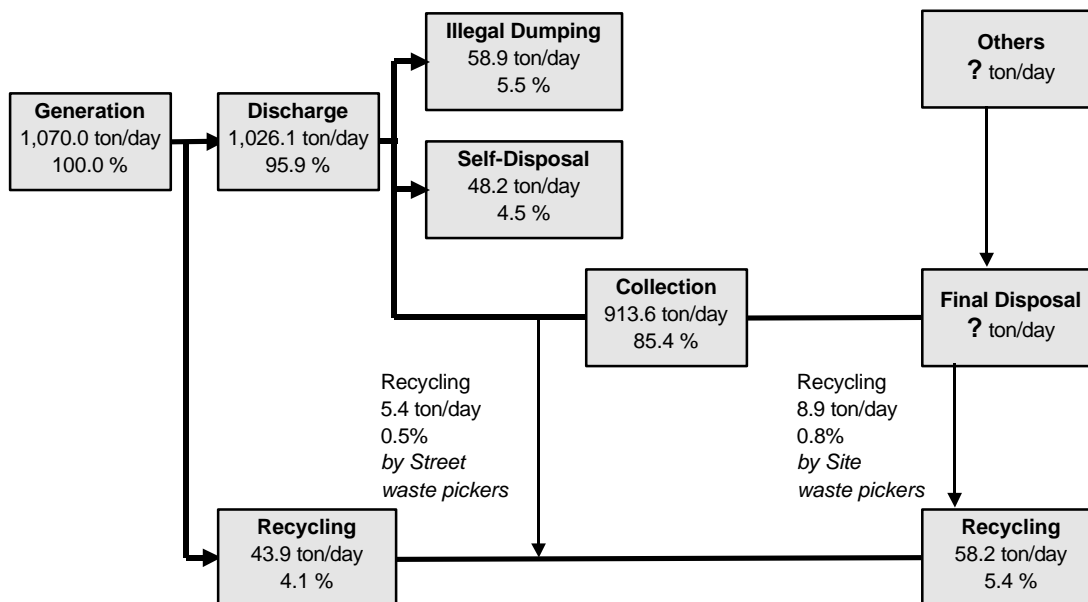


Figure 5-18: Waste Stream without M/P (2010)

5.3 Survey of Recycling Activities

5.3.1 Survey of Recycling System

a. Objectives of the Survey

This section of the Survey of Recycling Activities intends to find the present situation of recycling in the study area, based on data obtained by questionnaire survey and interview survey with stakeholders related to recycling activities from waste generation sources to the disposal site.

The objectives of this survey are:

- to outline the current recycling system and the market for the recyclable items;
- to evaluate volumes of various gathered materials and their treatment;
- to examine the required and forecast volume of treated materials;
- to check the current recycling system and the market.

To achieve the given objectives, the survey included all necessary works, such as interview with two categories of recycling facilities (intermediary and end users) and waste pickers (on the present sites for garbage utilisation in the city), literature survey, collection and analysis of data, and compilation of report.

b. Method of the Survey

Since recycling activities are concerned with many parts in the waste stream from the generation source to final disposal, the study team firstly drew a recycling flow diagram in the target area according to the information given by the counterparts and local consultants. The recycling flow diagram is shown in Figure 5-19 below.

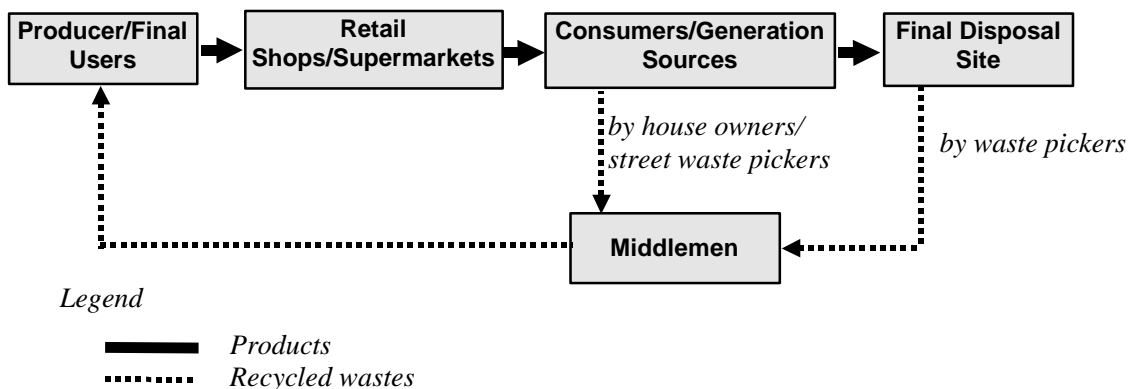


Figure 5-19: Estimated Recycling Flow Diagram in the Target Area

In order to verify this flow diagram and also to grasp the waste amount of each section of flow, the questionnaire and/or interview survey were conducted with the following related parties.

- House owners (Consumers)/generation source (refer to 5.2, *Waste Amount and Composition Survey*)
- Waste pickers in the cities (refer to 5.3.2, *Survey of Waste Pickers*)
- Site waste pickers (refer to 5.3.2, *Survey of Waste pickers*)

- Middlemen (refer to 5.3.3, *Survey of Recycling Companies/Unions*)
- End users (refer to 5.3.3, *Survey of Recycling Companies/Unions*)

The questionnaire survey and interview survey were carried out to identify the characteristics of the present recycling system and the total amount of waste recycled to the following number of interviewees.

Table 5-27: Number of Samples and Method of Survey

Related Party	Number of Samples	Method of Survey
1. House owners (Consumers)	60	Interview survey
2. Street waste pickers	10	Questionnaire and Interview survey
3. Site waste pickers	10	Questionnaire and Interview survey
4. Middlemen	10	Questionnaire and Interview survey
5. End users	10	Questionnaire and Interview survey

c. Results of the Survey

c.1 House owners/Generation Sources

The primary recycling activity starts at the generation source. While they discharge waste, they also practice recycling activities by sorting out valuable/reusable waste for sale or reuse. Therefore, representatives of each of the WACS sampling points were investigated by the study team using a questionnaire whether they recycle any waste items.

From outcomes of the questionnaire survey, the practice of reuse/recycling of items within the premises of the sources, or sale of recyclable wastes to middlemen is not active. However, among household samples for WACS, 15% of the middle income households and 35% of the low income households were found engaged in recycling activities. While only 5% of the high income household samples practised recycling (refer to Table 5-28). Therefore, among the low income families higher level of generated waste processing is observed.

Table 5-28: Questionnaire Survey Results (Recycle Activity)

Do you recycle waste in your house?	High income		Middle income		Low income		Total	
	Nos.	%	Nos.	%	Nos.	%	Nos.	%
Yes	1	5	3	15	7	35	11	18
No	19	95	17	85	13	65	49	82
Total	20	100	20	100	20	100	60	100

All the 11 families that answered that they do recycling only recycle glass wastes (bottles). After sorting bottles, they mainly sell them to middlemen.

The daily total quantity of recyclable materials sorted by sampling points for the WACS was between 0.1 and 0.4 kg/family/day (0.2 kg/family/day in average).

Since the recycling amount differs much by income level, the study team considered the recycled amount by income level. The amount of recycled materials by each income level is shown in the following table.

Table 5-29: Amount of Recycled Materials by Income Level

(unit: g/day)

Household income	Total Amount (g)	Nos. of Person	Average Amount per Person
High	300	74	4
Middle	800	81	10
Low	1,100	72	15

Finally, the total amount of recyclable materials sorted at all the generation sources in the city is calculated as shown below.

$$\{(4 \times 0.097) + (10 \times 0.336) + (15 \times 0.567)\} = 12.3 \text{ g/person/day}$$

$$12.3 \times 2,025,300/1,000,000 = 24.9 \text{ ton/day}$$

c.2 Street Waste Pickers

While the recycling activities of the public sector are dormant, those by the private sector are very active, particularly by street waste pickers who are often seen in the study area from the morning to the evening.

The questionnaire survey of street waste pickers was carried out for 10 persons from four district, namely Sabail, Nasimi, Yasamal and Narimanov by local consultants. The result of the questionnaire survey states that most street waste pickers mainly sort out glass and non-ferrous metals (e.g. aluminium, copper, duralumin and lead). The total amount of recyclable material sorted by those street waste pickers is estimated to be 270 kg/day. The results are detailed in section 5.3.2, *Survey of Waste Pickers*. It can be presumed that the street waste pickers are mainly working in the said four districts, where much waste is generated, but the their total number in the city is unknown. Assuming that they are 200, the total amount of recyclable materials sorted by the street waste pickers in the city is calculated as shown below.

$$270 \text{ kg/day} / 10 \times 200 / 1,000 = 5.4 \text{ ton/day}$$

c.3 Site Waste Pickers

Approximately 100-150 waste pickers work daily full time at the existing landfill site to sort out recyclable materials. They mainly collect bottles, glass and non-ferrous metals (e.g. aluminium, copper, duralumin and lead). From the interview survey of the 10 waste pickers, it is estimated that the total amount of recyclable materials sorted by those at the final disposal site is approximately 590 kg/day. The result is detailed in section 5.3.2, *Survey of Waste Pickers*. Assuming that there are 150 waste pickers at the site, the total amount of sorted recyclable materials sorted by them is calculated as shown below.

$$590 \text{ kg/day} / 10 \times 150 / 1000 = 8.9 \text{ ton/day}$$

c.4 Middlemen

The questionnaire survey was conducted to 10 middlemen but they were not cooperative to the survey. Most of the middlemen purchase recycled materials from waste pickers and some house owners who bring collected items to them. The materials are stored and subsequently sold to final users or even to middlemen again

depending on the types of material and the business scale of the middlemen. After purchasing sorted items some small middlemen resell them to bigger middlemen.

Table 5-30 shows the number of middlemen surveyed and the amount of recyclable materials they purchase.

Table 5-30: Monthly Quantity of Recyclable Materials Purchased by Middlemen

Item	Metal	Bottles and Glass
Nos. of middlemen	2	8
Quantity purchased (kg/month)	0.4 – 1.7	0.9 – 13,100

c.5 Producers/End Users

The questionnaire survey was conducted to 10 end users but they were not cooperative to the survey, a large-scale end user dealing with metals in particular, who was not cooperative at all. The rest 9 companies answered that their main products are bottles and glass (refer to Table 5-31).

Table 5-31: Categories and Main Products of End Users

No.	Name of companies	Main products or services
1	Winemaking factory ¹¹	Production of spirits
2	Winemaking factory ¹²	Production of spirits
3	Workshop for production of lemonade	Production of lemonade
4	Workshop for production of hunt belongings	Production of small shots
5	Workshop for production of lemonade	Production of lemonade
6	Workshop for production of lemonade	Production of lemonade
7	Workshop for production of lemonade	Production of lemonade
8	Hayal	Production of lemonade
9	ALCO-Ltd	Production of spirits
10	Azeri-Castel	Production of beer

Regarding the reuse of non-ferrous metal in the survey target companies, only one final user was found in the target area. Table 5-32 shows the number of final users surveyed and the amount of recyclable materials they purchase.

Table 5-32: Monthly Quantity of Recyclable Materials Purchased by End Users

Item	Metal	Bottles and Glass
Nos. of end users	1	9
Quantity purchased (kg/month)	460	880 – 2,330,000

d. Findings of the Survey

Following the first survey objective “understanding the present recycling system” the study team considered the next key objective: estimation of the present waste amount recycled. From the results of the survey, the present recycling flow diagram of all

recovered materials can be drawn as shown in the following figure. The total waste amount recycled is then estimated as shown in Table 5-33.

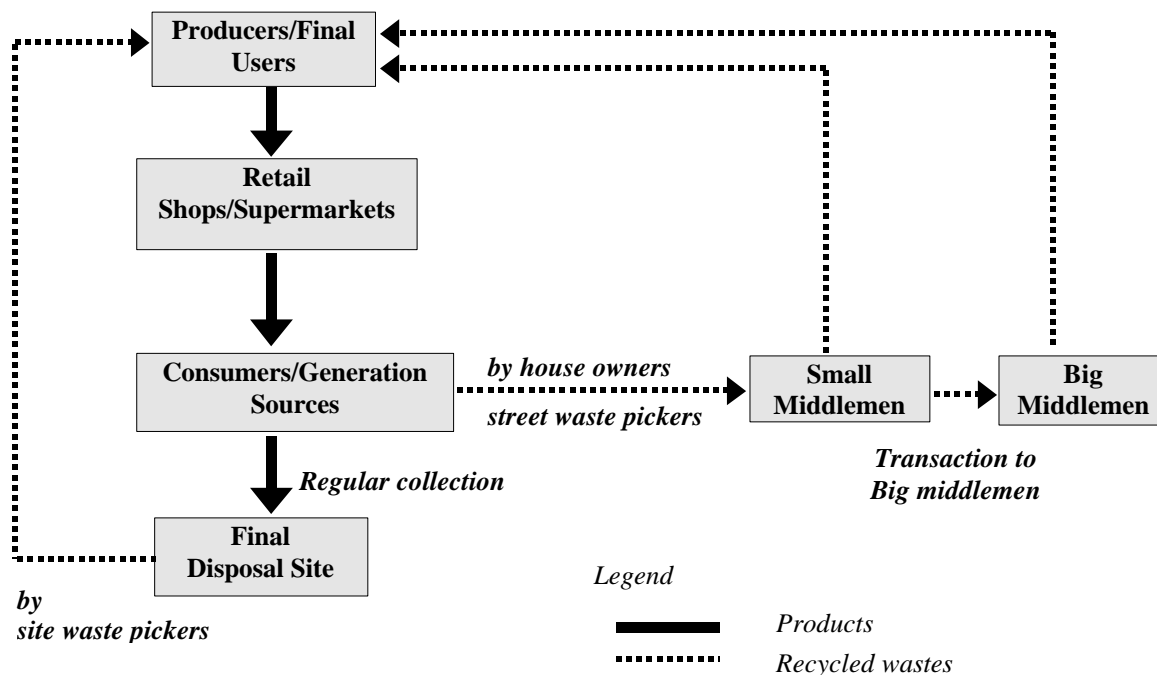


Figure 5-20: Recycling Flow Diagram for Recovered Materials

Table 5-33: Total Amount of Recycling

Unit : ton/day

Recycling Activity	Amount of Recycled Materials
Recycling at Generation Sources	24.9
Recycling by Street Waste Pickers	5.4
Recycling by Site Waste pickers	8.9
Total Recycling Amount	39.2

d.1 Ferrous and Non-Ferrous Metals

It was found that non-ferrous metals, i.e. aluminium, copper, duralumin and lead, are recycled actively, forming a large market. On the other hand, ferrous metals such as car bodies and tin cans are not recycled by the waste pickers either on the streets or at the waste disposal site. This difference derives from the fact that the market price of ferrous metals is much lower than that of non-ferrous metals. In addition, it is anticipated that there is no metal furnace plant close enough to recover the cost for transportation. Large machinery left abandoned in a number of factories that finished or ceased operation seems to be recycled by the other recycling route that is not identified in the present survey.

d.2 Bottles and Glass

Bottles including jars are also actively recycled in the study area similarly to the non-ferrous metals. The market price of bottles depends on the size and/or the manufacturer of them. The middlemen store standard-shaped glass bottles that are commonly used in a beverage industry by types (see the picture below), then pack a

certain number of bottles in a plastic bag or other package for the transfer to the other middlemen or the end users. Non-standard bottles, which are rather rare in shape, are stored separately from standard-shaped bottles. As far as the survey shows, the middlemen do not deal with cullet (e.g. broken bottles) since it does not have market value. Some of the site waste pickers were found recycling cullet, but its next destination is unknown.



d.3 Other Recyclable Items

Paper (including cardboard) or plastic film is not major recycling item and recycled only by a limited number of the site waste pickers. It was found that paper is reprocessed to carton.

PET bottles, textiles or batteries are not recycled at any stages. The team heard, however, that in the Soviet time a large volume of cardboard and batteries were collected from several republics and recycled.

A compost plant was constructed in Baku in the Soviet time, but did not succeed because mixed waste was fed and compost product contained impurities such as glass and metals.

5.3.2 Survey of Waste Pickers

a. Objectives of the Survey

The survey aimed to attain the following:

- to understand the present role of waste pickers in SWM;
- to understand the present working condition and environment;
- to obtain recycling amount through waste picking activities.

b. Method of the Survey

The survey of waste pickers was a part of section 5.3.1, *Survey of Recycling System*. The following survey methods were applied:

- interview with 10 street waste pickers;
- interview with 10 site waste pickers.

c. Questionnaire for the Recycle Market Survey (for waste pickers)

This questionnaire includes the following components:

- **general Information**, including survey data, names of the interviewer and the respondent, region of the work with the address, information on the respondent, and also the outline of recycling activities such as main products and annual sales.
- **wastes collection**, including types and forms of collected products, main buyers of these products, volume of annual collection (separately for domestic use and for export), unit price of sold products, and also perception of the respondent about the end product, received as a result of the sold wastes treatment.
- **respondent's opinion** about problems and tendencies of the work change in wastes collection.

d. Characterisation of Survey Categories of Collectors Interview

d.1 Age Structure of Waste Pickers

The number of surveyed garbage collectors includes 10 working on the suburban dumps (site waste pickers) and 10 within the city (street waste pickers). The ages vary widely, as shown in Figure 5-21. The average age of the site waste pickers was 27.8, while that of the street waste pickers was 55.0.

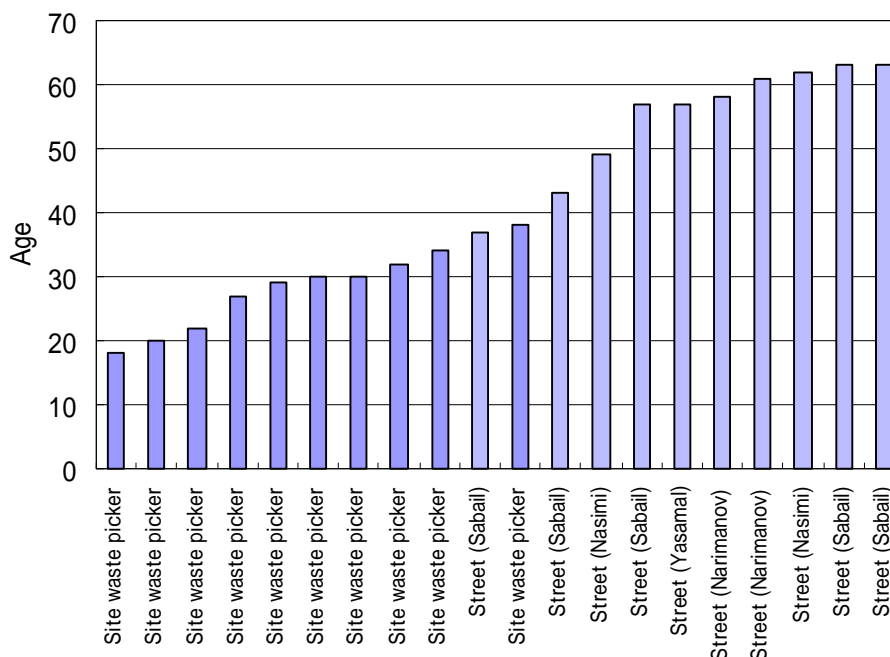


Figure 5-21: Respondents distributed to the Districts in compliance with age
As shown in the diagram, the site waste pickers of Baku (e.g. Sabunchi) are relatively young while site waste pickers are old.

Four out of 20 interviewed respondents were women.

d.2 Types of Waste Pickers

The street waste pickers are individual who collect recyclable materials from communal waste containers. Most street waste pickers have only plastics bags and small sacks to store collected wastes as their collection tool.

The waste pickers at the final disposal site work as a kind of cooperative but the present survey could not explore its structure and mechanism.

d.3 Monthly Income of Waste Pickers

Monthly income of the waste pickers were found to be as below.

Table 5-34: Income per Month

	Nos. of Answer	Monthly income in manat		
		min	max	Average
Site waste pickers	10	200,000	500,000	308,000
Street waste pickers	10	120,000	180,000	143,000

d.4 Working Years of Waste Pickers

The table below shows working years of the interviewed waste pickers.

Table 5-35: Working Years of Waste Pickers

Base : All interviewees (20)									
years	3	4	5	6	7	8	9	10	15
Nos. of Answer	2	1	2	3	1	3	1	6	1

e. Showings of Collection and Realization of wastes

e.1 Types of Recycled Materials

Main materials collected by the waste pickers were glass and non-ferrous metals (refer to Table 5-36).

Table 5-36: List of Main Collected Materials

Base : All interviewees (20)		
	Items	Nos. of Answer
Glass	bottles	20
	cullet	5
	other types of glass	12
	jars	12
Non-ferrous metals	aluminium	13
	lead	10
	copper	12
	other non-ferrous metals	9

e.2 Main Buyers

The interview showed that the main buyers of recycled materials are private companies.

Table 5-37: Main Buyers

Base : All interviewees (20)	
Items	Nos. of Answer
Glass for private company	20
Non-ferrous metal for private company	13
Plastic for private company	2

e.3 Annual Sales of the Recycled Materials

Handling volume of materials recycled by the waste pickers is as shown below. That by the waste pickers at the final disposal site is larger than that by the waste pickers on streets. This is probably because recycling at the final disposal site is systematically organised by a group while recycling on streets is done by individually.

Table 5-38: Annual Sales of the Recycled Materials

Items	Waste pickers at the final disposal site			Street waste pickers		
	Mean	Max	Min	Mean	Max	Min
Glass (number of pieces)	53,700	70,000	17,000	24,500	90,000	11,000
Non-ferrous Metal (kg)	199	300	140	120	50	170

e.4 Market Price of Recycled Materials

Price of recycled materials sold to the middlemen is same for the waste pickers at the disposal site and for the street waste pickers. Instead, difference of price is considered to occur according to the business size of the middlemen.

Table 5-39: Price of Recycled Materials

Unit : manat/kg

Items		Waste pickers at the final disposal site	Street waste pickers
Glass	Bottle	125 - 150	250 - 375
	Cullet	250 - 500	---
	Other types of glass	90 - 275	200
Non-ferrous metals	Aluminium	1500 - 2000	2000 - 2500
	Lead	1000 - 1500	2000 - 2500
	Copper	1500 - 2500	2500
	Other types of non-ferrous metals	400 - 2000	2000

f. Perception of Waste Recycling

f.1 Knowledge about the Usage of Recycled Materials

High proportion of the waste pickers know what is made from materials recycled by them.

Table 5-40: Usage of Recycled Materials – Known or Unknown

Base : All interviewees (20)			
Items		Waste pickers at the final disposal site	Street waste pickers
Glass	yes	6	9
	no	4	1
Non-ferrous metals	yes	8	5
	no	2	5

f.2 Concerns of Waste Pickers

The waste pickers were found to be concerned with the market price and volume of recycled materials. Those who care their health were more among the street waste pickers, probably because they are generally older than the waste pickers at the disposal site.

Table 5-41: Concerns of Waste Pickers

Base : All interviewees (20)		
Items	Waste pickers at the final disposal site	Street waste pickers
Cost of materials	8	9
Volume of materials	8	8
State of health	2	7

f.3 Future Collection Amount

The waste pickers at the disposal site are more optimistic in terms of future recycling amount than the street waste pickers who tend to consider that it is rather stable.

Table 5-42: Future Collection Amount

Base : All interviewees (20)		
Items	Waste pickers at the final disposal site	Street waste pickers
Increasing	8	1
Stable to a certain degree	1	6
Decreasing	2	3

g. Conclusion

- Recycling activities by waste pickers were found to be limited to recycling glass bottles and non-ferrous metals. Paper and plastics are the minor items, which are recovered by the site waste pickers only in a small scale. These will

be recycled more actively if a market is created and they are purchased at a reasonable price for the waste pickers. Ferrous metals are merely recycled and also need a market and a price setting system to be efficiently recycled.

- The street waste pickers are generally old and working individually, while the site waste pickers are mostly young and their activities are organised, attaining more recycled amount per person than the street waste pickers.
- It was found that waste contains glass bottles and non-ferrous metals in a large enough quantity for the waste pickers to maintain their lives. Therefore, it is presumed that the recycling of those materials at generation sources is not active.

5.3.3 Survey of Recycling Companies/Unions

a. Objectives of the Survey

This survey aimed to attain the following:

- to understand the present role of recycling companies/unions in SWM;
- to obtain recycling amount through recycling activities.

b. Method of the Survey

The survey of recycling companies/unions is a part of section 5.3.1, *Survey of Recycling System*. The following survey methods were applied:

- interview with 10 middlemen;
- interview with 10 end users.

c. Questionnaire for the Recycle Market Survey (for Companies/Unions)

This questionnaire included the following components:

- **general Information**, such as date of the interview, names of the interviewer and the respondent, location of region, address and other basic information of companies, their work types, and also information about the person interviewed.
- **products and Transportation**. This includes issues on the products received, main clients, volumes and costs of annual transportation, and types of the end product.
- **main supplier**, including types of the products supplied and volumes and costs of annual procurement.
- **production process**.
- **opinion** about cooperation with the government in issues of treatment and tendencies of volumes treated.

d. Analysis of Data from Recycling Companies Interview

d.1 Target of Interview

20 companies were selected for the survey, out of which 10 were intermediary and 10 were end users. It was found that there are no specialized companies to receive

plastics; in spite of the presence of companies to receive wastepaper, there were no collectors of wastepaper; and in general there are no collectors as well as processors of textile. Among the 20, 16 were private and 4 were public companies, and they were located in 7 districts, out of 11.

Table 5-43: Types of Business and Property of Surveyed Companies

Category	Type	Name of Company
Middleman	Private	Non-ferrous metal receiving point
		Glass receiving point
		Glass receiving point
		Glass receiving point
		Glass receiving point
		Glass receiving point
		Glass receiving point
		Glass receiving point
	Public	"Vtorresources" JS
End user	Private	Workshop for production of lemonade
		Workshop for production of lemonade
		Workshop for production of lemonade
		Workshop for production of lemonade
		Hayal (production of non-alcoholic drinks)
		ALCO-Ltd
	Public	AZERI-CASTEL
		Workshop for production of hunt belongings
		Wine making factory No.2
		Wine making factory No.1

Table 5-44: Location of Companies

District	Companies
Binagadi	4
Narimanov	1
Nasimi	7
Nizami	4
Sabail	1
Khatai	1
Yasamal	2
Total	20

d.2 Number of Workers

The number of workers varies among the companies. Half of them have 1 to 5 workers, and 4 companies by legal qualification can be referred to as middle and large (more than 50 workers).

Most of the companies (65%) are still young (less than 3 years after established):

Table 5-45: Number of Workers and Working Years

Category	Type	Nos. of worker	Working years
Middleman	Private	1	1
		2	1
		2	1
		2	1
		2	2
		2	2
		2	3
		3	1
	3	3	
	Public	27	35
End user	Private	5	7
		6	2
		6	2
		6	2
		23	2
		90	2
		200	1
	Public	15	5
		400	35
480		37	

d.3 Categories and Main Products of Companies

Main products of the 8 middlemen type companies were glass (bottles) and those of the other two were non-ferrous metals. Among the end-user type companies, 9 of them mainly deal with glass and only one enterprise deals with non-ferrous metals. This result is, however, questionable because it was difficult to ask for cooperation to the interview to middlemen and end users of metals.

Table 5-46: Categories and Main Products of Companies

Category of enterprise		Name of enterprise	Main products or services
Middleman	1	"Vtorresources" JS	Preparation of secondary resources
	2	Glass receiving point	Collection of bottles
	3	Glass receiving point	Glass receiving
	4	Glass receiving point	Glass receiving
	5	Glass receiving point	Glass receiving
	6	Non-ferrous metal receiving point	Non-ferrous receiving
	7	Non-ferrous metal receiving point	Non-ferrous receiving
	8	Glass receiving point	Glass receiving
	9	Glass receiving point	Glass receiving
	10	Glass receiving point	Glass receiving
End-user	1	Winemaking factory ¹¹	Production of spirits
	2	Winemaking factory ¹²	Production of spirits
	3	Workshop for production of lemonade	Production of lemonade
	4	Workshop for production of hunt belongings	Production of small shots
	5	Workshop for production of lemonade	Production of lemonade
	6	Workshop for production of lemonade	Production of lemonade
	7	Workshop for production of lemonade	Production of lemonade
	8	Hayal	Production of lemonade
	9	ALCO-Ltd	Production of spirits
	10	Azeri-Castel	Production of beer

Note *1: End-user 4 deals with non-ferrous metals mainly and non-ferrous metals in a small scale.

e. Characterization of Products and Transportation

e.1 Middlemen

Intermediary companies mostly (7 out of 10) deal with the collection of glass wastes.

The middlemen often do not consider broken glass valuable, but there were found some middlemen that handle it. “Jar” in the table below refers to a bottle with a wide mouth.

Table 5-47: Type of Glass Deal with by Middlemen

Base : All middlemen interviewees (10)	
Items	Nos. of Answer
Glass-bottle	7
Broken glass	2
Other glass (jars)	2
All types	7

e.2 Products of End User Company

One company specialises in non-ferrous metals (aluminium, lead, copper and others), and one receives newspapers, magazines, carton and other paper products. It is interesting that 9 out of 10 are dealing with the production of drinks (including 3 – alcoholic drinks).

Table 5-48: Products of End User Companies

Base : All end users interviewees (10)	
Items	Nos.
Production of lemonade	5
Production of beer	1
Production of wine and vodka	3
Production of small shots	1
Total	10

e.3 Main Types of Supplies and Clients for Middlemen

The following table shows what types of material the middlemen supply to which clients. It is clear that they supply various items to private companies, less variety of items to public companies and only bottles to households.

Table 5-49' Main Types of Supplies and Clients

Base : All middlemen interviewees (10)			
Items	Client – private companies	Client – public companies	Client – others
	Nos. of Answer	Nos. of Answer	Nos. of Answer
1 Bottles regardless types	7	1	2
2 Non-ferrous	2	1	0
3 Bottles of wine and vodka	3	2	0

4	Paper	1	0	0
5	Bottles of lemonade	5	0	0
6	Bottles of beer	1	0	0
7	Small bottles for shots	1	0	0

e.4 Annual Transportation on Surveyed Companies

The amount of annual transportation differs from company to company, depending on its business scale. Transportation of most materials is by the private companies.

Table 5-50: Volumes of Transportations by Categories of Companies (1999)

unit: number of item/year

Category of company (union)	1	Name of enterprise	Volume of transportation – private companies (number of items/year)	Volume of transportation – public companies (number of items/ year)
Middleman	1	“Vtorresources” JS	7 (ton)	4 (ton)
	2	Glass receiving point	75,000	290,000
	3	Glass receiving point	350,000	-
	4	Glass receiving point	380,000	-
	5	Glass receiving point	250,000	-
	6	Non-ferrous metal receiving point	20 (ton)	-
	7	Non-ferrous metal receiving point	5 (ton)	-
	8	Glass receiving point	300,000	-
	9	Glass receiving point	450,000	-
	10	Glass receiving point	290,000	-
End-user	1	Winemaking factory ¹¹	60,000,000	20,000,000
	2	Winemaking factory ¹²	50,000,000	10,000,000
	3	Workshop for production of lemonade	50,000	-
	4	Workshop for production of hunt belongings	3 (ton)	-
	5	Workshop for production of lemonade	30,000	-
	6	Workshop for production of lemonade	70,000	-
	7	Workshop for production of lemonade	450,000	-
	8	Hayal	150,000	-
	9	ALCO-Ltd	1,800,000	-
	10	Azeri-Castel	900,000	-

f. Main Suppliers

Main suppliers of materials to the intermediary are mainly private persons including citizens, mediators and garbage collectors. On the other hand the end users are supplied by other suppliers.

Table 5-51: Main Suppliers to Companies

Base : All interviewees (20)		
Supplier	Category of company	
	Middleman	End user
	Cases	Cases
Citizen	9	1
Industry	---	1
Mediator	4	1

Collector of wastes	5	1
Garbage collector	5	1
Other supplier	3	9

g. Business Performance

g.1 Annual Sales

Both categories of companies were requested to disclose data about annual sales. The annual sales of the intermediary companies are relatively in a small range (standard deviation = 14733 manat), while those of the end users are significantly diverse.

Table 5-52: Annual Sales Volumes (in the manat)

Category of company	Number of companies	Min.	Max.	Mean	Std. Deviation
Middleman	10	16,000	65,800	43,080	14,733
End user	10	15,000	396,000,000	67,735,800	142,9500,000

g.2 Cost of Transportation

Among the surveyed companies, it seems that only the end users transport the materials: there was not clear answer from the middlemen that they do transport the materials. Nine out of ten end users pay from 5 to 10 manat/kg to transport companies. The rest company answered zero as it has its own transport means and does not pay to a transport company. The amount of payment does not depend on the size of the end users and, in turn, the size of transport load.

Table 5-53: Cost of transportation

Category of company (union)	Cost (manat/kg)	Nos. of Answer
End user	Zero	1
	5	2
	6	1
	8	2
	9	1
	10	3
	Total	10

g.3 Annual Volumes of Supplies from Various Sources

Volumes of materials supplied in a year to the two categories of companies by sources are as in Table 5-54.

Table 5-54: Annual Supply Volumes (in items) by Sources

unit : number of item/year

Base : All interviewees (20)					
Category of company	Supplier	Nos. of Answer	Minimum	Maximum	Mean
Middleman	Citizen	9	1 (ton)	450,000,0	146,700
	Industry	0			

	Moderator	4	2 (ton)	250,000	80,000
	Collector of wastes	2	90,000	100,000	95,000
	Garbage collector	5	1 (ton)	110,000	48,000
	Other suppliers	3	100,000	120,000	111,700
	Total	10	---	---	240,500
End user	Citizen	1	0.5 (ton)	0.5	0.5
	Industry, volume	1	1 (ton)	1.0	1.0
	Moderator, volume	1	1 (ton)	1	0.8
	Collector of wastes, volume	3	1 (ton)	80,000	26,700
	Garbage collector, volume	5	-	80,500,000	16,304,000
	Other suppliers, volume	5	10,000	60,000,000	12,422,000
	Total	10	---	---	14,371,000

g.4 Material Prices

The price of collected materials was almost same for the middlemen and end users.

Table 5-55: Material Prices

Category of company	Glass (manat/item)	Non-ferrous metals (manat/kg)	Paper (manat/kg)
Intermediary	120 – 250	2250 – 2700	500
End user	60 – 225	2000	---

h. Treatment process

Treatment of materials by the intermediary companies is only sorting them into three types (ie glass, non-ferrous metal and paper). The end users are mostly engaged in packing rather than sorting.

Table 5-56: Number of companies with various types of treatment process

Category of company	Type of treatment	Type of production		
		glass	non-ferrous metal	paper
Middleman	Sorting	7	2	1
	Pressing			1
	Tampering			
	Washing			
End user	Sorting	4		
	Pressing			
	Tampering	9		
	Washing		1	

i. Relation to the Activity and Opinion on Tendencies

i.1 End Product

Most of the middlemen understand how materials that they handle are going to be processed.

Table 5-57: End Product – Known or Unknown

Base : All Middlemen interviewees (10)		
Answer	Final Product	Nos.of Answer
Yes	Drinks	7
	Various utensils	1
	Carton	1
No	---	1
Total		10

i.2 Governmental Support

The numbers of companies that are in favour of governmental support and that are against governmental support were same in the middlemen and in the end users.

Table 5-58: Governmental Support – For or Against

Base : All interviewees (20)		
Category of company	Answer	Nos. of Answer
Middleman	yes	3
	no	3
	Do not know	4
	Total	10
End user	yes	4
	no	4
	Do not know	1
	other	1
	Total	10

i.3 Collection Amount Forecast

The majority of the middlemen and the end users consider that the collection amount is constant in future and the rest expect the increase of materials.

Table 5-59: Volume Tendency of Products

Base : All interviewees (20)		
Category of company	Answer	Nos. of Answer
Middleman	Growing	4
	Relatively stable	6
	Total	10
End user	Growing	2
	Relatively stable	8
	Total	10

j. Conclusions and Recommendations

The results of this survey will serve as a base to examine the present condition on the recycling market in Baku and its future. The conclusions and recommendations drawn from this survey are as follows.

- Recycling activities are largely limited to the recycling of glass bottles and non-ferrous metals, market of which has been established. Glass bottles are categorised by type and returned to the original manufacturers. The price of recovered non-ferrous metals is high enough to raise economic benefit even though they need to be transported to recycling plants in the distance.
- The price of recovered ferrous metals is too low to be beneficial. This is because there is no ferrous metal recycling plant close enough to the city and cost for transportation to the nearest one is high.
- The team considers that it is possible to create a recycling market in future for items other than glass bottles and non-ferrous metals, such as ferrous metals and paper (mainly cardboard). However, the cost for transport of those per unit volume is high. Therefore marketability depends on whether recycling plants for them are constructed in the study area or its vicinity. Recognising that the market of those materials existed in the former soviet time, the consumers, middlemen and end users will include them into their recycling activities once the market emerges.

Chapter 6

6 Other Supplemental Studies

6.1 Air Pollution & Dispersion Modelling

6.1.1 Phase One

During Phase 1 of the project the JICA Team identified the following objectives for Phase 2 of the project. These included the following:

- Review of current level of understanding of air pollution assessment knowledge in BCE staff
- Review of available data on emissions and sources
- Identification of training needs of BCE staff
- Identification of a suitable suite of dispersion models
- Review of computing needs for dispersion models
- Identification of training needs

This Phase of the work enabled the JICA team to prepare for the second phase of the project and specify the required hardware and software, which were procured prior to the second team visit to Baku.

6.1.2 The Training

Training in air quality assessment was provided to members of staff from the BCE Environmental Impact Assessment (EIA) Information and Environmental Protection Unit. Training was carried out in the offices of BCE and was in the form of hands on computer training, site visits to industrial processes and tutorials. Much of the training was undertaken on a one-to-one basis.

Topics covered in the training included:

- ambient air quality;
- ambient air quality standards in Azerbaijan;
- emission standards;
- emissions inventory (including the use of the US EPA software Air CHIEF AP42);
- physics of the atmosphere;
- pollution source characterisation;
- data verification;
- installation and registration of the modelling software;
- use of dispersion modelling software (including Breeze AERMOD and ROADS);
- meteorological data processing ;
- analysis of dispersion modelling results;
- presentation of results (use of the software SURFER GRAPHICS);
- interface of the dispersion modelling software with GIS;
- exporting and presenting data in the JICA funded GIS.

In addition meetings were held with other members of BCE staff to discuss ways in which the dispersion modelling could be used by the inspectors and other staff of BCE.

6.1.3 Who Should be Trained?

Discussion was had with BCE as to who should be trained. It was agreed that Mr Zaur Dashdamirov would be suitable for in depth training and that Rasim Abdullayev and Kamran Aliyev should also receive hands-on dispersion model training, although not to the same level of detail. The individuals selected for air quality/dispersion model training were the same individuals that had received training in the use of the GIS. The selection of one member of staff to receive detailed training was for two reasons:

- their remit in BCE was less relevant to the use of air quality and dispersion modelling;
- they required further training in GIS and it would be more appropriate for their available time to be used for GIS than for dispersion model training. Mr Dashdamirov had reached an acceptable level of competency in the use of GIS and so could leave that training to focus on air quality/dispersion model training.

6.1.4 Documents and Models Provided to BCE

Several pieces of specialist software¹ were donated to BCE and full training in their use and application was provided. These were:

- (a) BREEZE AERMOD SUITE (Version 3.4.0) is the next generation of air quality modelling system. AERMOD is used to assess the impact of air emissions from a variety of industrial sources. The model predicts pollutant concentrations from point, line, area, volume, and flare sources with variable emissions in terrain from flat to complex. AERMOD captures the essential atmospheric physical processes and provides reasonable estimates over a wide range of meteorological conditions and modelling scenarios. This dispersion modelling system includes:
 - an advanced meteorological pre-processor to compute site-specific planetary boundary layer (PBL) parameters;
 - highly developed dispersion formulations that incorporate current PBL understanding and variables for both the convective and stable boundary inversions;
 - enhanced plume rise expressions and treatment of plume penetration of elevated inversions;
 - evolved computation of vertical profiles of wind, turbulence, and temperature;
 - sustained treatment of receptors in all types of terrain data.
- (b) BREEZE AERMET Pro (Version 3.1.0) – a meteorological data pre-processor that takes data in from the standard meteorological station (wind speed, direction, cloud cover and temperature) and converts it into the format required by

¹ Full details of the software are available at www.breeze-software.com.

AERMOD, as well as estimating the additional parameters required such as Monin-Obukov length, mixing height, roughness etc;

- (c) BREEZE ROADS (Version 3.1.0) – This suite incorporates a series of models developed by the US State of California for the estimation of impacts from roads. This suite is used throughout the world and provides an additional level of sophistication to AERMOD when modelling line sources. ROADS suite is designed to predict air quality impacts of carbon monoxide (CO), nitrogen dioxide (NO₂), particulate matter (PM), and other inert pollutant concentrations from moving and idling motor vehicles at or alongside roadways and roadway intersections;
- (d) SURFER Graphics (Version 7) – a graphics presentation tool that is suitable for the presentation of the results from ROADS and AERMOD suites, specifically as contour plots. The dispersion models are provided with an interface to make the presentation of modelled data swift and automated.

Documents provided as part of the training were as follows:

- (a) Turner D B (1994) *Workbook of Atmospheric Dispersion Estimated: An Introduction to Dispersion Modelling*, Second Edition, Lewis Publishers US.
- (b) US Environmental Protection Agency Air Chief Emission Factor and Inventory Group (1999) *Air Chief 7.0*.
- (c) Trinity Consultants Incorporated Limited (1999-2000) *Breeze Roads Suite User Manual*
- (d) Trinity Consultants Incorporated Limited (1999-2000) *Breeze AERMOD Suite User Manual*
- (e) Trinity Consultants Incorporated Limited (1999-2000) *Breeze AERMET Pro User Manual*
- (f) US Environmental Protection Agency – *AERMOD Detailed Technical Guidance* (Provided on CD ROM)
- (g) Trinity Consultants Incorporated (1995) *Practical Guide to Atmospheric Dispersion Modelling*, Prepared by Dr R Schulze.

Reference (a) is a general introduction text to dispersion modelling, which includes a description of the derivation of the main equations used to estimate dispersion and the factors that affect the accuracy of dispersion models. The book also includes a series of exercises and spreadsheets on a floppy disk to enable simple calculations to be made.

Reference (b) above includes (on the CDROM):

- (a) *The Factor Information Retrieval (FIRE) Data System* contains EPA's recommended emission estimation factors for criteria and hazardous air pollutants from stationary sources. FIRE includes information about industries and emitting processes, the chemicals emitted and the emission factors themselves. FIRE allows easy access to criteria air pollutant emission factors obtained from the Compilation of Air Pollutant Emission Factors (AP-42), the Locating and Estimating document series and the retired AFSEF and XATEF documents.

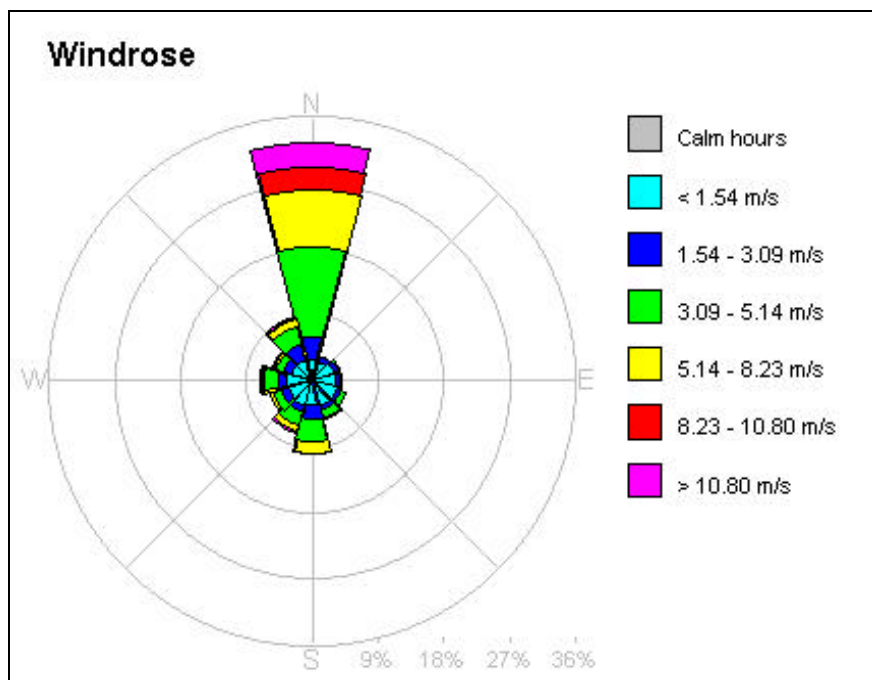
- (b) *AP42 – Compilation of Air Pollution Emission Factors 5th Edition* - An emission factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (eg kilograms of particulate emitted per tonne of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality and are generally assumed to be representative of long-term averages for all facilities in the source category (ie a population average). The documents cover an extensive range of mobile and stationary sources of all sizes and ages/efficiencies.
- (c) *Emission Inventory Improvement Programme* – The Emission Inventory Improvement Program (EIIP) was established in 1993 to promote the development and use of standard procedures for collecting, calculating, storing, reporting, and sharing air emissions data. The EIIP is designed to promote the development of emission inventories that have targeted quality objectives, are cost-effective and contain reliable and accessible data for end users. To this end, the EIIP is developing inventory guidance and materials, which will be available to states and local agencies, the regulated community, the public, and the EPA.
- (d) *Locating and Estimating Sources of Emissions* - a set of documents and tables that allow the tracking of sources of emissions, sorted by pollutant rather than industry type – hence if air quality data reveal a certain pollutant to be a problem, for example ambient concentrations of nickel (Ni), potential sources and information relating to those sources is grouped in these L&E documents.

6.1.5 Training and Results

Mr Dashdamirov was trained for a total of around 4.5 weeks with at least 3 full days of training per week. At times he was unavailable for training due to other work commitments and GIS training. Mr Aliyev and Mr Abdullayev continued GIS training during Mr Dashdamirov's Air Pollution training and he occasionally was called on to assist his colleagues or learn additional GIS skills. Additionally, Mr Dashdamirov was called on to demonstrate the air pollution modelling to his colleagues, under the supervision of the JICA team member.

Meteorological data for the nearest station to Baku for which suitable and complete data were available (ie Mashtagi, a met station north east of Baku city) were provided by the Azerbaijani sub-consultants. The data were purchased locally. Other data were available but were incomplete with many of the 3-hourly measurements missing. The data were not in dispersion model ready format and so were processed by the JICA team into the correct format. This involved interpolation as the raw data were only available for every three hours throughout the year, whereas the models require hourly data (ie 8760 values per year for each of the parameters (including wind speed, direction and temperature). These data were then processed by the AERMOD met pre-processor (AERMET) to allow for the difference in location between the met station and the sources of pollution to be modelled. A wind rose of the 1999 data for Mashtagi is presented below. The wind rose shows the frequency of the wind directions and speeds. The arms of the wind rose point towards the direction from which the wind was blowing. It can be seen for example

that the prevailing wind is from the North and that around 30% of the time the wind is from the 30° sector centred on North. Also most of the stronger winds (shown as the outer bands of the rose) are from the North.



Mashtagi, nr Baku City 1999 Interpolated Data Used in the Dispersion Modelling

Training in the use of the ROADS model was undertaken by the JICA team following completion of the AERMOD training. The approach to modelling different types of road (free flowing, congested etc) was demonstrated using example data. However, time did not permit detailed modelling using actual road data. This is currently being undertaken by the BCE-trained staff.

In addition the approach of amalgamating a group of roads into a single area source was discussed in order to allow AERMOD to be used, along with industrial emissions data to examine the overall fate of pollutants in the city as a whole. Implementation of the Master Plan will involve detailed modelling of the major sources of pollution in Baku and refining the detail and accuracy of the emissions data.

Several major emissions sources were considered for the modelling by the JICA team and the BCE trainees. Two were selected for training purposes. These were the newly installed Combined Cycle Gas Turbine (CCGT) at TEC1 Power Station in the coastal/industrial region of Baku City, and the district thermal heating plant adjacent to the BCE offices. Meetings were held with the operators of the two plants and emissions data determined as accurately as possible. Data were readily available for the CCGT and example calculations using the engineering data were undertaken by the JICA team and the BCE trainees to determine the validity and accuracy of the data provided. The new installation of the CCGT was particularly useful as accurate data on the plant were available; but more importantly because the impact of the emissions from the plant could not yet have been measured in the air around Baku as the plant had only been operational for 2 weeks at the time of the visit. Emissions data for the heating plant were derived from emission factors although the accuracy of these estimates is likely to be very low as basic data such as the quantity of fuel

burnt or the hours of operation were unavailable. BCE trained staff were continuing their investigations of the heating plant and emissions data should become more accurate in time.

A print out of the impact of the new CCGT as modelled with AERMOD using Mashtagi 1999 met data is provided on the following page.

From the modelling undertaken it was clear that the impact of the new CCGT to annual mean ground level concentrations was small and confined to a small area in the sea, just south of the power station. This is as expected from the wind rose – ie most of the time the wind blows from the north and so the pollution is blown south.

Short term impacts over periods of hours to days (rather than over the whole year) were spread more evenly around the plant, but again the higher ground level concentrations were generally south of the CCGT, corresponding to the fact that the stronger winds blew from the North in 1999.

6.1.6 Summary, Findings and Recommendations

Meetings were held between the JICA team and the BCE to discuss the training and decide on the individual(s) to be trained. It was decided in consultation with BCE that there was only one suitable candidate for the detailed dispersion modelling training. This was Mr Dashdamirov who had also been recently trained in the use of the GIS. Other individuals with the relevant technical knowledge in industry and to whose work dispersion modelling would be relevant did not have any necessary computer skills. Two further individuals were identified as being suitable for general training. Mr Dashdamirov delivered this training under the supervision of the JICA team. This training was an effective way for the JICA team to assess the level of understanding Mr Dashdamirov had of the models and served as revision on training provided to Mr Dashdamirov.

It was evident that there are very few individuals within BCE who have any computer skills *at all*. Most inspectors are occupied with the tasks of inspection and show no interest in being able to undertake assessment. Whilst air pollution assessment with dispersion models requires a fairly high level of computer literacy, it would be useful for BCE inspectors to understand what dispersion modelling can do, what its limitations are and what data are required in order to undertake a successful air quality assessment.

AQ Recommendation 1: all inspectors attend at least five half-day general air dispersion and air quality assessment seminars

As the BCE or its successor (depending on progression towards Ministry status) takes an increasing role in the regulation of industry the level of understanding of air quality predictions techniques and air quality assessment will need to increase. There is a body of knowledge within the BCE in relation to the operation and control of industry, on a practical level. This knowledge is useful to the air quality assessor and the dispersion modeller and it is appropriate that the staff of BCE understand data requirements and sensitivities of dispersion modelling and assessment.

The seminars should be undertaken by a suitably qualified international expert as part of the follow-on project (ie any projects designed to implement the Master Plan drawn up as part of this project) from the current one that is funded by JICA.

The seminars should form a coherent progression over a series of at least 5 half-day seminars; subject matter covered should include the following, additional topics or sub-topics may be added depending on the outcome of the seminars held:

- emissions: data collection, validation, verification and accuracy;
- air quality standards and guidelines applicable in Azerbaijan and European air quality standards and targets;
- factors affecting dispersion, ambient concentrations of pollutants in Baku, air quality management techniques;
- elementary physics of the atmosphere, dispersion modelling and its use in air quality assessment;
- inputs and outputs of dispersion modelling, air quality management, GIS.

AQ Recommendation 2: Further Training in the use and application of dispersion models

The training provided in October and November 2000 has provided BCE with 3 members of staff who know (in outline) the functionality and use of dispersion model and air quality assessment. One person is capable of running the models provided. The use and application of the dispersion models is a complex process and requires many case studies over several years before the user(s) are confident of their application and limitations. Further training of Mr Dashdamirov, particularly in the use and application of the ROADS model is required, and also in the application of the AERMOD SUITE to actual situations. The opportunity to work through actual case studies was limited during the initial training: firstly, because it is essential that the use of the models is fully understood before applying them to real data, but also because the availability of accurate emissions data was limited.

Ideally training should be continued for Mr Dashdamirov for at least three, four-week periods over the next two years. This will reinforce the initial training and also increase his understanding of the models and their application. Detailed hands-on training, similar to that provided to Mr Dashdamirov, should be provided to at least two further individuals within BCE. Mr Dashdamirov can then train these two individuals in the detailed application of the models to air quality assessment. This will provide BCE with a team of three air quality modelling and assessment experts. These three individuals can then continue the series of training seminars undertaken as part of AQ Recommendation 1.

There is a need BCE staff to be able to undertake level assessments of air pollution impacts of new developments in Baku. With industrial activity being relatively low at present, it is important that as the economy improves in Azerbaijan and industry returns to operation, this is done in a controlled way. Baseline data on pollutant levels is generally available and air quality assessment of new and refurbished industry is important in ensuring air pollution does not return to previous levels.

Dispersion modelling is a powerful tool in determining the appropriateness of certain actions, mitigation measures and developments and if internal modelling can be undertaken this will strengthen the arguments and confidence of BCE in dealing with the potential air pollution problems in Baku. In any event, the BCE could provide an air pollution modelling service to developers for a fee to enable them to support their applications with mutually acceptable data.

Recommendation 3: Interaction with other Aid Projects

There are several projects being undertaken in Baku and Azerbaijan that involve the collection and interpretation of air pollution data. For example the TACIS funded survey of pollution in the Caspian region has collected similar data to the JICA funded project. One of the main constraints to detailed and accurate dispersion modelling of air pollution in Baku, is the unavailability of reliable and accurate data on emissions. It is recommended that an international modelling/air quality assessment expert along with the individual(s) trained in air quality assessment within BCE form links with these aid projects in Baku, collate and review the emissions data collected and begin to compile an emission inventory that is reliable, accurate and suitable for dispersion modelling.

6.2 Analysis of Training Needs Analysis Data

6.2.1 Scope

This analysis is based on 59 wholly or partially completed responses received by 13 September 2000.

6.2.2 Age

Figure 6-1.

The BCE age profile shows a range from 22 - 70 years of age, with a mean (arithmetic average) age of 41.2 years.

The age profile bell curve shows a normal distribution and suggests there is no immediate pressure on retirements, but over the next ten years, it will be essential for the BCE to recruit staff to take over from those who retire or leave, in addition to any other staff required for operational reasons. Clearly, new staff recruited to meet operational needs should possess the appropriate skills and experience, regardless of age.

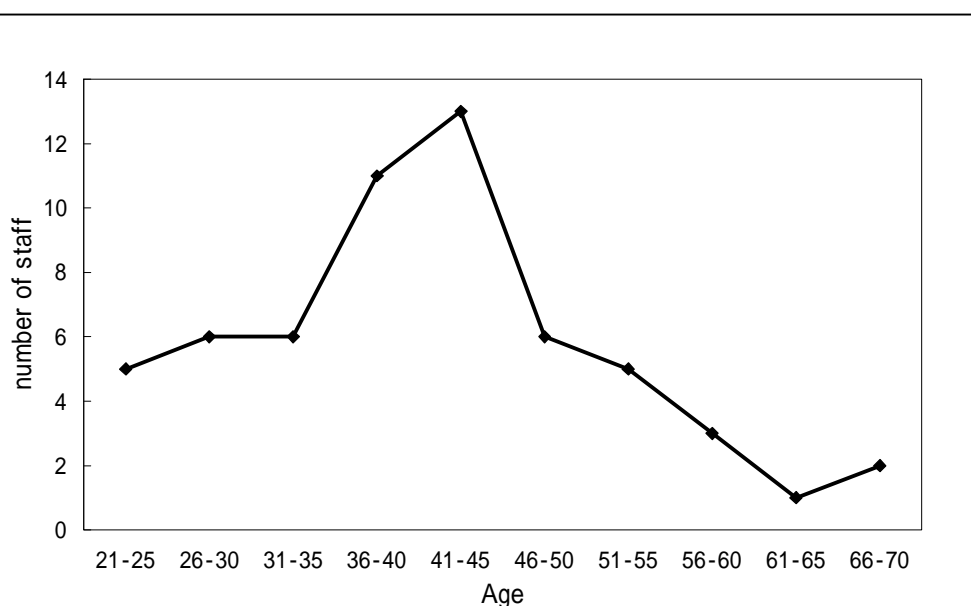


Figure 6-1: Age Profile Distribution

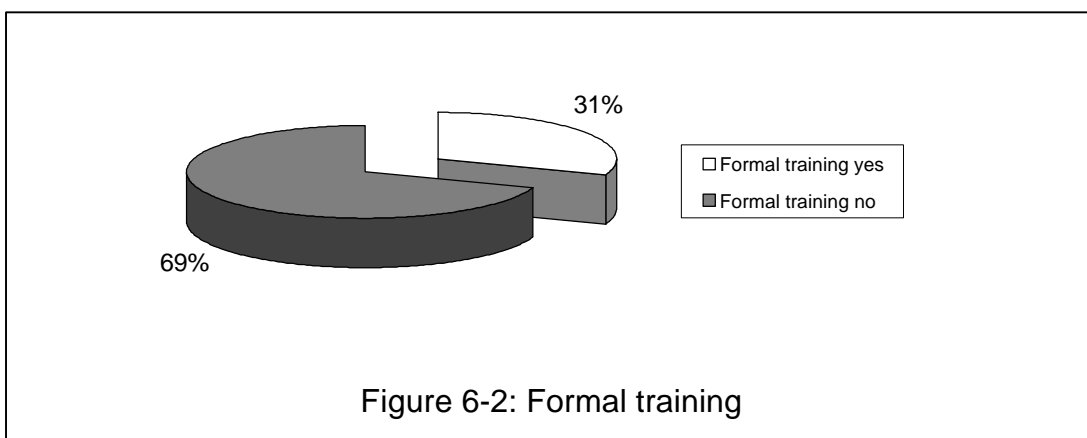
6.2.3 Formal Training Since Joining BCE

Figure 6-2.

Only a small number of individuals claim to have received training since joining the BCE. This lack of training is a serious handicap to the smooth effective and efficient working of the BCE. A number of respondents identified training received prior to the BCE. A number of conclusions may be drawn:

- within the BCE, training relies on cooperative working or experience being passed from one staff member to another, without any formalised processes;
- staff will tend to avoid doing those tasks for which they feel themselves to be poorly trained, in order not to make errors;
- the BCE is vulnerable to criticism from better informed outsiders (for example, production experts in industry), having only a small number of experts with up to date training.

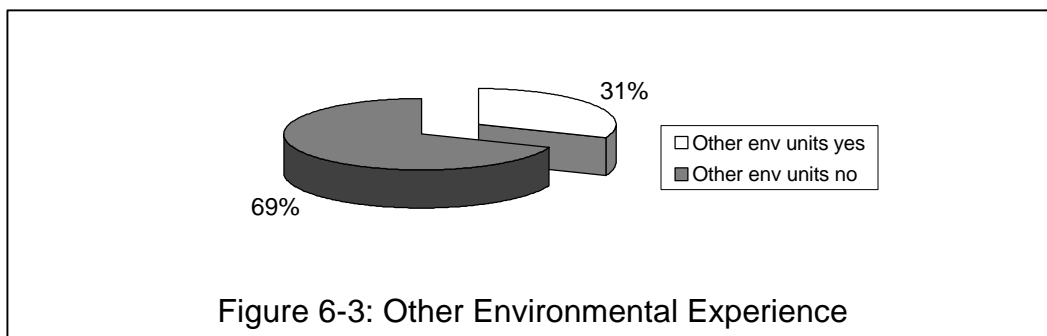
Not all (or any) of these aspects may be true in every case, but observation suggests that there is evidence of under-performance due to a lack of training. Clearly, staff who do attempt to undertake any tasks without having had any training will take longer and be less efficient or effective than they should be.



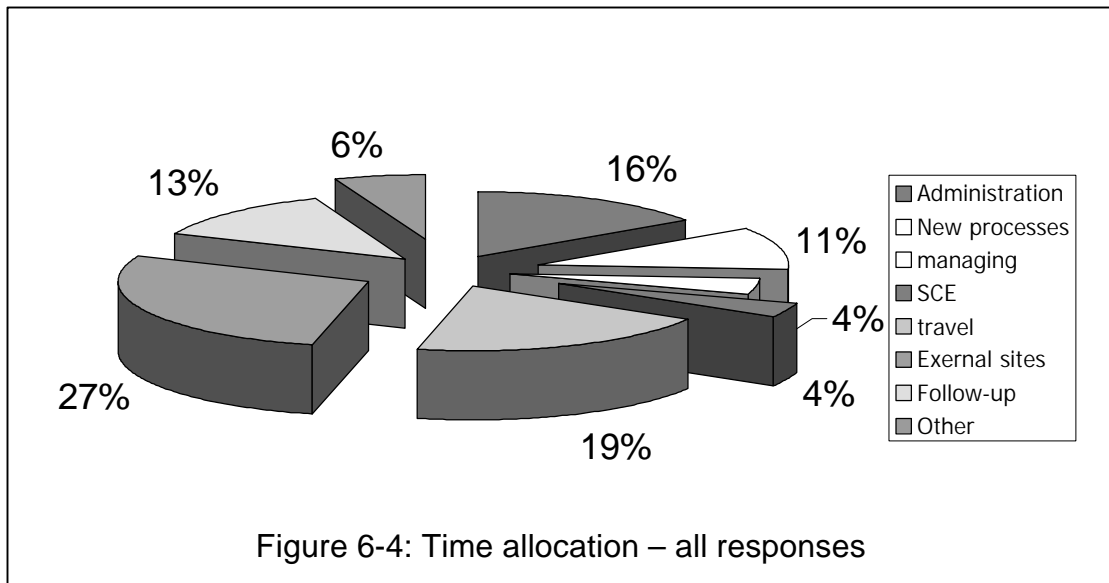
6.2.4 Other Environmental Experience

Figure 6-3.

The percentage of respondents claiming previous relevant experience (32 percent) suggests that there should be substantial experience of other approaches to environmental issues than that taken at the BCE. This experience is particularly prevalent amongst EIA department staff and includes experience with Hydromet, the SCE and the State Caspian Inspectorate.



6.2.5 Work Categorisation - Time Allocation



The average categorisations declared by respondents are reviewed below.

- administration (low figure is best)

overall, the figure of 16 percent is higher than is desirable and implies the equivalent of some 15 staff currently engaged full time in administrative activities. Clearly, there are issues of definition - for example whether report writing following an inspection is administration - but at face value, this figure is high. Amongst inspectors, (where the figure should be lowest), administration is only 6 percent;

- studying new processes etc (*no optimum figure*)

given that there is relatively little formal training input, the implication of 11 percent spent on this activity is that there is major inefficiency in this area. A well organised approach could prevent duplication and ensure a consistent approach to every issue. Inspectors, who need to be aware of developing industrial processes spend 8 percent of their time, on average on this activity, equivalent to almost half a day per week;

- managing other staff (high for managers best, low for other staff best)

given that the management overhead within the organisation is around 16 staff, the level in the survey of four percent is surprisingly low. However, this may be due to some extent to the profile of the respondents. Department and unit heads spend 16 percent of the time on this activity. There are managers who claim to spend no time managing, but this may be due to uncertainty of definition between 'managing' and 'administration';

- with staff from SCE etc (low for most individuals best)

the figure of four percent for the organisation is reasonable and assumes there is significant letter and telephone contact. However, most of this contact would normally be at managerial levels. Inspectors spend four percent and heads of units and departments seven percent on this activity;

- travelling to external sites (*low is best*)

Computation note: where respondents grouped travel with attendance at external sites, an arbitrary 50:50 split was taken, based on the profile of those respondents who did allocate separate percentages to each activity.

The response of 19 percent (range 0-70 percent) is a remarkably high figure, given the geography of the Baku region. Distances are relatively short (compared with the time to cross the country) and the public transportation system is generally quite good. There will be some individuals who travel relatively infrequently and there is therefore the implication that those who do travel spend a very large portion of their time travelling. Many respondents claim a higher proportion travelling than being at the site or on follow up (ten respondents). This situation should be regarded as wholly unacceptable by the senior managers at the BCE. Inspectors would be expected to spend more time than other groups travelling and this is indeed the case. Inspectors spend 23 percent of their time travelling with department heads at eight percent.

This aspect of BCE management and activity requires urgent attention. Better planning of visits, grouping those physically close to each other is critical. A combined visit to a factory by the different inspectors sharing one vehicle would also be beneficial. Clearly, the lack of its own transport resource is a major obstacle for the BCE, but not an insurmountable one and should not be used as an excuse for a low number of visits and significant wasted time;

- at external sites (high is best for inspectors. EIA no optimum figure)

at just less than thirty percent (28 percent), this figure could be increased if a better planning approach were introduced and a more structured approach to visits adopted. Inspectors spend 39 percent of the time at external sites, with unit and department heads at ten percent. EIAs should normally require little time away from document review activity.

However, whilst EIA activity is being developed, it may be appropriate for staff to conduct personal validation of submitted data where there are reasons to check the data supplied;

- writing reports and follow up (*no optimum figure*)

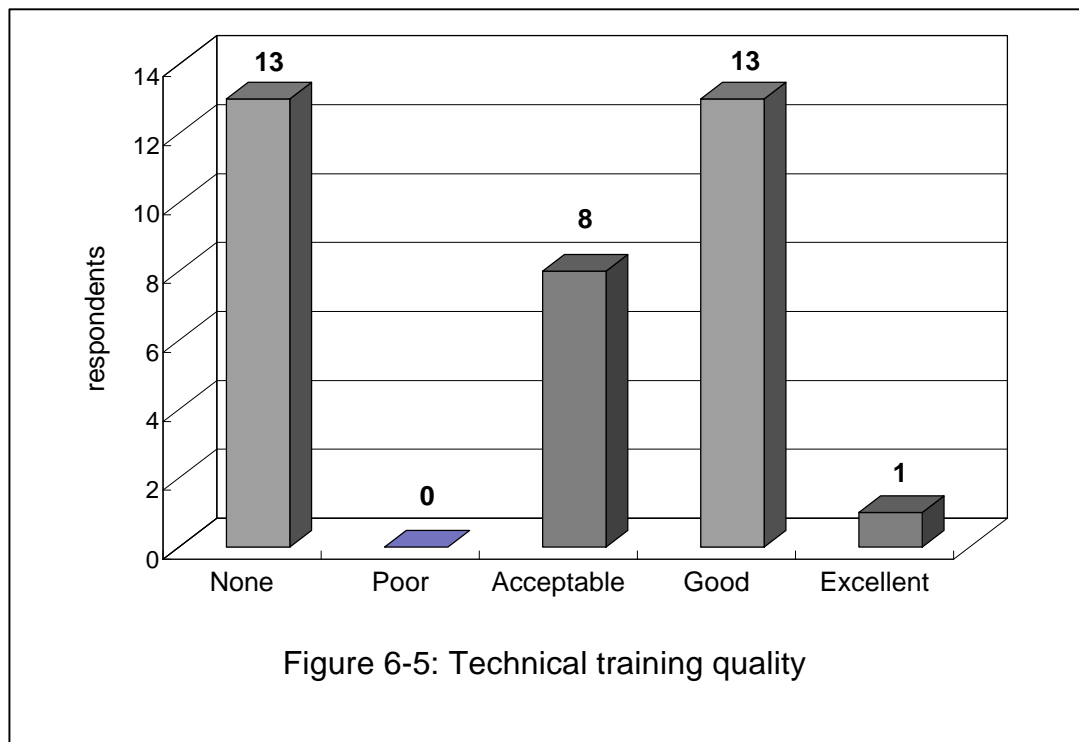
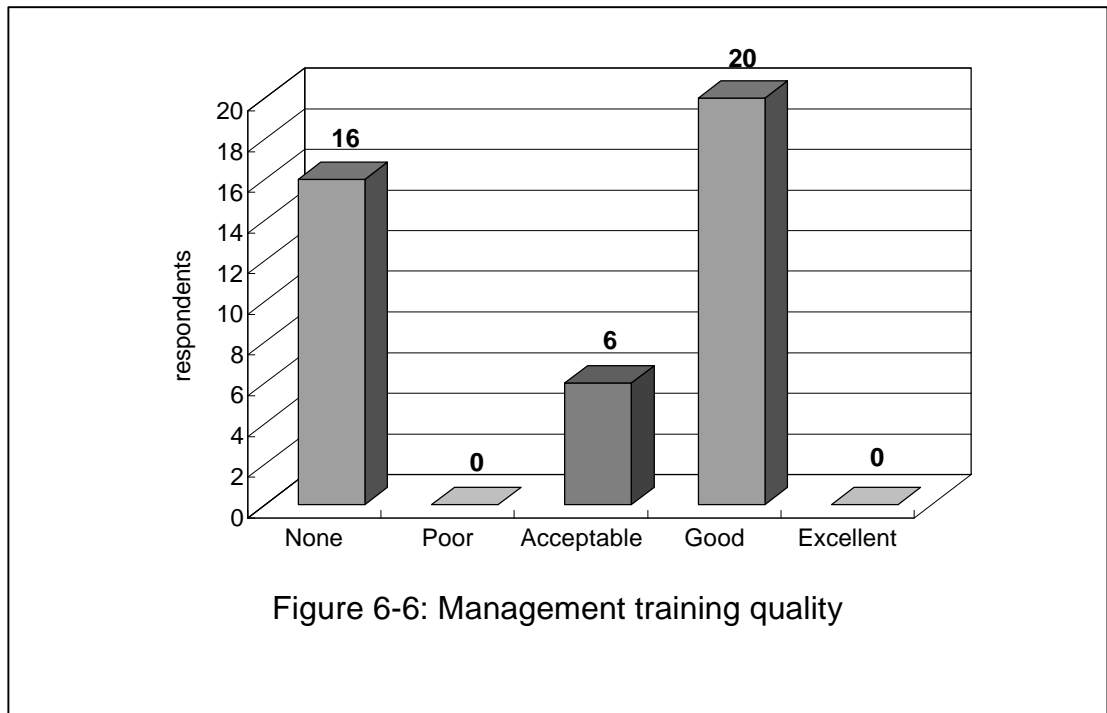
at 13 percent, this figure is around half the time at external sites, which may be a little high, given that the reports are rarely required to be passed outside the BCE, for example for prosecution. A range of simple pro-forma reports, to be completed on site and signed by the inspector and the target should suffice for most visits. More complex reports should be necessary following only a small number of visits where prosecution is seriously considered or some other major issue arises.

6.2.6 Training Quality and Perceptions

Figure 6-6 and Figure 6-5.

Given that there has been very little formal training, it is unwise to place too great a reliance on this data. In particular we note a large number (21) of respondents claimed to have had *no* training, but *were* able to rate either the management or technical training quality. From written comments, we deduce that a number of

respondents were applying this grading to the overall quality of training inputs, including their formal education.



6.2.7 Specific training

The correlation of answers with previous questions was poor. Respondents who claimed no training (above) described programmes, whilst others who claimed that

they had had training, did not respond to this section. Most respondents did not include dates for their training. However, there were a number of important points:

- one respondent claimed training in environmental law over twenty years ago, and several respondents referred to training during soviet times, including in general management and planning.
- It is important to query the relevance of this given the formation of the Republic, new environmental laws and a new and developing approach to environmental issues generally. No respondents claimed formal training in environmental law since the adoption of the 1999 law, suggesting an urgent need for this to be addressed. It is likely that each individual has established their own interpretation of the law - an unacceptable situation for future development;
- only thirteen respondents claimed to have computer or GIS training, indicating an urgent need for more training in this area (this would include the rôle of the GIS and data analysis and interpretation as well as data inputs). One respondent added that they could use a computer, although no training had been received within the BCE;
- ten respondents claimed training in planning, one in 1982. The relevance of that programme must be in doubt after almost 20 years and the transition to a democratic state.

6.2.8 Personal Training Needs

Figure 6-7.

The survey did not seek to match training aspirations with departmental objectives, as this is too complex an issue to address in a simple questionnaire.

Self declared requirements for training were as follows:

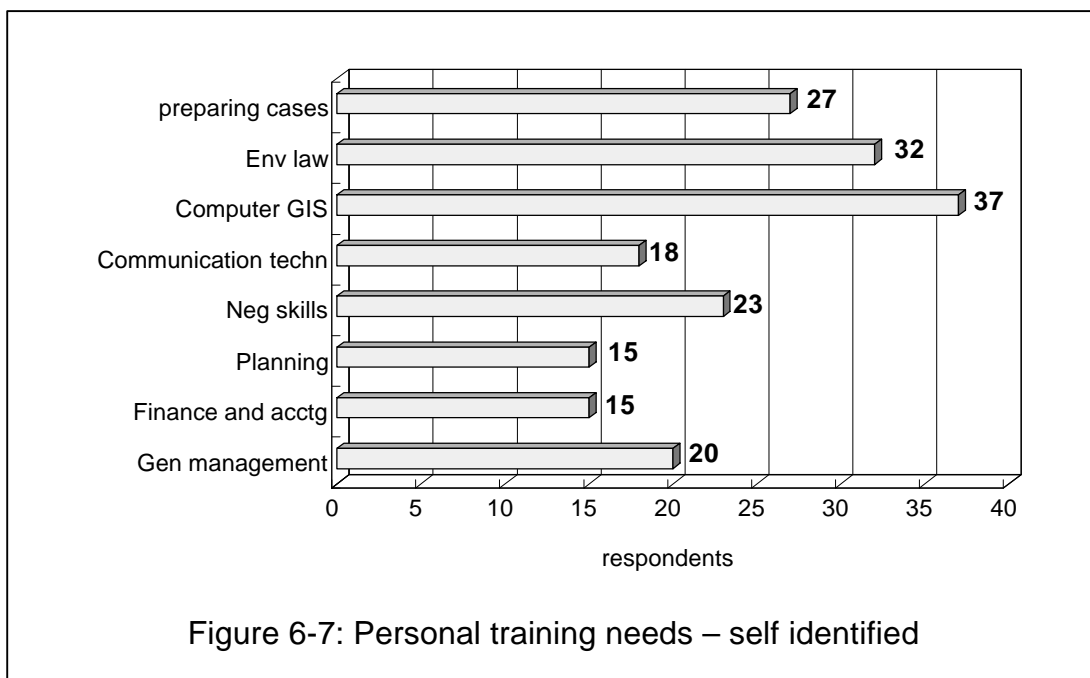
computer and GIS	34 percent
environmental law	25 percent
preparation of cases for prosecution	27 percent
negotiation skills	39 percent
general management	31 percent
communication techniques	62 percent
finance and accounting	55 percent
planning	45 percent

No other areas for training were identified, except in one specific technical case for one individual.

Clearly, each of these terms is open to wide interpretation and an essential next step is to define more clearly what is required, for what objectives and which specific topics should be included in each of these aspects. It will be most effective to develop a programme where participants are able to gain short and long term benefits.

In particular, a focus for the training needs to be identified and equipment may need to be made available for ongoing use (for example in computing) before training is undertaken.

Similarly, for prosecutions, it will be necessary to ensure that there is a well defined enforcement policy and that implementation is rigorously followed through, before the investment in detailed training is appropriate.



6.2.9 Department and BCE training

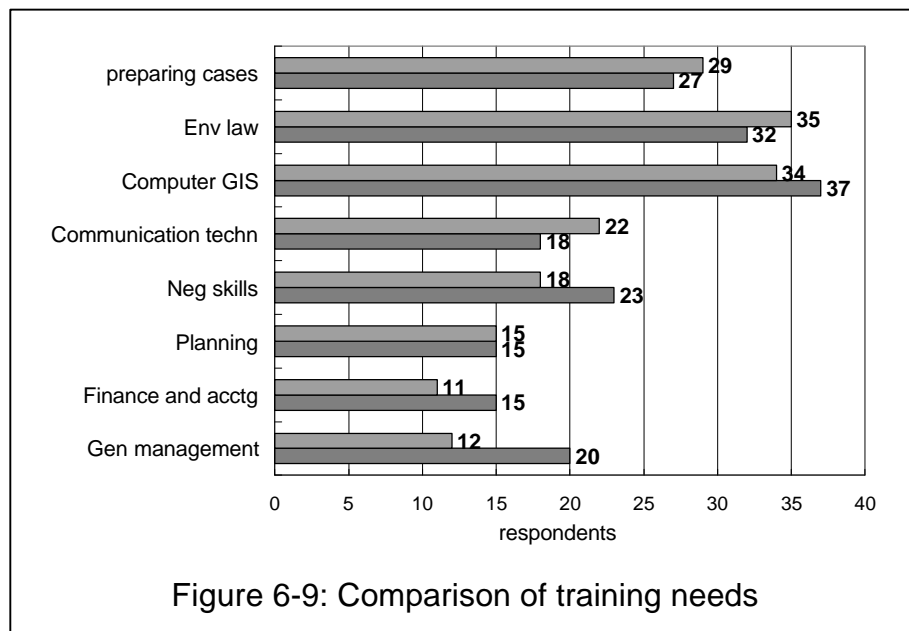
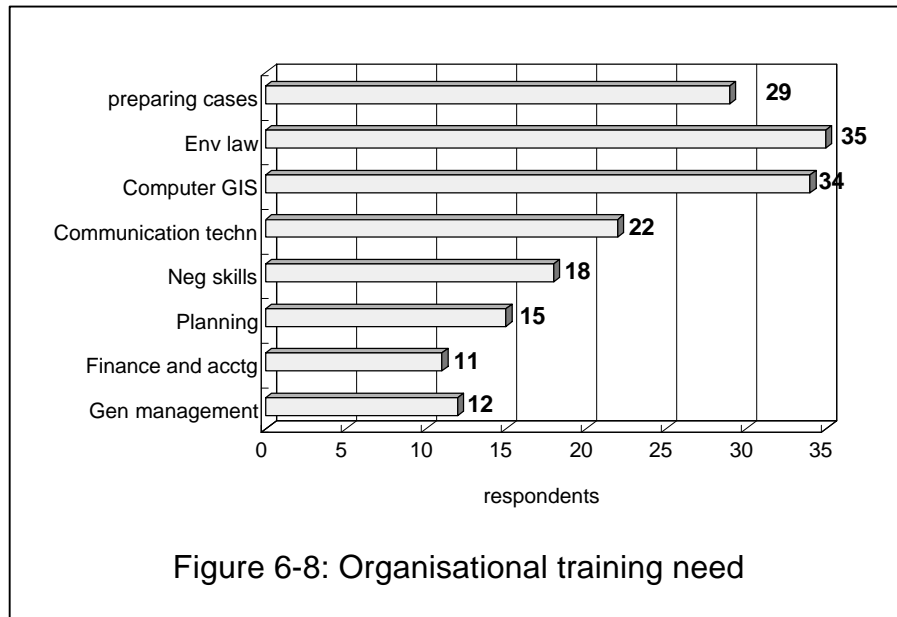
Figure 6-8 and Figure 6-9.

In our experience, respondents are often reluctant to identify training needs for the organisation for which they work, fearing this will be seen as inappropriate and critical.

Responses were as follows:

computer and GIS	58 percent
environmental law	59 percent
preparation of cases for prosecution	49 percent
communication techniques	37 percent
negotiation skills	31 percent
planning	25 percent
general management	20 percent
finance and accounting	19 percent

As with personal needs, computing/GIS and environmental law were both seen as areas where training is necessary. The similarity to the personal priorities suggests that the organisation is weak in both these areas.

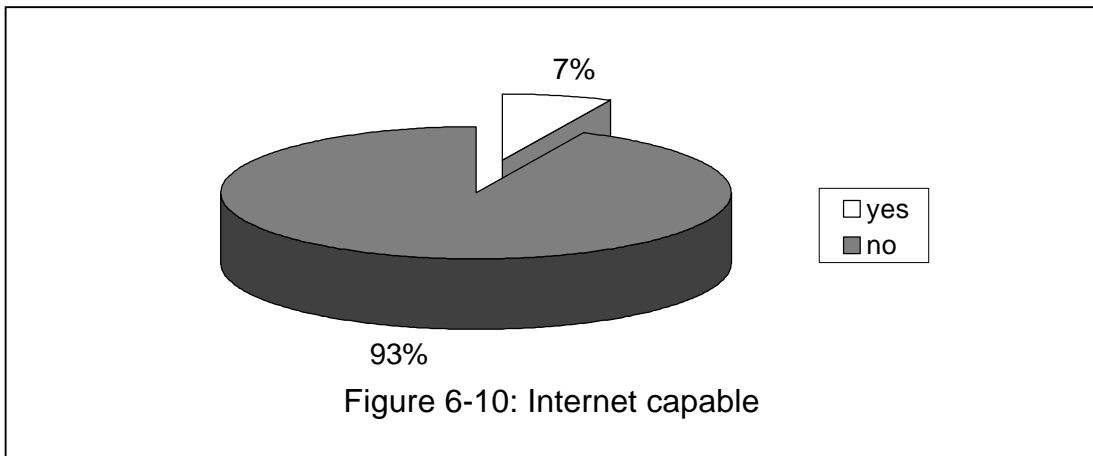


6.2.10 Internet use

Figure 6-10.

Only four respondents claimed they knew how to use the internet for researching environmental issues. The internet is clearly an important source of information and knowledge of good and best practice and should be addressed as a matter of urgency.

It is also proposed that a web site be developed for the BCE and it will be essential that staff are able to use it and deliver content in an appropriate manner and format.



6.3 Flora and Fauna in the Absheron Sanctuary

6.3.1 Flora

a. Types of Vegetation

Flora in the sanctuary is a reflection of the ground and water condition. Depending on the distance from the seashore, in land water bodies and ground height, vegetation can be divided into four.

1) Vegetation in Wet Saline Land

This lies along the seashore with a width of about 10m and elevation of about up to 5m higher from the Caspian Sea level. The vegetation community is further divided into two: vegetation in the first stripe of wet saline land and in the second, the former being near to the seashore.

2) Vegetation in Running Sand

Running sand, where the ground is vulnerable to wind force, lies next to wet saline land, and has its own vegetation community.

3) Vegetation in Wetlands

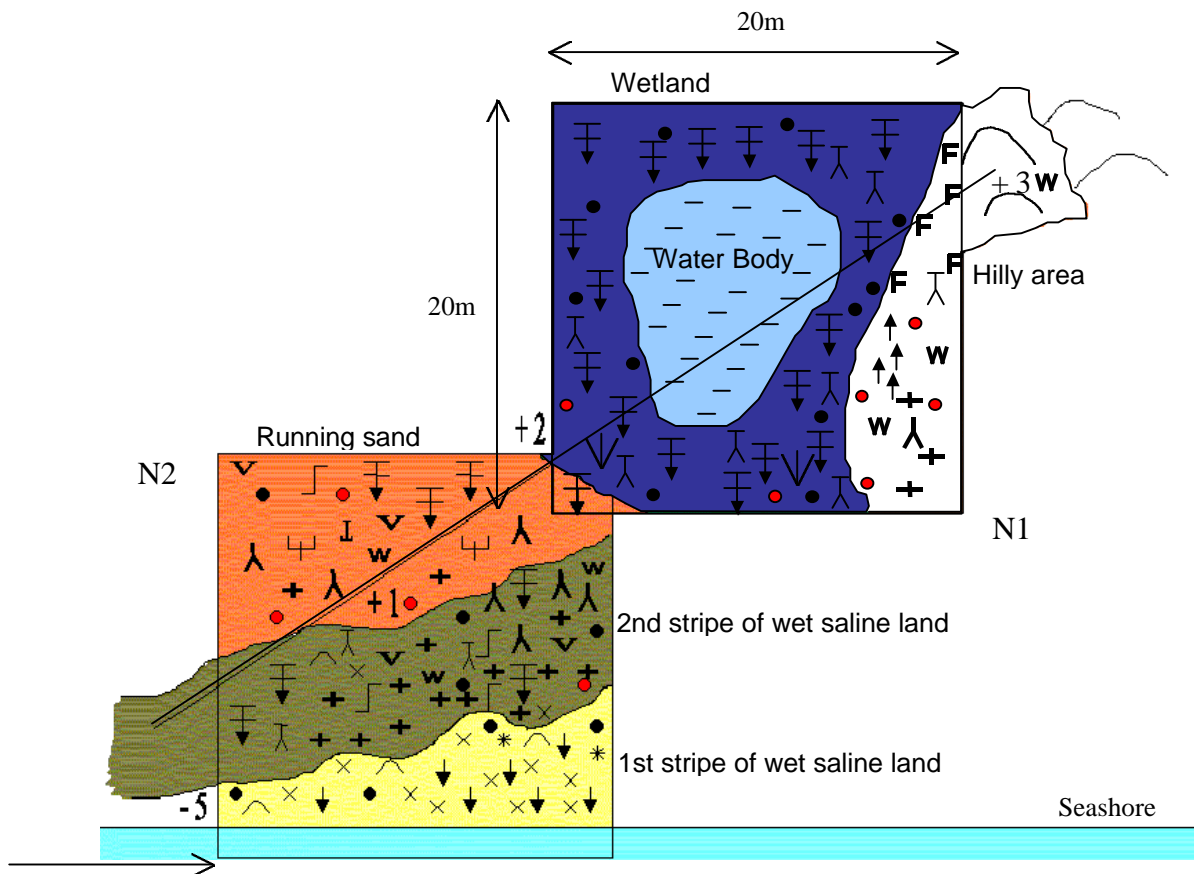
There are many water bodies in the area and reed-type vegetation flourishes.

4) Vegetation in Hilly Area

In-land water bodies are often surrounded by a hilly part whose elevation is about 8m or more higher than the Caspian Sea level. Vegetation in this area is tolerant of strong sea wind and water scarcity.

b. Species Distribution

Scientists in the Academy of Sciences carried out a field survey of species along a line and in two 20m squares. Results are as in















About 600m from the existing entry gate.

Figure 6-11: Flora Species Distribution

Table 6-1: Notes for Figure 6-11

N 1	Search area N1	
N 2	Search area N2	
+ 2	Altitude above the Caspian Sea level	
⌋	<i>Agrophyllum arenarium</i>	Êóìàð÷èè ìãñ÷àíúé
↓	<i>Atropis gigantea</i>	Áãñèèëüíéöà êðóííàÿ
∇	<i>Artemisia arenaria</i>	Ïëúíú ìãñ÷àíàÿ
W	<i>Artemisia annua</i>	Ïëúíú ìãñéàóíÿÿ
↓	<i>Atriplex fomini</i>	Ëääååå Ôñèíà
+	<i>Argusia sibirica</i>	Àðãóçèÿ ñéàèðñéàÿ
λ	<i>Convolvulus persica</i>	Âúðííé ìãðñéãñéèé

	<i>Convolvulus erinaceus</i>	Âûþíê ìñîããððàèñòúé
	<i>Tamarix ramosissima</i>	Òàìàðèèñ ìñîããððàèñòúé
	<i>Limonium meyeri</i>	Êâðíàé Ìñðà
	<i>Tripolium vulgare</i>	Àñòðà ñîéíí-àéíààý
	<i>Schoenoplectus littoralis</i>	Êàìúø ìðèìðñèéé
	<i>Suaeda altissima</i>	Ñáááá áññèàý
	<i>Suaeda confusa</i>	Ñáááá çàìóðàííàý
	<i>Ruppia maritima</i>	Ðóðè ìðñèéé
	<i>Glycyrrhiza glabra</i>	Ñîéíàèà àíèàý
	<i>Ephedra distachya</i>	Ýóááðà ááóóèéíèíààý
	Hillocks	
	Line survey route	

6.3.2 Fauna

This section introduces ecological characters of some of the fauna species that are or will be found in the Absheron Sanctuary. It is to be noted that due to the study schedule, a field survey was conducted only limited period by scientists of the Academy of Sciences, although such survey should be done throughout the year, at least in every season.

a. Cormorant

Phalacrocorax carbo sinensis Shaw et Nodder

In Azerbaijan the Cormorant is found along all the coastal zones of the Caspian Sea and almost on all the inside water bodies of republic which are rich in fishes.

The Cormorant is a sedentary species of Azerbaijan. On the Shah Dili spit it is found throughout the year. In summer it occurs on the territory of the sanctuary. In winter, it appears (in a few numbers) on water areas around the spit. During the migration season the flocks with different numbers (from several birds to several thousand) pass above the territory. Some times the flock flies by transit above the spit, and some times the birds sit down the water for rest and feeding.

On Absheron sanctuary Cormorants prefer water areas along the coastal zone of the spit, but some times they go out to the coast for rest and for drying their feathers.

The pubescence of Cormorants comes at 3 years age. They are monogamous. Usually, the pairs of Cormorants are constant. On the nesting place they come in pairs and in breeding plumage. Cormorants nest by colony and in suitable habitat the colony can contain tens of thousands of birds. During the breeding season near 100 individuals of Cormorant were found around the Shah Dili spit. It is presumed that these birds nest on islands and on derricks, which are near the sanctuary and use territory of the spit for feeding and resting.

Usually nests are placed nearby water in deep overgrowth of bush or on land (rare), and some times on broken stalk of old reed on half meters over ground. Materials for nesting are dry branches and reed. The egg laying begins from the end of April and the eggs are usually 3-5 with bluish with white streak colours. Both parents breed the eggs during 28-30 days.

At the end of August the Cormorants combine into flocks. Usually young birds fly in separate flocks and start their migration earlier than old individuals (from September).

Although Cormorant is a sedentary bird for Azerbaijan, obviously, most numbers of birds have migration to the south region of coast in cool weather. Later they come back for breeding. Besides, during migration season, considerable part of northern breeding population (from delta of Volga River) pass through the territory of sanctuary to wintering places on the Southern Caspian (Lenkoran, Kizil-Agach State Reserve, coastal zone of Iran). In spring (from February or at the beginning of March) the Cormorants come back to the nesting places.

The number of Cormorants have strong fluctuation in period of spring and autumn migration. The number can strongly change during a day, because flocks during passage use water area around the spit for rest and feeding. According to previous observations, in the time of intensive passage (peak of passage) above the territory of the Shah Dili spit up to 6,500-7,000 individuals of Cormorants are found flying within 30 minutes.

Besides distance migration, Cormorants have a habit of daily roaming. They go to feeding places in the morning. In the second part of day their activity is less, and becomes more before the sunset again. In summer they have main activity in the morning and evening times (when the temperature of air is not so high), but in winter they are active all the day.

Fish is a main diet of Cormorants. Usual they take fish of 20-25 cm in size. This species does not give preference to any particular species of fish, and take fishes which are in high numbers at the time. Old Cormorants feed nearly 1 kg of fishes (on average, 700-750 g) a day.

Cormorants procure the food in coastal zone (often not far than 50 m from the coast) and around the old oil platforms. The birds feed by diving, preferring water at 4 m deep. Sometimes they have feeding associations with pelicans (protocooperation).

Cormorants are many in number. On fish pound this species can damage the fish catch. In such places it needs to conduct some measures to stabilise their number.

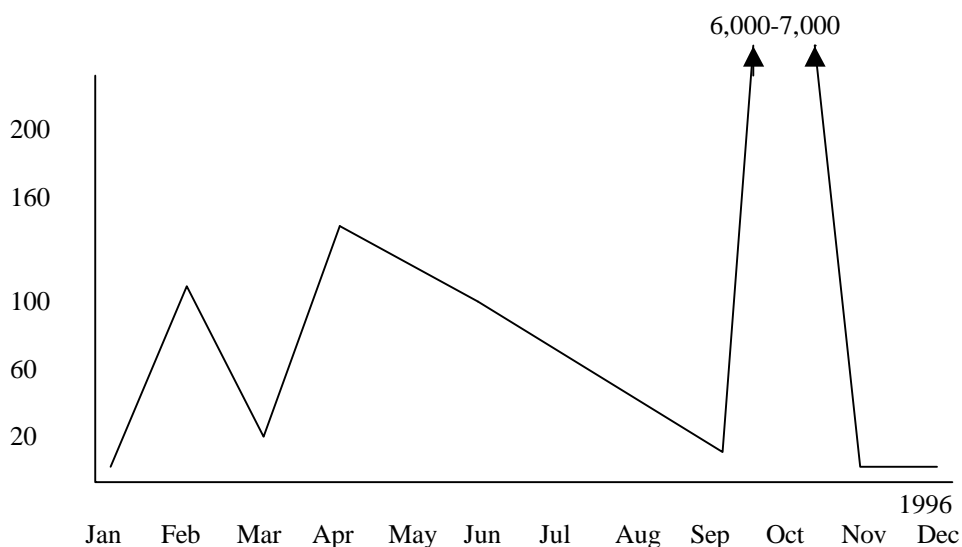


Table 6-2: Seasonal Fluctuation of Number of Cormorant on Shah Dili spit

b. Purple Heron

Ardea purpurea purpurea L.

Category by SPEC (Species European Conservation Concern) – 3

Status – Vulnerable, Criteria – seriously declined

The Purple Heron is a breeding-migration bird for Azerbaijan. In the breeding season it is rare, and in the migration season it is common species in the country.

On the Absheron Sanctuary some pairs of Purple Heron can have nests. During the migration season the flocks in passage fly above this territory and use it for feeding and rest.

The Purple Heron prefers vast open wetlands with overgrow of reed *Phragmites*. For feeding it can fly to other places (seacoast, shallow water of lakes, agriculture lands and others). This species tends to avoid meeting with people and nests only in out-of-the-way places. Nests are usually built in stands of mature reed, which must be inundated throughout the breeding season, since drying out causes the nest deserted.

Usually the Purple Heron nests by separate pairs or by a little colony. The material for nest is stalk of old reed. Both parents are participating in building of nest. Egg laying beginning from the end of April. In nest may be 4-5 eggs of green-blue colour. A brood continues about 28 days. Most part of time the female is sitting on eggs. First time after hatching, the mail carrying food for nestling, later both parents do it. The nestlings leave the nest at 6 weeks age, and leave the parents at 2 months age.

Autumn migration is from September. Usually, young herons beginning their migration early and fly separately from old birds. The Purple Herons, which have migration above the Shah Dili spit, is birds from northern breeding population (from delta of Volga River and coastal zones of Northern Caspian). This birds pass to wintering places on Southern Caspian and in Africa. Usually, Purple Herons have migration at night (birds fly out after the sunset and sit down for rest after sunrise).

The passage flocks is not big (about 10-20 birds), but some times young birds can organized big passage flocks (till 100 individuals).

Usually, the Purple Heron is available at night. They are feeding at early morning.

The diet of this species is fish, frogs, lizards, grass-snakes, water and ground invertebrates, and some times rodents. During hunting, Purple Heron can stay in water long times for wading the prey.

The major threat for population of Purple Heron is destruction of their habitat by drying of marsh and cutting or burning of reed (which is material for nest and place for concealing). The next threat is disturbance by people (hunters and fishers), especially in breeding season. On Absheron Sanctuary presence of habitat can depend from level of The Caspian Sea, which has strong fluctuation last times. But last 2-3 years level of sea is stabilized and the survey of this territory showed that now it is a good place for nesting of Purple Heron. We count, that it need to secure this territory from disturbance of people during breeding season for increasing the nesting population of this species on Shah Dili spit.

c. Mute Swan

Cygnus olor Gmel.

Included in Red Book of Azerbaijan

For Azerbaijan it is wintering and migratory species, but sometimes it has nesting in small numbers. Wintering population of Azerbaijan fluctuates between 1000- 2000 in mild winters and as many 11000 – 12000 in cold winters.

On Absheron Sanctuary it is wintering species and found during migration season. The numbers of wintering population of Mute Swan on Shah Dili spit lies within 60-150 individuals (1993-2000 years) and can changes during winter. The reason of these changes is roaming of swans in triangle of Shah Dili – Pirallahi – Tava islands. This roaming depend from weather and feeding conditions. Generally speaking, this triangle has one wintering population of water birds.

The habitat of Mute Swan is big stagnant fresh or salted water reservoirs with overgrow of reed, where disturbance is absent. It is monogamous and has permanent pair. Female builds the nest in heart of overgrows of reed on heap of old plants. Where are 7-9 eggs in the nest usually. Egg laying beginning from end of April. Female sitting on eggs during nears 35 days, then together with male raises the nestling. The nestling can fly at 4 months age and live together with parents during no less than 1 year.

The Mute Swans comes to wintering places at December. During winter they occur on open water along coastal zone around the Shah Dili spit. Usually they keep by family groups, but some times, during seasons of wintering or migration, swans form the flocks. The birds, which have wintering in Azerbaijan, are from North Caspian breeding population.

Diet of Mute Swan is under water parts of plants. They feed on shallow water and take sprout, rhizome and root under the water by bill. Some times they takes small water animals. During wintering the main food for this species are algae. Storm weather and raise of water levels can deprive the swans of food. But usually birds do not go to better places and stay on wintering territory.

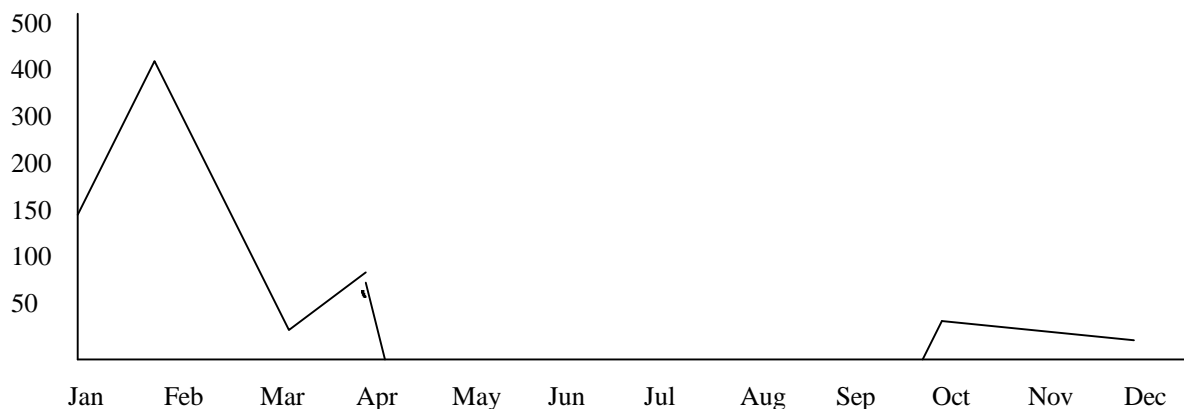


Table 6-3: Seasonal Fluctuation of Number of Cormorant on Shah Dili spit

Although, Mute Swan includes in Red Book of Azerbaijan the main threat for this species here is hunting. Absence of food in cold weather can be reason of mass mortality of individuals of this species. Besides, swans can perish in oil lakes and pools during migrations.

We count, that for conserve the population of this species it need to strong controls for hunting on this territory and to conduct the meets with hunters and local people for explanation importance these measures. We also count that in cold winters it need to gives some forage for holding these birds.

d. Red-Crested Pochard

Netta rufina Pall.

Category by SPEC (Species European Conservation Concern) – 3

Status – Declining, Criteria – Moderate decline

For Azerbaijan Red-Crested Pochard is wintering and breeding species. During winter it is found (with high numbers) along coastal zone of Caspian, in summer it is common or some times numerous bird on inside lakes of Azerbaijan. According D.A. Scott, P.M. Rose (1996), wintering population of this species (coastal zone of Azerbaijan) contains more than 10 % of West-central Asia/Southwest Asia flyway population (it is more than 20000 individuals).

During winter season it places on shallow water of sea around the Shah Dili spit. Usually it forms the big flocks. Wintering population of *Netta rufina* of Shah Dili – Tava fluctuated from 9000 to 12000 individuals. During breeding season it was not noted on this place, but Absheron Sanctuary is good habitat for nesting of this species and we count, that in suitable condition (absent of hunting and disturbance) Red-Crested Pochard can nesting on Shah Dili spit.

Pubescence of Red-Crested Pochard is coming at 2 years age. Often perform courtship rituals beginning at wintering places before migration. Usually they make nesting colony, but some times they can breed by separate pairs. During breeding season *Netta rufina* prefer lakes or big floods with deep overgrow of reed. Nests building occur in reed near the edge of water (on little capes or on hillock) at the center of lake. Materials for nests are leafs and stalk of reed. Egg laying beginning

from May. It have 7-10 eggs in nest. Female sitting on eggs about 28 days. The male keeps together with female, then males gather by big flocks for moulting.

Autumn migration of breeding population of red-Crested Pochard begins from September. Wintering birds beginning to come from October. This species is short-distance migrant. The birds, which have wintering along The Caspian Sea coast, had breeds in delta of Volga River or from Volga-Ural steppes. Spring migration beginning from March.

Diet mostly comprises waterplants; Chara, Ceratophyllum and Zoostera are preferred. Sometimes they take mollusks also (Hydrobira, Theodoxus).

The main threat for this species is degradation of their nesting habitat by drying. On territory of Shah Dili spit was found some suitable habitat for nesting of Red-Crested Pochard and we think, that this species can use the place for breeding if the disturbance and fluctuation of water level in lagoons will be absent.

e. Saker

Falco cherrug cherrug Gray

Category by SPEC (Species European Conservation Concern) – 3

Status – Endangered, Criteria – Large decline, <2500 pairs

Included in Red Book of Azerbaijan

It is wintering and migration species for Azerbaijan. Count of number of Saker was not conducted in Azerbaijan. It is very rare species and it is difficult to find this bird during their sojourn on territory of the sanctuary.

The Saker appears mainly in open, steppe-like habitat with low vegetation. Such habitat develops in areas with low precipitation and/or chalk soils, and typically the short vegetation is maintained by sheep-grazing. Breeding may occur also in areas where forests are interspersed with steppe intrusions.

The Saker is beginning to fly away from Azerbaijan to nesting sites at March. This subspecies of Saker build the nests on trees. Eggs laying beginning from the end of April. It has 3-5 eggs in the nest. The nestling is hatching from the end of May – beginning of June.

Autumn migration is from October. The breeding range of this subspecies extends from basin of Volga and South Ural to the east till the steppes of Kulundin and Minusin. Birds from these places flying to the wintering sites (in Lencoran and North Iran) across coastal zones of Azerbaijan. Some birds stay for wintering along littoral zones, but most numbers pass to south of Caspian. It need to say that wintering number of Saker in Lencoran (where many waterbirds have wintering also) rather high.

During breeding season the most part of diet of Saker is susliks (*Citellus citellus* and *C. suslicus*), and some times it takes birds. On wintering the main preys are water birds (Mallard, Pochard, Shoveler, Teal, waders and terns), but it also takes other species (Little Bustard, Kestrel, larks, thrushes, Starling, Rook, Magpie etc.).

The main threat for Saker in Europe is destroying of its breeding habitat. For wintering birds in Azerbaijan the threats are hunting without control and death on electric lines during migration.

f. Purple Gallinule.

Porphyrio porphyrio seistanicus Zar. et Haerms

Category by SPEC (Species European Conservation Concern) – 3

Status – Rare, Criteria – <10000 pairs

Included in Red Book of Azerbaijan

The range of this population includes Syria, Palestine, Mesopotamia, Iran and western coast of The Caspian Sea. This sub-species is sedentary for Azerbaijan, but some times (in cold winters) we can meet birds from northern part of population (delta of Volga River).

Last times numbers of Purple Gallinule have strong increased. Sedentary population of Azerbaijan was estimated as 130000 individuals (according date of count of State Ecology Comity from 1993), but most numbers of these birds occur in Kura delta, on Lencoran lowlands, on firth of Divichi and on inside water reservoirs of republic. The population of coastal zones is not big. On Absheron Sanctuary some separate pairs build nests.

Purple Gallinule nests in dense overgrow of reed. Usually they nesting by solitary pairs, but some times the pairs can place near from each other. Breeding beginning from April, when they organize big flocks and having courtship display. Then birds breaking up for separate pairs. Both parents build not big and not deep nest (about 30 sm. in diameters) in deep of reed, on hillocks and on submerged reed. The material for nests are stems and leafs of old reed. The nests are always good concealed in dense of plants above water level. Egg laying include 3-9 eggs (usually 3-5). During brooding (about 22-25 days) female is replace by male on nest. The juveniles are meeting in June. At the end of breeding season juveniles combine into the groups with males.

On Shah Dili spit the Purple Gallinule occur during all season of year in small number, with little increase in periods of spring and autumn migrations.

During all season this species occur in reed. It is diurnal bird. For feeding Purple Gallinule prefer places with alternation overgrow of reed and open shallow water. The main food is rhizomes, young green shoot and seeds of marsh plants and reed. Less mean have different water invertebrates and insects. Some times takes eggs and nestling of little birds and frogs.

Although, this species have high numbers now, it is very vulnerable bird. The main threat for *Porphyrio porphyrio* is cold winters. Mass mortality is noted during especially cold weather. It is reason of strong fluctuation of population size. After strong declining the numbers of Purple Gallinule is staying rare during some years, then it beginning to increase. This species also suffers from fluctuations of water level, especially during breeding season, when nests and nestling loss protection in case of drying of water reservoir and become the prays of predators (foxes, jackals and dogs) and people. Besides, this species is very believe to people and as rule permits to go up to itself on close distance. That is why the hunters are also big problem for this species.

g. Coot

Fulica atra atra L.

In Azerbaijan the Coot occurs on lakes, bays and rivers of lowlands, with overgrowth of plants and (in winter) water areas of most water reservoirs and all coastal zone. For Azerbaijan it is sedentary species, but their numbers have strong increasing in winter season in our country. The Coots are meeting during all season on territory of Absheron Sanctuary.

The size of wintering population of Coot on Shah Dili spit accounts in average about 8500 individuals. During spring and autumn migration numbers of this species have strong fluctuation (from several tens to several thousand), but numbers of autumn birds more high in comparison with spring numbers. Number of Coot in breeding season is low on Absheron Sanctuary.

During breeding season some pairs nest on this place. Coots prefer the water reservoir with dense vegetation in this period. The breeding begins from March-April. Pubescence of Coot is coming at 1-year age. They have permanent pair and place of nesting. Usually they nest by separate pairs, but some times (in suitable habitat) it possible to find a little colony. Before the nesting Coots have conjugal plays. The materials for nests are leaves and stalks of reed, rush or sedge. The nests conceal in dense of reed (near the edge of water or on the water) and have dais from nest to water. Egg laying is from the middle of April and contains 7-8 (till 12) eggs. Usually, male builds second nest for rests of itself after the end of egg laying. The nestling are meeting from May. Moulting is from the end of June.

Breeding population of Coots leaves the places of nesting from October – beginning of November. Mass migration of northern Coots is from November. These birds are from breeding population of Northeast Europe. Coots prefer water areas around Absheron Sanctuary, during migration and wintering seasons. Usually they are not passing across the Shah Dili spit, and fly along coastal zone of spit or above the sea in 1-km form the end of spit. Coots migrate at night usually, but some times the migration continues till 12 o'clock in the morning.

Coots have wintering on water areas around the Shah Dili spit. They form big flocks with high density in this period. Time of stable wintering is January and February. At this time birds have only short distance roaming, which depend from weather and food condition.

The main food of *Fulica atra* is green part of different water plants and their seeds. Some times they take water and other invertebrates, mollusks and little fish. Together with food Coot takes sand and fine pebble. Prevalence of definite type of food is depends from season of year and place of residence.

Although, Coot is one of numerous species in our country, number of this bird have some decreasing. So, number of wintering population of Kizil Agach Bay was 4.5 millions in 50th years, and now (according date of State Ecology Comity from 1993 year) it is about 70 000 individuals. The size of breeding population is also decreasing from the reason of human impact.

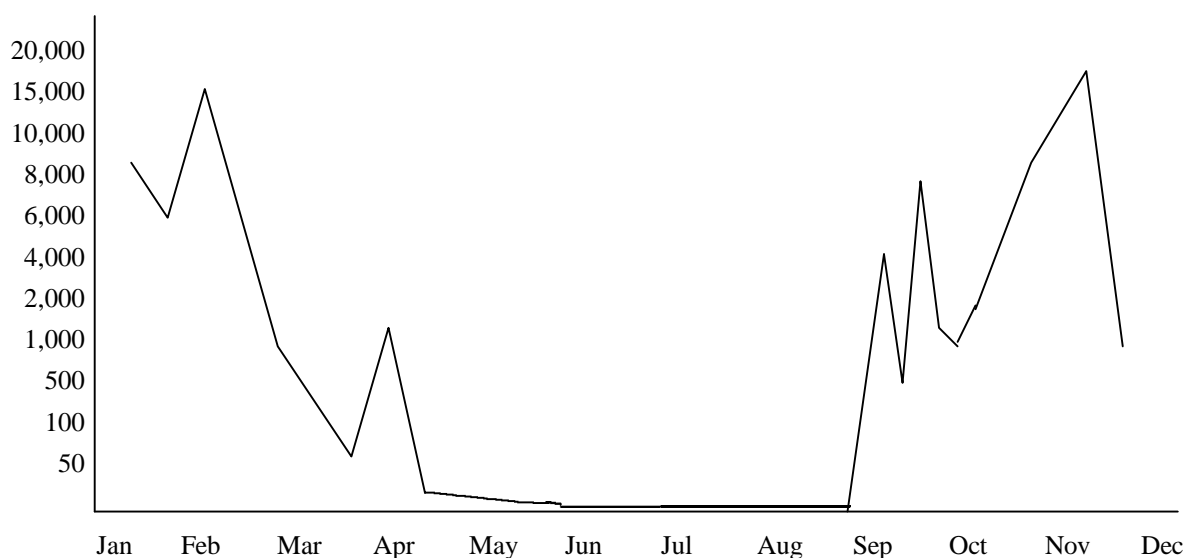


Table 6-4: Seasonal Fluctuation of Number of Coot on Shah Dili spit

h. Black-Winged Stilt

Himantopus himantopus himantopus L.

In Azerbaijan Black-Winged Stilt is found along all coastal zones of The Caspian Sea and almost at reservoirs of Kura lowland. It is breeding and migration species for our country, but it also has wintering in small numbers.

The habitats of Black-Winged Stilt are costs of lakes and floods with shallow brackish water. Habitat of breeding is the same as wintering. During breeding season some pairs of *Himantopus himantopus* nest on the territory of Absheron Sanctuary.

They are monogamous. Usually they form colonies (rather big in suitable habitat), some times with other species of birds. The nesting is beginning from May. Nest is little pit without pavement between shells and pebble and places on little sand spits, islands and shoals near the edge of the water. Egg laying include 3-4 eggs. The nestling are meeting from June. After the hatching nestling leaves the nest and go away to edge of water or to bushes. Nestling has independent feeding on the next day after hatching. In colony they are not aggressive. Both parents actively guard the nest. They flush before approaching of people, fly around above the head and yell loudly.

Autumn migration is from September; mass migration is in October. Local breeding population has short-distance migration to places of wintering on south coast of Azerbaijan and on Southern Caspian along coast of Iran. Some part of birds from northern population has migration across this territory to the same places as local. Everything else birds have wintering on the places of breeding. For the most part of range Black-Winged Stilt is sedentary species. They do not form the big flocks for migration (usually 5-15 individuals). They can not fly long time and have many stops along the pass way for feeding and rest. Spring migration is from April.

The main food of Black-Winged Stilt is water and other invertebrates and their grubs (beetles, grubs), mollusks and little lobsters. Some times it takes vegetative part of plants.

Although, Black-Winged Stilt is rare on territory of Shah Dili spit, in other places this species is common and measures of conserve is not necessary for these birds.

i. Herring Gull

Larus argentatus cachinnans Pall.

In Azerbaijan Herring Gull is found along all coastal zones of The Caspian Sea and almost on all inside reservoirs of republic.

The Herring Gull is sedentary species for Azerbaijan. On the Shah Dili spit and can be seen at all seasons. In summer it breeds on the territory of sanctuary. During winter season, it is found (in a few numbers) on water area around the spit. During migration season the flocks with different numbers pass above the territory. Some times the flocks fly by transit above the spit, and some times the birds sit down the water for rest and feeding. Aside from, Herring Gulls accompany flocks of other species of birds (grebes, ducks, coots, etc.) during their migration.

During winter and autumn-spring migration Herring Gull prefers water areas along coastal zone of the Absheron Sanctuary and uses the land for rest. According to dates of 1996 year, in breeding season this species nests on island Tuleniy, which places at the end of Shah Dili spit. Nesting colony of Herring Gull of Shah Dili spit contained 2000 – 3000 individuals. According new investigation we can say that this colony still has place. Investigation of population changes in Absheron Sanctuary was not conduct, but we have information about general situation with Herring Gulls on islands of Baku archipelago during last years. As an example we are going to show this trends on Gil Island. Colony of Gil island composed 5-7 thousands of birds. In May of 1996 year on this island were found 6300 Herring gulls, in June of same year (after fire) only 2120 adult and 150young, in summer of 1998 year – 2300, in 1999 year – 1500 and only about 1000 in this year (2000 year). The cause of destruction of this population is disturbance from the local people (collection of eggs, fire, supplying the cats and dogs etc.) and oil pollution in the sea.

Breeding is beginning from the end of March. The Herring Gull has nesting on ground on open places, without (or with poor) vegetation. During breeding season they form big colonies, some times with other species of birds. Pubescence of Herring Gulls is coming at 3 years age. Before the nesting they have intricate conjugal plays. The nest is pit with 2 stratum of spreading – vegetative and downy. Materials for 1st stratum are dry leaves and stalks of reed and different branches. Egg laying is from April. Usually, Herring Gull lay 2-3 eggs. Some times 2 females put the eggs in one nest, and then it can be till 6-7 eggs in one nest. Both parents sit on the nest during about 26 days. After the hatching old birds care for nestling during 1-1.5 month. The cannibalism was noted for Herring Gulls. After breeding they widespread along a coast of sea.

Although, Herring Gull is sedentary species for Azerbaijan, most numbers of birds from our breeding population leave places of nesting and flyaway to the south for wintering. Autumn migration is beginning form October-November. The main places of their wintering are India, Egypt, Black Sea and South Caspian. Little numbers of Herring Gulls stay at the places of breeding for wintering. Wintering birds is meeting

along coast of Caspian and in Baku, where they have feeding on dust-heap. Spring migration is from the end of January, mass is from February-March.

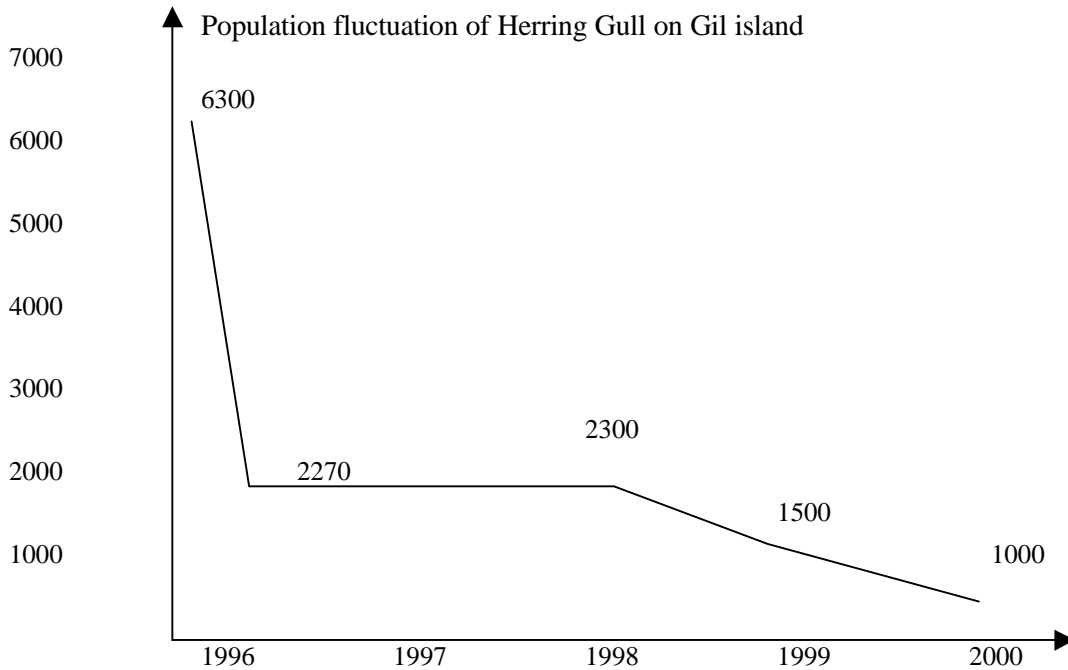


Table 6-5: Seasonal Fluctuation of Number of Herring Gull on Gil island

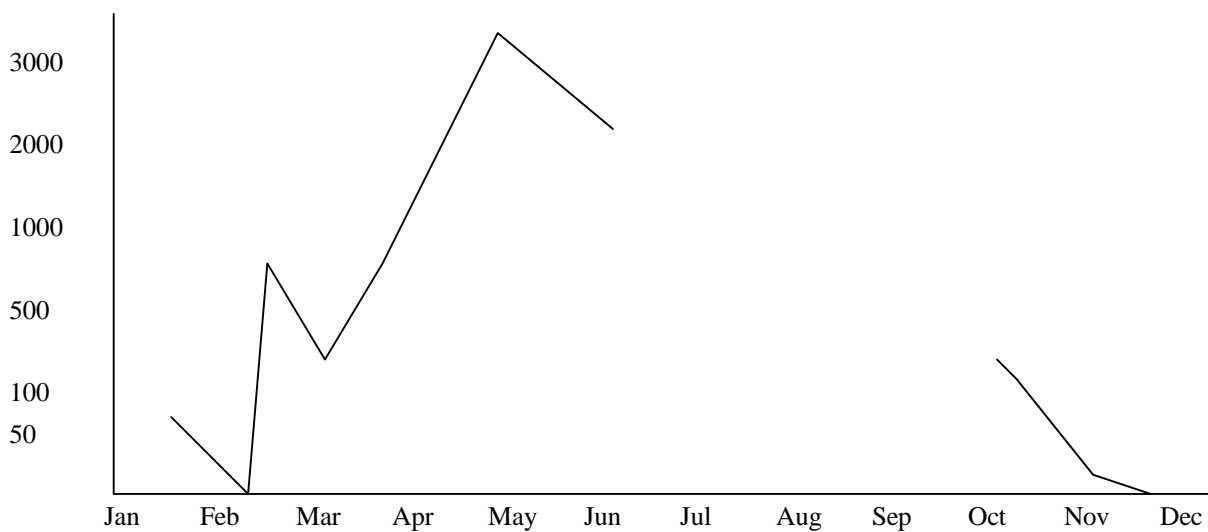


Table 6-6: Seasonal Fluctuation of Number of Herring Gull on Shah Dili spit

The Herring Gull is omnivorous bird. During breeding season main food of this species are sick or dead fishes (goby, sprats, herrings, vobla, pike perch and others), rodents, lizards, young or sick rabbits, different invertebrates, carrion etc. During migration this gulls often fly with flocks of other species of birds (grebes, ducks, coots etc.) and feed by feeble and sick individuals. Except it Herring gulls feed by different refuse during winter on dust-heaps.

j. Sandwich Tern

Sterna sandvicensis sandvicensis Lath.

Category by SPEC (Species European Conservation Concern) – 2

Status – Declining, Criteria – Moderate decline

In Azerbaijan Sandwich Tern is found along the coastal zone of The Caspian Sea and on islands. It is breeding and migratory species for our country. The Sandwich Terns have meet from April on Shah Dili spit. This species has breeding on this territory.

According to dates from the end of June 1996 year, we can suppose that nesting colony of Sandwich Tern of Shah Dili spit contained 2000 individuals. We also can say (according new investigation) that now this colony still has place, but usually this species changes nesting places very often (the reason is disturbance by people and predators). That is why we count that it need to contact new investigation (in summer) for getting a more precise definition about size of this colony.

The main habitat for this species (in all season) is coastal zones of sea. It keeps off coasts with bushy vegetation and prefers sand and shingle beaches. Sandwich Tern breeds only on islands in Azerbaijan. In Absheron Sanctuary they nest on Tulenyi Island. Nesting is colonial, frequently with other tern species and Herring Gull.

Pubescence of Sandwich Tern is coming at 1year age. Egg laying beginning from the end of May and contain 2-3 eggs. Bare patches of ground among vegetation use for nest-sites. The nest is just pit on ground, sometimes with little pavement. Both parents is brood the eggs during 22-23 days. After the hatching nestling combine in big flocks and keep together till the beginning of flying. High mortality of nestling is usual picture in colony of Sandwich Tern. After breeding they widespread along a coast of sea.

Autumn migration beginning from October, but some individuals stay at breeding sites till the end of November, especially in warm years. Breeding population from the Caspian Sea has wintering at Persian Gulf.

The main food for Sandwich Tern is different species of fish. Small surface-shoaling marine fish are taken in plunge-dives 5-10 m, they also take mollusks and sometimes different invertebrates and nestling of other species of birds.

According to dates of G.M. Tucker and M.F Heath (1994) populations of Sandwich Tern in most West European countries are stable or have little increasing now, and in Eastern Europe this species still have decreasing. So, besides, some nesting colonies of Sandwich tern have high numbers (like colony of Shah Dili spit (2000) or Garasu Island (more 5000 individuals) of Baku archipelago), the general numbers of this species is low. The reason is heightened sensibility of this species to disturbance from people and predators (especially from big gulls). We think, that for preservation this population it need to secure territory of sanctuary in breeding season from hunters and local people.

k. Ear shrew

Hemiechinus auritus brachyotis Satunin

On territory of Shah Dili spit it is sedentary species.

Information about number of *Hemiechinus auritus* is absent almost. It is typical kserophilic animal. It lives on sands, and appears in different associations (wormwood-halophytic, different grasses) on this territory. It keeps off wetlands. Some information about habitable of this species on Islands of Baku archipelago has places.

It prefers fissure between the rocks, dense bushes, and old burrow of tortoises, foxes and sandpipers for colony. Sometimes it makes burrow itself. It uses similar burrows and shelters in all habitats. We met this animal during a day in not deep burrows without bedding. Such common burrows the Ear Shrew uses for diurnal conceals, but for breeding it makes more compounds borrows.

All founded *Hemiechinus auritus* were single animals or female with whelps. It shows that they have not permanent family and combine for pairs only during period on heat. Coupling of *Hemiechinus auritus* is in May. This species have breeding one time per year. It has from 4 to 6 whelps. Newborn are little (mass is 5-10 g), helpless, blind, with closed ears, without fur and quills. Only female takes care about posterity. Pubescence of *Hemiechinus auritus* is coming at 230-240 days age. Life interval is 5-6 years.

The *Hemiechinus auritus* fall to long and deep hibernation. The hibernation beginning from early November and continues till the end of March – beginning of April. We found young near the Shah Dili spit at 03.11. 98, that shows this species goes to hibernation rather late. Time of hibernation is also depends from sex, age and fatness. Old individuals go to hibernation more early, than young do.

The time of activity of *Hemiechinus auritus* is twilight and night. Meetings with these animals were noted after the sunset right away. They coming back to diurnal conceal at 1.5-0.5 hours before the sunrise.

The diet of Ear Shrew is insects, lizards, snakes and rodents. Aside from, mollusks are important food for this species, especially in spring. Ants are the main species from insects.

Population of *Hemiechinus auritus* has declined during last times. This species is rare for Absheron peninsula now. Ear Shrew has soft quills, that is why this animal is vulnerable to predators. The main enemy for Ear Shrew is raptor birds, animals and dogs.

I. Brown Hare

Lepus europaeus Pallas

According the dates of Vereshagin N.K. (1942) Brown Hare prefers coastal zones, where rush, overgrowth of weeds, halophytes and camels bur have place. In comparison with nearby territories (Turkan, Zira) there are not so many hares occur on Shah Dili spit. It was found only two lairs of Brown Hare on 8 km. of route and was not found any hares. For lairs it chooses hills of dunes with bushes. This species keeps off wetlands. Date about numbers of Brown Hare on territory of Absheron Sanctuary is absent.

Brown Hare has not permanent dens which it can uses during long time. Burrow-entrances have place between bushes. Sometimes they dig the ground, make holes (height – 37-35 cm, width – 16-19 cm, depth – 2-10 cm.), and do not touch the

grass around entrance (it helps to do the burrows not so noticeable). They also use old lairs, which are place between hills on bare sand or under the bush.

The breeding of Brown Hare has place during all season of year, but (according Vereshagin N.K., 1942) mass breeding is from March to June. Usually they occur by separately individuals. The group of males can gather around one female during period of heat, later during all season of breeding they keep by pairs. The superfetation (when repeated fertilization of females takes place 1-5 days before the childbirth) is typical for this species. The pregnancy is continuing 44-46 days. According our dates the numbers of cubs is on average 2.5 cubs for one female on the territory of east Absheron. The leverets are born with open eyes and good fur. Female goes away after the feeding and does not approach to young hares during 5-6 days. The leverets beginning to feed on plants at 10-15 days age, but they also can continue to feed on milk of mother. From the beginning of November young hares do not differ from old animals. Pubescence of Brown Hare is from the spring. Life interval is about 12 years.

On territory of Shah Dili spit these animals are sedentary, but in other regions of our country they have local roaming during March-June (the reason is ploughing of the fields).

The main food of Brown Hare is growing wild cereals and more rarely - motley grass ephemeral. They also often feed on melons, watermelons, tomatoes etc.

The Brown Hare is twilight and nocturnal animal. They can meet during a day at the heat season. In summer they can go to the feeding a little later (about at 19⁰⁰) than in winter. In the morning, after the sunrise, the hares finished a feeding and lie on dens by separate individuals. It is very difficult to find the Brown Hare in lair because it has protective coloration.

The main enemies of Brown Hare are predators (jackals and foxes) and poachers (they shoot the hares from the cars at night). Degradation of habitat by swamping is also threat for this species. We think that protection territory of sanctuary from poachers and stabilised the number of predators can help to increase the population of this species.

m. Red-Tail Sanderling

Meriones lybicus

The Red-Tail Sanderling is most numerous species on the territory of Shah Dili spit. Burrows of sanderling were noted in all habitat of the spit except overgrows of reed near marshlands. Some burrow-entrances were found in 10 m from the sea. Grounds covered by wormwood, halophytes and motley grasses are the main habitat for sundering here. Big colonies were found on sand hills between patches of marshland. Only wetlands are free from burrows of rodents. Besides the underground waters are place nearly to surface of ground in Absheron Sanctuary, numbers of Red-Tail Sanderlings is more high here than at nearby territories (Turkan and Zira). The reason of it is virgin of lands and good forage reserve.

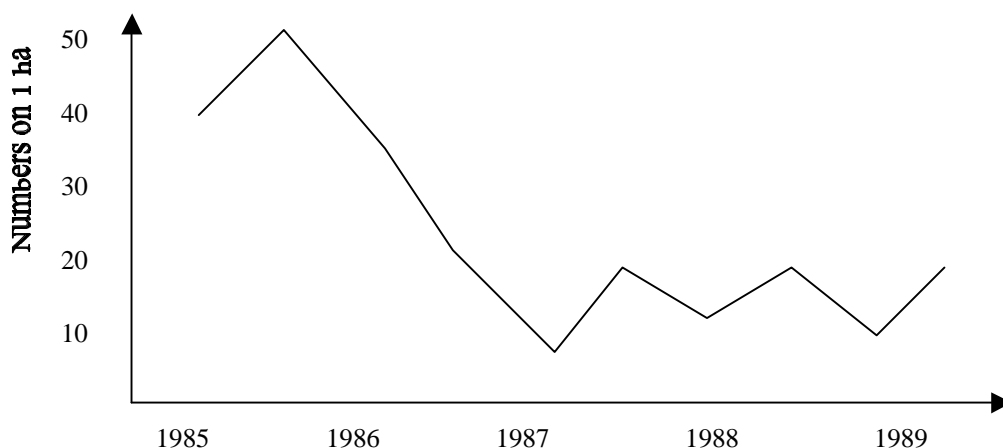


Table 6-7: Population Fluctuation of Red-Tail Sanderling on the Territory of East Absheron

Organisation of burrows of Red-Tail Sanderling on Absheron peninsula is studied rather well. The most simple arranged burrows are temporary or "common" burrows. They are either blind passage or through passage (in 45-55 cm under the ground). Except it, they have some other types of burrows: forage, wintering, brood and complex. The complex burrows are most difficult. They can occupy till 25 m² and have more ten burrow-entrances.

The Red-Tail Sanderling has breeding during all season of year. It has two peak of breeding: spring is more high (April-March) and autumn (September-October). According our date one female has form 2 to 10 embryos (in average 6.3). The pregnancy lasts about 22-25 days. Usually, the cubs are born without fur and blinds. The cubs become independent at 1-1.5 month age. Female can conceives right away after the childbirth.

This species has not migration. They have strong attachment for places of their colony. Widening of colony goes at the expense of young individuals.

The main food is shoots of wormwood, halophytes and different annual plants. The Red-Tail Sanderling prefers the ephemeral during spring and autumn seasons. In summer they prefer the seeds.

They live by colonies of different size. Family groups can include many individuals, but sometimes they can break up after the leaving by young individuals.

The Red-Tail Sanderling is predominantly twilight and nocturnal animal. During summer, when temperature is high they have activity at twilight and night. In other season they are available during all day.

n. Ordinary Fox

Vulpes vulpes L.

We found excrements and traces of Ordinary Fox on Shah Dili spit very often. But only 2 burrow of this species were found here. It point that foxes have feeding here during all season of year, and the little numbers of burrows can be explain by

closeness of underground water and high numbers of jackals (the jackals are big threat for young foxes). We noted that in winter the foxes occur here in more big number. The reason of it is good forage reserves – high numbers of rodents and wintering birds. During summer foxes are more rare in Absheron Sanctuary.

The Ordinary Fox is cosmopolitan species and is found everywhere, except field of marshlands. However, in non-breeding season it often visits these habitats. The burrow usually places on knobbly place. Sometimes they make burrows on slope of hills. Burrows can be temporary and permanent. Depth of underground labyrinth of temporary burrow can be 50-250 cm and it can have 1 or 2 burrow-entrances. Permanent burrow usually has 2-3 lateral entrances and nesting camera. The underground labyrinth of these burrows usually has 2-3 corridors with diameters 25-30 cm. Strong fluctuation of temperature is absent in depth of this burrow.

The coupling is in January. During this season foxes often combine in groups and make "foxes wedding". One female is at the head of wedding, and group of males following she. After the coupling foxes dividing on pairs. Male and female make burrow together. The cubs are born with downy fur, but blind (during 15-19 days) and have weight about 100-150 g. Both parents care for brood. Young foxes beginning independent at 3-month age. From September-October young foxes look as old individuals and have nomadic life.

The Ordinary Fox have attachment to burrow and to places of their habitable. They have permanent breeding burrows, if the disturbance is absent. Foxes also have permanent hunting area.

The main food of Ordinary Fox is rodents (red-tail sanderling and jerboas) and birds during winter. During summer they also take lizards, young shrews, tortoises different invertebrates (in general – locusts). The most percent of food is rodents and invertebrates. Except it Ordinary Fox often take carrion (for ex. fishes which were ejected by fishers) and plants. Foxes can take domestic birds from nearby settlements, if the food is not enough.

The Ordinary Fox is primary twilight and nocturnal animal. We noted meetings with foxes at evening, night and at early morning. During summer and autumn hunting of foxes beginning after the sunset and continuing during all night. If the fox have found many foods, they have rest during night and continuing the hunting at the morning. During one night Ordinary Fox can walk till 30 – 40 km. Sometimes it possible to meet this species during a day, especially in summer when they have broods need to continue the hunt during a day.

The Ordinary Fox is useful animal, because it destroys many rodents (which can be carrier of plague). But sometimes foxes can be of damage by hunting on domestic birds, hares and rare species of wild birds. That is why we count that on the territory of Absheron Sanctuary it need to conduct some measures for stabilised their numbers.

o. Caspian Seal

Phoca caspica Gmelin

This is endemic species of The Caspian Sea. It was included in Book of Gines records as a least seal of the great oceans. Weight of old individuals during period of most fatness is about 50 – 60 kg, maximum – 100 kg. Corpses of these animals can be found during all season of year around coastal zone of Shah Dili spit. In October of

2000 year 4 corpses of seal were found on route of 8 km, and on Tuleniy Island were found 18 dead individuals. We noted both old and new corpses.

The seal-rookery of Caspian Seal with about 200 individuals was found on south-west end of Tuleniy Island. The seals occur on this island during all seasons of year, but the most numbers have place at April-May and September-October, when spring and autumn migration have place. N.K. Vereshagin wrote (1938): "According to dates of hunters and fishers, Caspian Seal occur around of Absheron peninsula during all seasons. Quite possible, (in defiance of information of Dinnik N.A. and Satunin K.A.) that sometimes this species have breeding here". Now fishers also talk about all-the-year-round occurring of seals on this territory, but this question is open till this time. We have some old information about numbers of seals which were shoot on islands and spits of Baku archipelago (included Shah Dili spit):

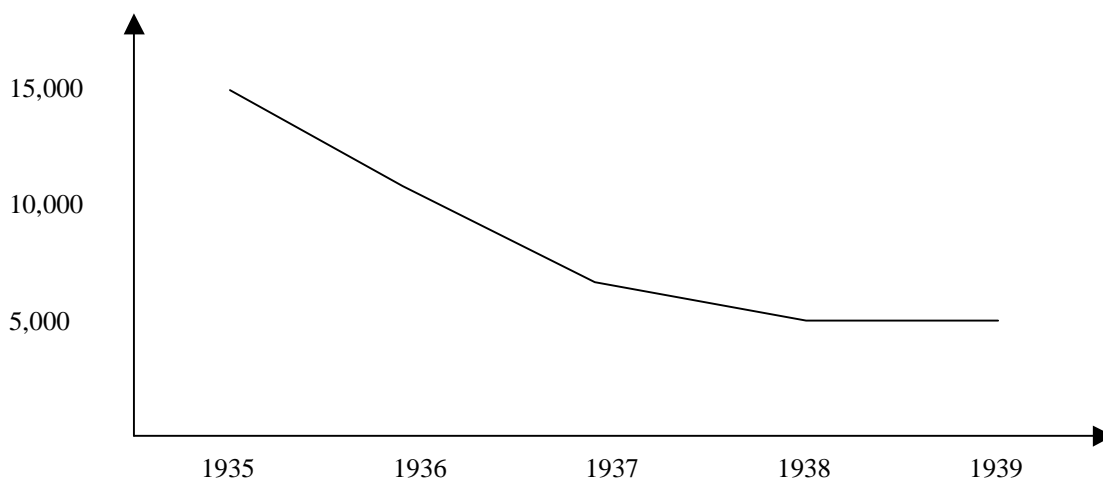


Figure 6-12: Number of Caspian Seals

The Caspian Seal is monopopulation species. The number of this population has steadily decreasing – at the beginning of century it was count about 1.5 millions of individuals, and present-day population estimate as 400-420 thousands individuals.

The main habitats of Caspian Seal are bare islands and spits. They prefer open places without vegetation. On territory of Absheron Sanctuary it has seal-rookery on the south-west end of Tuleniy Island.

The breeding is on the ices of North Caspian. 90 % of population has place here there in this period. Period of whelp (procreation and lactation) continue about 1 month – from the end of January to beginning of March. Females and seal-calf form separate groups from groups of males, barren females and immature seals. The seal-calf is beginning independent life from March. The different groups are mixing and the coupling is beginning at this month. Time of pregnancy is 11 months. Female has only 1 seal-calf. The height of whitecoat is 70-75 cm, and weight is 3-4 kg. Moulting is beginning at 10-15 days age, and into 3-4 weeks the moulting is finished. The pubescence of males of Caspian Seal is coming at 8-9 years age, and of female at 7years. Life interval is about 50 years.

The main food of seals is fish: sprats, *Atherina mochon* and goby. The year ration of population of Caspian Seal include about 297.7 thousands of ichthyomass.

They have spring and autumn migrations. During spring they pass from North Caspian to South and Middle Caspian, and in autumn they coming back to the breeding places. But some individuals stay on studding territory throughout the year. The composition of residual groups is not known.


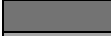

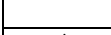


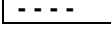
For protection of Caspian Seal and increasing their population we count that it need to conduct the next measures:

- To protect this animals from disturbance of fishers, hunters and local people.
- Do not use the land of seal-rookery
- To prohibit fishing by explosives and fishing net around the spit and island
- To study the groups of seals, which occur on this territory throughout the year.

Table 6-8: Season Fluctuation of Fauna on Shah Dili Spit

Name of species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.Cormorant, <i>Phalacrocorax carbo</i>		//	////// ////	//////// ////					////// ////	//////// ////	//////// ////	////
2.Purple Heron, <i>Ardea purpurea</i>			////// ////	//////// ////					////// ////	//////// ////		
3.Mute Swan, <i>Cygnus olor</i>				//////// ////						//////// ////	//////// ////	
4.Red Crested Pochard, <i>Netta rufina</i>			////// ////	//////// ////					////// ////	//////// ////	//////// ////	
5.Saker, <i>Falco cherrug</i>			////// ////							//////// ////	//////// ////	
6.Purple Gallinule, <i>Porphyrio porphyrio</i>			////// ////	//////// ////	//////// ////				////// ////	//////// ////	//////// ////	
7.Coot, <i>Fulica atra</i>			////// ////						////// ////	//////// ////	//////// ////	//////// ////
8.Black-Winged Stilt, <i>Himantopus h.</i>			////// ////	//////// ////					////// ////	//////// ////	//////// ////	//////// ////
9. Herring Gull, <i>Larus argentatus</i>			////// ////						////// ////	//////// ////	//////// ////	//////// ////
10.Sandwich Tern, <i>Sterna sandvicensis</i>				/					////// ////	//////// ////	//////// ////	
11.Ear Shrew, <i>Hemiechinus auritus</i>	*	*										*
12.Brown Hare, <i>Lepus europaeus</i>	---- --	---- --	---- --	---- --	---- --	---- --	---- --	---- --	---- --	---- --	---- --	---- --
13.Red-Tail Sanderling, <i>Meriones lybicus</i>												
14.Ordinary Fox, <i>Vulpes vulpes</i>				---- ---	---- --							
15.Caspian Seal, <i>Phoca caspica</i>												

Legend:

	High number
	Usual
	Rare
	Not found
	In hibernation
	Fluctuation in numbers
	Unknown

Chapter 7

7 Scope of Work and Minutes of Meetings

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SCOPE OF WORK

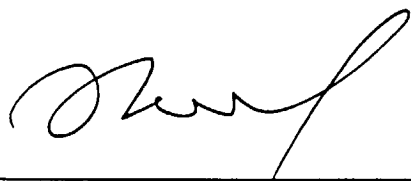
FOR

*THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIDJAN REPUBLIC*

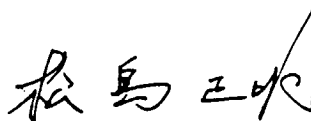
AGREED UPON BETWEEN

STATE COMMITTEE FOR ECOLOGY AND CONTROL FOR NATURE USE,
BAKU COMMITTEE FOR ECOLOGY AND CONTROL FOR NATURE USE,
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

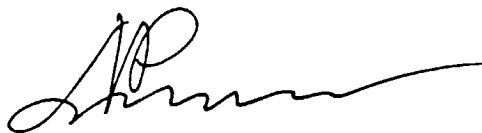
Baku, August 20, 1999



Mr. Ali Hasanov
Vice Prime Minister, Chairman
State Committee for Ecology and Control
for Nature Use



Mr. Masaaki MATSUSHIMA
Leader of the Preparatory Study Team
The Japan International Cooperation Agency



Mr. Mamed Akhmedov
Chairman
Baku Committee for Ecology and Control
for Nature Use

I . INTRODUCTION

In response to the request of the Government of Azerbaijan Republic (hereinafter referred to as "the Government of Azerbaijan"), the Government of Japan decided to conduct The Master Plan Study on Integrated Environmental Management in Baku City in Azerbaijan Republic (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Azerbaijan.

The present document sets forth the scope of work for the Study.

II . OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. To develop a master plan for Baku City area, which includes directions of environmental management measures including the institutional system for the Baku Committee for Ecology and control for nature use (hereinafter referred to as "BCE"), identification of environmentally degraded areas, and appropriate measures for actions required, .
2. To develop basic ideas to solve serious environmental problems by exploring possible measures, and strengthening an environmental monitoring system, and
3. To pursue technology transfer on developing the master plan by means of joint work between the Japanese Study Team and the counterpart personnel .

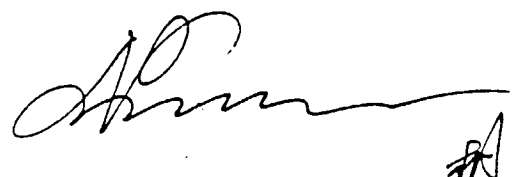
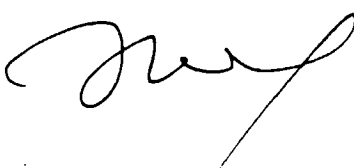
III . STUDY AREA

The Study shall cover the area under control by BCE.

IV . SCOPE OF THE STUDY

Major Components of the Study are issues as follows:

1. Establishment of environment oriented database for land use planning
2. Development of basic management plan for industrial and domestic wastes
3. Development of environmental monitoring system and capacity enhancement of BCE's laboratory
4. Institutional strengthening and human resources development for BCE



Phase I : Collection and review of related data and information

1. National policy for social and economic development
 - (1) National Economic and / or Social Development Plan
 - (2) National Industrial Development Plan
2. Policy for social and economic development in Baku City
 - (1) Baku City Planning
 - (2) Land Use Plan for Baku City Area
 - (3) Economic and / or Social Development Plan for Baku City Area
 - (4) Public Infrastructure Development Plan for Baku City Area
 - (5) Environmental Programs for Baku City Area
3. Identification of Environmental problems
 - (1) Reviewing environmental study reports made by the research institutes
 - (2) Field reconnaissance and exploring on environmental problems
 - (3) Study on present and past industrial activities through information on kinds of industries, production process, raw materials, energy sources for plants, goods and their volume, wastes generated, and others
4. Institutional and legal framework for environmental management
 - (1) Reviewing the legal framework, i.e. related environmental laws, regulations, and standards enforced in Azerbaijan
 - (2) Responsibility of the State Committee for Ecology and control for nature use and BCE, and coordination mechanism for environmental management among authorities concerned

Phase II : Supplementary Environmental Study and Estimation of Future Development Scenario

1. Supplementary sampling and analysis of air, water, polluted soil, and waste
2. Development of pollution map
3. Preparation of Geographic Information System (GIS) and database
4. Estimation of a future development scenario of the study area, based on the existing development plans / programs
5. Forecast of deterioration of future environmental conditions (air, water, polluted soil, and waste)

Phase III : Formulation of Master Plan for Environmental Management

1. Establishment of short-, mid- and long-term conservation goals
2. Detailed study for main components as follows:
 - (1) Establishment of environment oriented database for land use planning
 - (2) Development of basic management plan for industrial and domestic wastes
 - (3) Development of environmental monitoring system and capacity enhancement of BCE's laboratory
 - (4) Institutional strengthening and human resources development for BCE
3. Cost estimation of main components
4. Study on investment plan and financial analysis
5. Formulation of implementation schedule
6. Evaluation of master plan and selection of priority projects



Phase IV : Formulation of implementation program on priority projects

1. Formulation of implementation program
2. Evaluation of the projects

V. SCHEDULE OF THE STUDY

The study will be carried out in accordance with the tentative schedule as attached in the Annex I. The schedule is tentative and subject to be modified when both sides agree upon any necessity that may arise during the course of the Study.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Azerbaijan:

1. Inception Report:

Thirty (30) copies at the commencement of the study in Azerbaijan. This report will describe the Study schedule, methodology and Study Team members assignment as well as the outline of the field survey.

2. Progress Report (1):

Thirty (30) copies at the end of first field survey.

3. Interim Report:

Thirty (30) copies at the end of second field survey..

4. Progress Report (2):

Thirty (30) copies at the end of third field survey..

5. Draft Final Report :

Thirty (30) copies of Draft Final Report at the fourth field survey in Azerbaijan. The Azerbaijan side shall submit their comments within one (1) month after the receipt of the Draft Final Report.

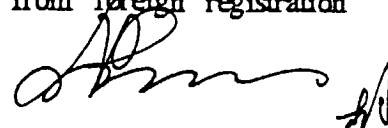
6. Final Report:

Sixty (60) copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report.

VII. UNDERTAKINGS OF THE GOVERNMENT OF AZERBAIDJAN

1. To facilitate the smooth conduct of the Study, the Government of Azerbaijan will take the following necessary measures:

- (1) to secure the safety of the Japanese Study team (hereinafter referred to as "the Team").
- (2) to permit the members of the Team to enter, leave and sojourn in Azerbaijan for the duration of their assignment therein, and exempt them from foreign registration



requirements and consular fees.

- (3) to exempt the members of the Team from taxes, duties, fees and any other charges on equipment, vehicles, machinery and other materials brought into and out of Azerbaijan for the conduct of the Study.
 - (4) to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study.
 - (5) to provide necessary facilities to the Team for the remittances as well as the utilization of the funds introduced into Azerbaijan from Japan in connection with the implementation of the Study.
 - (6) to secure permission for the Team to enter into private properties or restricted areas for the implementation of the Study.
 - (7) to secure permission for the Team to take all data and documents including photographs and maps related to the Study out of Azerbaijan to Japan.
 - (8) to provide medical services as needed. It's expenses shall be chargeable to the members of the Team.
2. The Government of Azerbaijan shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Team.
 3. Baku Committee for Ecology and control for nature use shall act as a counterpart agency to the Japanese Study Team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study. Close cooperation with the Executive Power of Baku City may be required.
 4. Baku Committee for Ecology and control for nature use shall, at its own expense, provide the Team with the following, in cooperation with other organizations concerned:
 - (1) Available data and information related to the Study,
 - (2) Counterpart personnel and supporting staff,
 - (3) Necessary number of vehicles with drivers for the Team
 - (4) Suitable office space with necessary equipment in Baku, and
 - (5) Credentials or identification cards to the member of the Team.

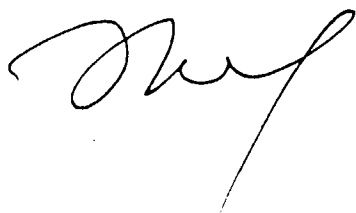
VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, the Team to Azerbaijan,
2. to pursue technology transfer to counterparts personnel in the course of the Study.

IX. CONSULTATION

JICA and Baku Committee for Ecology and control for nature use will consult with each other in respect of any matter that may arise from or in connection with the Study.



(Annex I)

The Master Plan Study
on Integrated Environmental Management
in Baku City
in Azerbaijan Republic

Tentative Schedule

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
DESCRIPTION																			
PHASE		Phase I					Phase II					Phase III				Phase IV			
WORK IN AZERBAIDJAN		■				■		■				■				■			
WORK IN JAPAN	□			□					□						□				□
REPORT PRESENTATION	▲ IC/R		▲ P/R (1)						▲ IT/R					▲ P/R (2)		▲ DF/R			▲ F/R

NOTE

- IC/R : Inception Report
- P/R (1) : Progress Report (1)
- IT/R : Interim Report
- P/R (2) : Progress Report (2)
- DF/R : Draft Final Report
- F/R : Final Report

MINUTE OF MEETINGS

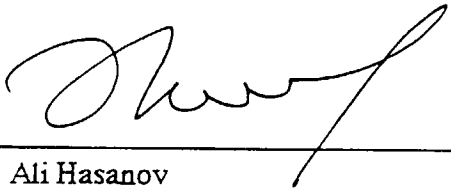
FOR

*THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIDJAN REPUBLIC*

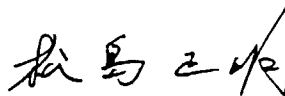
AGREED UPON BETWEEN

STATE COMMITTEE FOR ECOLOGY AND CONTROL FOR NATURE USE,
BAKU COMMITTEE FOR ECOLOGY AND CONTROL FOR NATURE USE,
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Baku, August 20, 1999



Mr. Ali Hasanov
Vice Prime Minister, Chairman
State Committee for Ecology and Control
for Nature Use



Mr. Masaaki MATSUSHIMA
Leader of the Preparatory Study Team
The Japan International Cooperation Agency



Mr. Mamed Akhmedov
Chairman
Baku Committee for Ecology and Control
for Nature Use

1. Introduction

In response to the request of the Government of Azerbaijan Republic (hereinafter referred to as "the Government of Azerbaijan"), the Preparatory Study Team (hereinafter referred to as "the Team") of Japan International Cooperation Agency (hereinafter referred to as "JICA") visited Azerbaijan from August 11 to August 21, 1999 to discuss the Scope of Work (hereinafter referred to as "S/W") for the Master Plan Study on Integrated Environmental Management in Baku City in Azerbaijan Republic (hereinafter referred to as "the Study").

The Team carried out field surveys of the study area and held a series of discussions with the authorities concerned of the State Committee for Ecology and control for nature use (hereinafter referred to as "SCE"), the Baku Committee for Ecology and control for nature use (hereinafter referred to as "BCE"), and other related organizations.

The list of attendance is attached in the Appendix 1.

The Minute of Meetings have summarized main points of the discussions made in the course of the preparation of S/W for the purpose of better understanding for S/W.

2. Study Area

Both side agreed on the study area as described in S/W (see in Annex 2). However in-depth study for each components will be discussed and focused taking into consideration urgency and necessity from environmental management point of view in the course of the study.

3. Target Year

Both side agreed that the target year for the master plan should be set tentatively up to year 2010. However it may be modified according to the the progress of other development projects and activities related to environmental management.

4. Geographic Information System (GIS) and database

Target area for GIS system is initially same as in the above article 2. However it was agreed that main target area shall be limited in central Baku, and other priority area will be discussed and made based on the request from BCE.

Items and depth of the database must be based on and limited to the existing environmental data available to the team.



5. Coordination with Other Ministries and Organizations

The team requested BCE to coordinate with SCE regarding smooth implementation of the study, and the SCE and BCE to coordinate with other ministries and organizations concerned to get maximum cooperation from those organizations as well as to avoid any duplicated works. The team also suggested to establish a Steering Committee and Working Group(s) to achieve the above mentioned coordination. The SCE and BCE agreed to this point and promised to set up the committee and to invite representatives from relevant ministries and organizations shown in appendix 3.

6. Coordination with International Organizations

The team requested the SCE and BCE to coordinate with the World Bank and other international donor agencies and development organizations to exchange view and information as well as to avoid any duplicated works, and the SCE and BCE agreed to this point.

7. UNDERTAKINGS OF GOVERNMENT OF AZERBAIDJAN

- (1) It was confirmed that the SCE and BCE would assign the appropriate number of counterpart personnel to the JICA study team. The specialized fields of the study team are as follows.
 - a. Team leader/environmental management
 - b. Environmental monitoring
 - c. Solid waste management
 - d. Air pollution
 - e. Water pollution / hydrology
 - f. Soil pollution
 - g. Urban planning
 - h. Computerized database
 - i. Economist
- (2) The team requested that the Azerbaijan side would provide suitable office space with necessary equipment, and sufficient numbers of vehicles with drivers for the Study. The Azerbaijan side accepted to provide suitable office space with necessary equipment (desk, chairs, filing cabinets, and other appropriate office equipment), electricity and telephones, but the Azerbaijan side expressed concern that, due to budgetary and administrative constraint, it would be difficult to provide appropriate number of vehicles with drivers and other necessary office equipments such as computer. The Study Team recognized the situation and agreed to convey the message to JICA headquarters for positive consideration.

8. Counterpart Training

The SCE and BCE requested that JICA conduct counterpart training in Japan, in addition to on-the-job-training, for the purpose of smooth technology transfer during the Study. The team agreed to convey the request to JICA H.Q. for consideration.



9. Technology Transfer Seminar

The SCE and BCE requested that JICA hold a seminar as a part of technology transfer in the course of the study. The team recognized the necessity and promised to convey the request to JICA H.Q. for consideration.

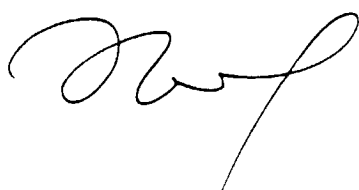
10. Equipment necessary for the study

- (1) The SCE and BCE requested the study team to bring the basic equipment for environmental analysis necessary for the study. The team agreed to convey the request to JICA H.Q. for consideration. Procurement of equipment will be finalized by JICA based on the absolute necessity of the study avoiding any duplication between existing facility at BCE lab. and those to be provided by other donors.
- (2) The SCE and BCE agreed to bare the cost of custom handling charge (0.15%) for the equipment.

11. Report

As for the study reports, the SCE and BCE agreed to make them open to the public in order to achieve maximum use of the study results.

The SCE and BCE requested that JICA to provide executive summaries for each reports and final report as a reference in Russian for better understanding of the study result. The team recognized this necessity and promised to convey this request to JICA H.Q. for consideration.

LIST OF ATTENDANCE

(Azerbaijan side)

Ministries of Foreign Affairs
Mr. Israfil Akhmedov

First Secretary,
International Economic Relations Department

Department of Foreign Investment and Technical Assistance, Cabinet of Ministers
Dr. Nail S. Fataliyev

Deputy Head of Division

State Committee of Ecology and Control for Nature Use

Mr. Fuad Akhund-Zade

Head of Department for Ecology Project

Mr. Ramiz Tagiev

Head of Department for National Park

Mr. Jafarov Ogtay

Head of Department for Science and Natural Resources

Dr. Rauf B. Muradov

Director of Project Implementation Unit,
Urgent Environmental Investment Project

Prof. Aslan N. Shabverdiyev

Coordinator of the Ozone Center

State Committee of Hydrometeorology

Mr. Musayev Zulfugar Fatulla

Chairman

Mr. Kezimov Seifulla

Vice Chairman

Mr. Mansimov Mirzakhan

Vice Chairman

Mr. Hajiv Giling Abdul

Head of Environmental Pollution Monitoring Serves

Baku Committee of Ecology and Control for Nature Use

Mr. Mamed Akhmedov

Chairman

Mr. Hasanov Tofik

Project Manager,

Mr. Abdulhasanov Mutalim

Director, Water Resources Conservation Department

Executive Power of Baku City

Mr. Eldaniz Lahidjev

First Deputy Mayor

Mr. Adalat Azioev

Deputy Mayor

Mr. Agamelik Melikov

Deputy Mayor

Mr. Isa Qarashov

Vice-chief of International Department

Ms. Nurana Mardanova

Chief of Press, Mayor's office

Mr. M. Ataev

Chief of Protocol, Mayor's office

Azerbaijan National Aerospace Agency

Mr. Rustam B. Rustamov

First Deputy Director-General

Mr. Haji-Zadeh Fuad

Director of Institute of Ecology

Mr. Aliev Niyazi

Manager of Institute of Ecology

Mr. Ahmedov Shahim

Chef of Department

Mr. Zejrualon A.K.

Chef of Department

Mr. Ismatova H.R.

Chef of Department

Mr. Aldullaser H.A.

Chef of Department

Mr. Aliev N. S.

Chef of Department

Mr. Aliyev Hamid

Chef of Department

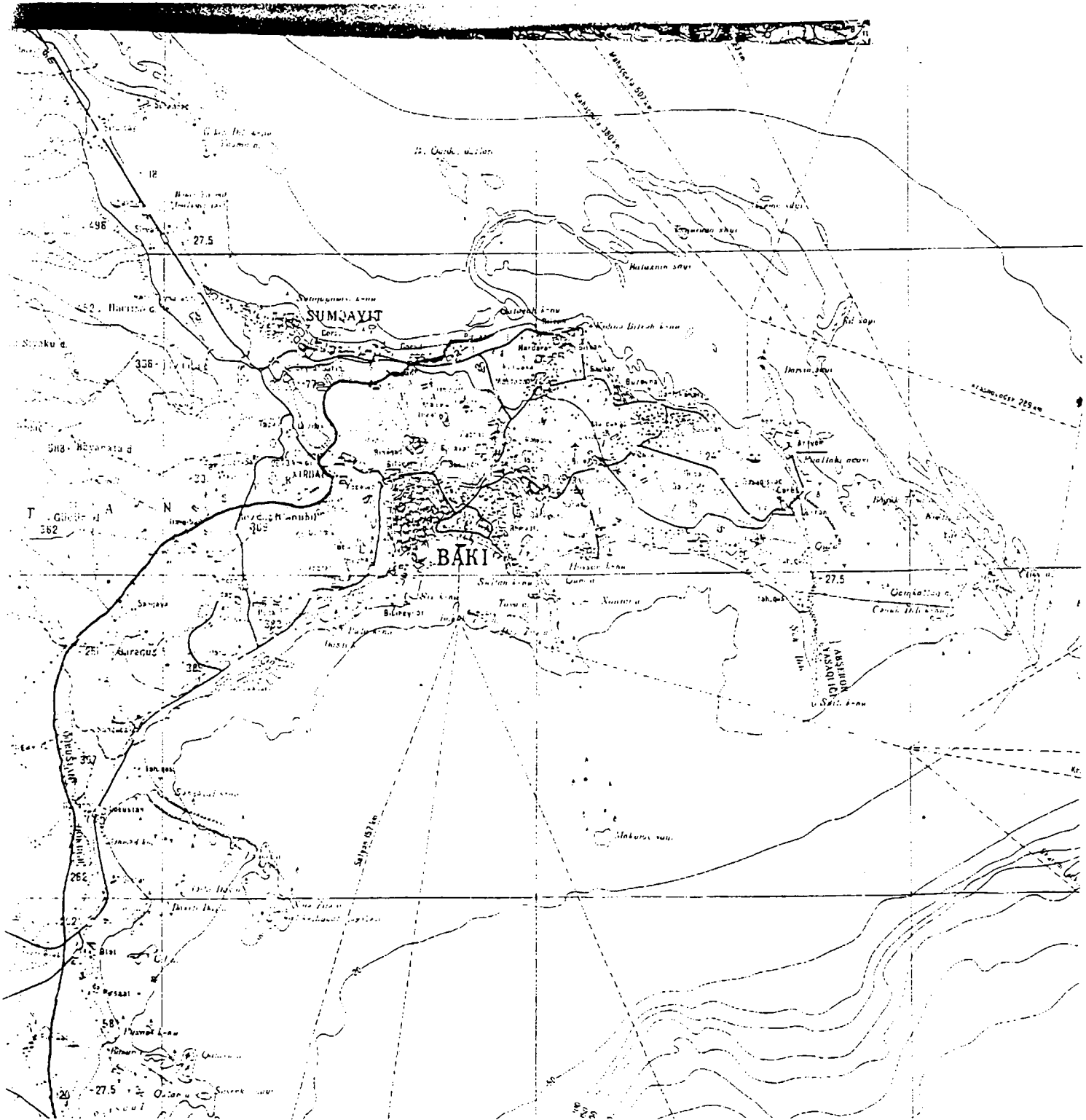
(Japanese side)

Preparatory Study Team of Japan International Cooperation Agency (JICA)

Mr. Masaaki Matsushima	Team Leader
Mr. Kentaro Inoue	Environmental Management Planning
Mr. Takayuki Nakagawa	Study Planing
Mr. Fumio Fukuda	Urban Environmental Management
Mr. Akisuke Kobayashi	Environmental Monitoring
Mr. Munehiro Fukuda	Polluted Soil Recovery
Ms. Kumiko Ikawa	Interpreter



ANNEX-I



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The tentative function and composition of the Steering Committee

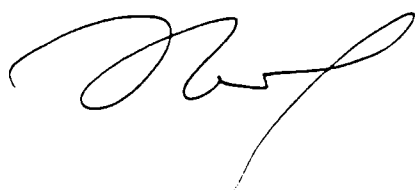
I. Function

The study on Master Plan Study on Integrated Environmental Management of Baku city in Azerbaijan Republic (hereinafter to as "the Study") will cover a wide range of subjects handled by other organizations and agencies. Therefore the SCE and BCE will establish a Steering Committee and Working Group(s) which consist of other organizations and agencies for overall management of the Study.

⁷ II. Composition

1. Cabinet of Ministers
2. State committee on Ecology and Control for Nature Use
3. State Committee of Hydrometeorology
4. Baku committee on Ecology and Control for Nature Use
5. Ministry of Public Health
6. State committee for operational safety control and monitoring in industry and mining
7. Executive Power of Baku city
8. State committee for Melioration and Water Economy
9. Ministry of Economy
10. Ministry of Finance
11. SOCAR
12. Ministry of Transport
13. Others

The above noted organization and agencies would be confirmed at the commencement of the Study.



**MINUTES OF MEETINGS
ON
THE INCEPTION REPORT
OF
THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIJAN REPUBLIC**

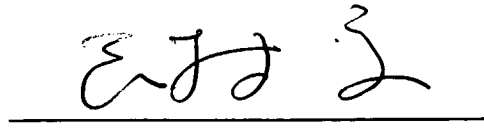
AGREED UPON BETWEEN

**STATE COMMITTEE FOR ECOLOGY AND CONTROL FOR NATURE USE
BAKU COMMITTEE FOR ECOLOGY AND CONTROL FOR NATURE USE
AND
JICA STUDY TEAM**

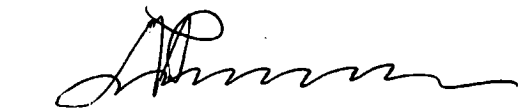
Baku, February 18th, 2000



Mr. Faik Gajiev
Director General
State Committee for Ecology and Control
for Nature Use



Mr. Susumu Shimura
Leader of JICA Study Team



Mr. Mamed Akhmedov
Chairman
Baku Committee for Ecology and Control
for Nature Use

Witnessed by



Mr. Masahiro Ota
Chairman
JICA Advisory Committee

**MINUTES OF MEETING ON THE INCEPTION REPORT OF
THE MASTER PLAN STUDY ON INTEGRATED ENVIRONMENTAL
MANAGEMENT IN BAKU CITY IN AZERBAIJAN REPUBLIC**

1. INTRODUCTION

- 1.1 The Study Team has submitted thirty (30) copies of the Inception Report both in English and Russian respectively to the Government of Azerbaijan. Consequently a series of meetings were held from February 11th to 18th in Baku in Azerbaijan to discuss the report submitted. A list of officials attending in the above meetings is given in the Appendix 1.

2. ISSUES AND DECISIONS

- 2.1 Various issues were discussed and clarifications on the Inception Report (IC/R) were made. Subsequently appropriate consensus on the major items of the IC/R including the objectives, the major study components, the work schedule and others was reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

2.2 GIS Facility

The study team informed JICA would provide GIS facility which might include a server computer, two client computers, GIS software, network accessories, basic digital map(s) and others considering the minimum requirement for the system. The network accessories refer to devices to establish network between the server computer and the client computers installed on the same floor.

The study team requested the Azerbaijan side to decide a place for the installation of the facility.

The Azerbaijan side replied that the facility should be installed in the room of the study team to be set up in the BCE (Baku Committee for Ecology and Control for Nature Use) office.

2.3 Weekly Meetings between Study Team and Counterparts

For smooth implementation of the study and technology transfer to the counterpart (C/P) personnel, the study team proposed weekly meetings between the counterpart and the study team be held to discuss weekly work progress, agendas for the following week, responsibilities of the C/P and the study team, issues to be resolved by the counterpart, and the other matters encountered.

The Azerbaijan side replied that the meetings should be held at 11:00 on every Monday morning at the office of BCE.



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2.4 Members of Steering Committee and Counterpart Team

The Azerbaijan side stated that they organized a steering committee for the decision making of the study and assigned a counterpart team for smooth implementation of the study. The steering committee consists of the representatives from relevant ministries and organizations as follows:

1. Ministry of Public Health
2. Baku City, State Executive Power
3. Azerbaijan State Oil Company
4. State Committee for Hydrometeorology
5. State Road Polices
6. State Committee for Ecology
7. State Committee for Melioration and Water Resources
8. Committee for Soil
9. Azeravtonakliyat (State Committee for Transportation)

The counterpart team consists of the following members:

No	Surname – Name	Institution	Position in his/her institution
1	Nutsalov Enver Nutsal oglu	Nutsalov Enver Nutsal oglu	Deputy chairman
2	Gasimov Ahmed Amrah oglu	Controlling Department for Ground, Ground Surface and Flora	Main Inspector
3	Zeynalov Adil Saig oglu		Leader Inspector
4	Ragimov Sohbab Sultan oglu	Controlling Department for Water Resources	Main Inspector
5	Gambarov Mirsalam Beyukara oglu	Controlling Department for Atmosphere	Inspector
6	Guseynov Yasar Ilyas oglu	Steering Department for Controlling of Fauna	Inspector
7	Celebova Sevinc Ferayaddin gizi	Chemical Department	Chemical Engineer
8	Abdullaev Rasim Ramazan oglu	Department for Controlling Buildings and Ecological Experts	Main Expert
9	Dasdemirov Zaur Zahid oglu		Expert
10	Suleymanov Elsan Aydin oglu	Department for information and Agitation of Ecological Knowledge	Specialist of Agitation
11	Cafarov Aydin Agaverdi oglu	Department for Financing and Accountancy Calculation	Economist

The above members may be replaced, when required.

2.5 Candidate for Counterpart Training in Japan

The study team informed that JICA would provide counterpart training in Japan to one person from mid-June to mid-August when the study team would be in Japan. The team requested the Azerbaijan side to nominate the candidate by February 25, 2000.

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The Azerbaijan side accepted the request.

2.6 Modification of the Inception Report

The Azerbaijan side requested the study team further technical information on some of the issues described in the IC/R so that the Azerbaijan side could fully understand its contents.

The study team accepted their request.

2.7 Monthly Seminars

The Azerbaijan side requested the study team to organize seminars, in addition to weekly meetings, where the Azerbaijan side can receive technical information on environmental management.

The study team accepted the request stating that they would hold monthly seminars and three seminars would to be held during the 1st study work in Azerbaijan, i.e. in the middle of March, in the middle of April and in the middle of May.

2.8 Change of the Study Schedule

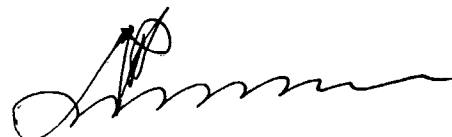
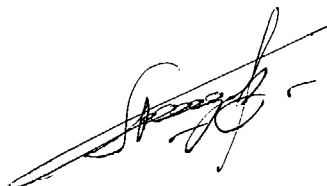
The Azerbaijan side asked the reason why the study schedule was not 18 months as agreed upon the scope of work (S/W) on August 20, 1999, but 15 months.

The study team replied that the study period was shortened in order to facilitate the early commencement of the priority project(s).

3. CONCLUSION

3.1 The Azerbaijan side submitted technical comments on the IC/R, particularly ways and means of the study and the Japanese side took a note of those comments. Both sides agreed that technical discussions would be continued during the study at the weekly meetings, due to limited time and their technical nature.

3.2 Following the intensive and technical discussions among participants held from the 11th February to the 18th February 2000, the IC/R with the above clarifications and modifications was fully approved by the both sides.



ATTENDANT LIST

<Azerbaijan Side>

Ministry of Foreign Affairs

Mr. Israfil Akhmedov

First Secretary, International Economic Relations
DepartmentDepartment of Foreign Investment and Technical Assistance, Cabinet of Ministers

Mr. Rashid Fataliev

Head of Department

State Committee for Ecology and Control for Nature UseMr. Faud Akhund-Zade
Mr. Aliev Lakhuti

Head of Department for Ecology Project

State Committee of Hydrometeorology

Mr. Hadjiev Kilinc

Director

Baku Committee for Ecology and Control for Nature UseMr. Mamed Akhmedov
Mr. Mursal I. Aliyev
Mr. Nusalov AnvarChairman
First Deputy Chairman
Vice ChairmanExecutive Power of Baku CityMr. Nagiev Tahir
Mr. Mubariz N. AtayevManager
Chief of Protocol

<Japanese Side>

JICA Study Team

Mr. Susumu Shimura

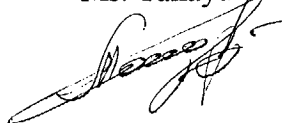
Team Leader and Environmental Management
PlanningMr. Shinya Kawada
Ms. Noriko OtsukiEnvironmental Monitoring Planning
Fauna and Flora (Birds) Ecology/ Environmental
Quality SurveyMr. Kazutoshi Masuda
Mr. Tamotsu SuzukiSystem Engineer (GIS)
Municipal/Medical Solid Waste ManagementJICA Advisory Committee for the Study

Mr. Masahiro Ota

Chairman

JICA Headquarters

Ms. Takayuki Nakagawa

Second Development Study Division, Social
Development Study Department

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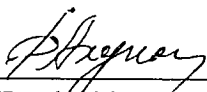


**MINUTES OF MEETINGS
ON
THE PROGRESS REPORT (1)
OF
THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIJAN REPUBLIC**

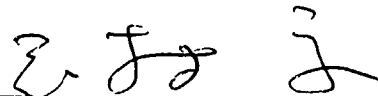
AGREED UPON BETWEEN

**STATE COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
BAKU COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
AND
JICA STUDY TEAM**

Baku, June 1, 2000



Mr. Fuad Akhund-zade
Head
Department for Ecology Project
State Committee for Ecology and Nature
Utilisation Control



Mr. Susumu Shimura
Leader of JICA Study Team



Mr. Mamed Akhmedov
Chairman
Baku Committee for Ecology and Nature
Utilisation Control

**MINUTES OF MEETING ON THE PROGRESS REPORT (1) OF
THE MASTER PLAN STUDY ON INTEGRATED ENVIRONMENTAL
MANAGEMENT IN BAKU CITY IN AZERBAIJAN REPUBLIC**

1. INTRODUCTION

1.1 The study team has submitted thirty (30) copies of the Progress Report (P/R) (1) in English and Russian to the SCE/BCE. Consequently a series of meetings was held from May 29th to June 1st in Baku in Azerbaijan to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

2. ISSUES AND DECISIONS

2.1 Various issues were discussed and clarifications on the P/R (1) were made. Subsequently appropriate consensus on the major items of the P/R (1) including the M/P framework and the major study components in the 2nd Study Work in Azerbaijan was reached during the meetings. These issues, clarifications and consensus are outlined in the paragraphs as follows.

2.2 Environmental Management Master Plan

The study team confirmed that the integrated environmental management master plan (M/P) is 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. 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.

The Azerbaijan side approved the confirmation.

2.3 Proposed Priority Projects

Taking account of the key environmental issues and selection criteria, the study team proposed six priority projects as shown in the table below. The team will formulate implementation programmes for any or all of these, provided that the C/P agrees and JICA approves them.

Table 1: Proposed Priority Projects

Priority projects	Outline
1. Development of environmental data management	Collection of environmental data, enhancement of GIS, etc.
2. Institutional capacity building for the BCE	Development of administrative structure, development of law enforcement system, etc.
3. Development of environmental monitoring system	Development of environmental quality monitoring system, establishment of the central laboratory, development of pollution source inspection system, etc.
4. Development of nature	Improvement of BCE's capacity for the conservation

conservation system	of sanctuaries and natural monuments.
5. Development of illegal dumping control system	Improvement of BCE's capacity to control illegal dumping, development of control system among the BCE, BEP, District EPs and other relevant organizations, etc.
6. Development of supervision and support system for M/P formulation of MSW and waste recycling	Improvement of BCE's capacity to supervise and support the M/P formulation and recycling plans, development of cooperative system among the BCE, BEP, District EPs and other relevant organizations, etc.

The Azerbaijan side agreed to the team's proposal and requested the study team to formulate implementation programmes of the all projects listed above.

2.4 BCE's Requests to the 2nd Study Work in Azerbaijan

The BCE showed their requests to the 2nd study work in Azerbaijan as in Appendix 2. The team's reply to the requests is as in Appendix 3.

2.5 Preference of the Azerbaijan Side for Priority Projects

Since the current capability of BCE laboratory is very limited due to various reasons, the Azerbaijan side emphasised the importance of item I.4.i of Appendix 2 "enhancement of the BCE laboratory". The study may include the renovation of current laboratory, installation of equipment that is dispersed in the several institutions, conduct environmental quality analysis works together with the study team, and others.

The Azerbaijan side also expressed their particular interest in item II.4 of Appendix 2 "Development of illegal waste dumping control system".

The study team replied that they would convey the preferences of the Azerbaijan side for the priority projects to the JICA headquarters.

2.6 Jeiranbatan Reservoir

Recognising the importance of the Jeiranbatan reservoir as a principal water source for Baku city, the Azerbaijan side stressed the necessity to include the reservoir into the GIS base map and to carry out a water quality survey as written in the P/R(1).

The team understood and replied that they would convey this statement to the JICA headquarters.

2.7 Land Use Plan

If information on land use plans exists and is available to the team, land use boundaries will be input as a polygon data of GIS database. The study team requested the Azerbaijan side to inform about the availability of the plans by the end of June 2000.

The Azerbaijan side replied that they would do their best to obtain the plans.



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2.8 Opening Environmental Web Site

The study team informed that opening an environment web site using the GIS database developed by this study is a good step for environmental information sharing. The team clarified that they would create html formatted files which show part of the information contained in the GIS database, and that the Azerbaijan side would be required to secure appropriate host facilities within the servers of SCE or Government of Azerbaijan.

The Azerbaijan side acknowledged the clarification.

2.9 Comments on the P/R (1)

The study team requested the Azerbaijan side that all comments from the Azerbaijan side regarding the P/R (1) should be sent in writing to the office of the BCE by June 9th, 2000 if they are to be considered by the team in preparing the Interim Report. These comments will be forwarded by the BCE to the team leader by June 12th.

The Azerbaijan side accepted the request.

2.10 Soil Map

The Azerbaijan side requested the study team to input a soil map of the study area as natural conditions in the GIS Database.

The study team replied that they would do so if it were provided to the team by the end of June 2000.

The Azerbaijan side acknowledged the reply.

2.11 Counterpart Training after the 2nd Study Work in Azerbaijan

The team requested the Azerbaijan side to nominate one candidate for the counterpart training, which will be carried out during the 2nd study work in Japan (between December 2000 and the middle of January 2001, see Figure 2-1 of P/R(1)), by the team's arrival in Azerbaijan in August 2000.

The Azerbaijan side accepted the request.

2.12 Equipment of the Team

The study team requested the Azerbaijan side to keep the equipment of the team in safe and appropriate condition.

The Azerbaijan side accepted the request.

3. CONCLUSION



S7-24




3.1 Following the intensive and technical discussions among participants from May 29th to June 1st 2000, the P/R (1), with the above clarifications and modifications, was fully approved by the both sides.

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S7-25
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ATTENDANT LIST

<Azerbaijan Side>

State Committee for Ecology and Nature Utilisation Control

Mr. F. Akchund-Zade	Head of Department for Ecology Project
Mr. L. Aliev	Coordinator

Baku Committee for Ecology and Nature Utilisation Control

Mr. M. Akchmedov	Chairman
Mr. M. Aliyev	First Deputy Chairman
Mr. A. Nusalov	Vice Chairman
Mr. T. Bagirov	Department Chief
Mr. E. Aliyev	Department Chief
Mr. M. Gambarov	Department Chief
Mr. M. Kuliev	Department Chief
Mr. A. Karmukov	Chief of Financial Department
Mr. F. Aliyev	Unit Head
Mr. M. Gudayatov	Unit Head
Mr. V. Orujev	Unit Head
Mr. Sh. Bayramov	Unit Head
Mr. A. Safarov	Unit Head
Mr. M. Abdulgasanov	Unit Head
Mr. A. Agaev	Unit Head

Executive Power of Baku City

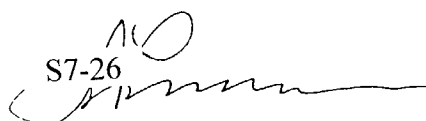
Mr. B. Novruzov	Chief of Greenery Deptment
-----------------	----------------------------

<Japanese Side>

JICA Study Team

Mr. Susumu Shimura	Team Leader and Environmental Management Planning
Mr. Shinya Kawada	Environmental Monitoring Planning
Mr. Yasuji Himi	Environmental Analysis/ environmental Laboratory Enhancement Planning
Ms. Noriko Otsuki	Fauna and Flora (Birds) Ecology/ Environmental Quality Survey
Mr. Kazutoshi Masuda	System Engineer (GIS)
Mr. Benjamyn Damazer	Institutional Building/ Human Resources Development
Mr. Ichiro Kono	Administrative Coordinator/ Pollution Source Survey/ Opinion Survey on the Environment



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REQUESTS TO BE CONSIDERED IN THE MASTER PLAN ON INTEGRATED ENVIRONMENTAL MANAGEMENT IN BAKU CITY

I. Strengthening Capabilities of the BCE

I.1 Air quality control

- i. set up of a vehicle emissions monitoring system
- ii. monitoring of major air polluters (oil refineries, gas production, cement plant)

I.2 Water quality control

- i. establishment of a monitoring system for Absheron surface and underground waters, drinking water quality, as well as wastewater discharged directly to the sea
- ii. construction of a wastewater collection system to direct sewage from Zagulba, Buzovna, Mardakan, Shuvelan communities to Mardakan-Shuvelan wastewater treatment works.

I.3 Soil quality control

- i. inventory of contaminated areas in Greater Baku
- ii. establishment of a monitoring system to investigate soil contamination level on the Absheron peninsula

I.4 Laboratory

- i. Enhancement of the BCE laboratory
- ii. Establishment of the BCE's laboratory with the following departments:
 - water analyses;
 - air analyses;
 - soil analyses;
 - toxicological analyses;
 - radiological analyses;
 - noise and electromagnetic waves control;
 - food quality analyses;
 - fauna control.

I.5 Nature conservation

Preparation of designs of protection facilities for the Absheron and Gil island sanctuaries

II. Others



S7-27



II.1 Protection of green plantations

Uncontrolled import of plants may cause diseases to original vegetation of the Absheron peninsula. Therefore, in order to enrich flora bio-diversity on the peninsula and prevent dissemination of plants diseases the following actions should be taken:

- establishment of a city nursery centre;
- strengthening of the flora protection station;
- development of a water use plan for irrigation considering the possibilities of underground waters use

II.2 Establishment of the following waste recycling enterprises:

- Paper, cullet etc.
- Car batteries
- Tyres

II.3 Development of M/P for municipal solid waste management.

II.4 Development of illegal waste dumping control system

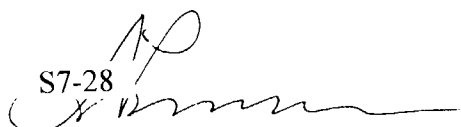
II.5 Protection of Binagady quaternary flora and fauna deposits

Binagady deposits of quaternary flora and fauna were found in Binagady settlement in 1938.

Over 50,000 bones of creatures were found in the bituminous layer representing the Pliocene flora and fauna including 40 mammal species, 120 species of birds, 2 species of reptiles and 1 amphibian. The deposits also contain the remains of 107 species of insects and 22 plant species.

Unfortunately, this natural monument is not protected properly and the area is polluted with domestic solid wastes and metal wastes.



S7-28




Reply to the requests from the BCE**I. Strengthening Capabilities of BCE****I.1 Air quality control**

The team will consider the requests for the formulation of both M/P and an implementation programme of priority project 3.

I.2 Water quality control

The team accepts Request i as part of priority project 3, but not Request ii because the team understands that the construction of a wastewater collection system is out of BCE jurisdiction and wastewater matters were already covered by the wastewater M/P.

I.3 Soil quality control

i. Development of inventory requires huge workload and does not comply with the selection criterion of the priority project. What the team will do is to input available soil data into the GIS, method of inventory development and recommendation.

ii. The team accepts this request as part of priority project 3. The inventory requested above will be developed by the monitoring system considered in this request.

I.4 Laboratory

i. This request will be incorporated into priority project 3.

ii. The team will consider, as part of priority project 3, the structure and function of the BCE laboratory together with those of the central laboratory.

I.5 Nature conservation

The preliminary design will be developed only for the Absheron sanctuary. This is because time is limited and the Absheron sanctuary is more likely to be accessed by people.

II. Others**II.1 Protection of green plantations**

The team considers that nursery operation, pest control and irrigation are out of the BCE's jurisdiction. However, the team may recommend responsible organisations to implement the requested subjects if they are found to be relevant to the strengthening of the BCE.

II.2 Establishment of the waste recycling enterprises

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II.3 Development of M/P for municipal solid waste management.

The BCE is the organisation which supervises the management of municipal solid waste and recycling. It itself does not manage waste matters. Therefore, requests II.2 and II.3 are considered out of the BCE's jurisdiction. The team will focus on the supervising function of the BCE in priority project 6.

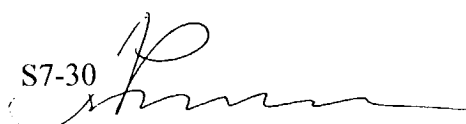
II.4 Development of illegal waste dumping control system

The team will ask JICA for approval and budget allocation for this request (priority project 5).

II.5 Protection of Binagady quaternary flora and fauna deposits

The team will examine a nature conservation system, part of which is the conservation of Binagady deposits (priority project 4).



S7-30 



**MINUTES OF MEETINGS
ON
THE INTERIM REPORT
OF
THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIJAN REPUBLIC**

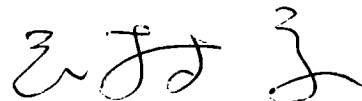
AGREED UPON BETWEEN

**STATE COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
BAKU COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
AND
JICA STUDY TEAM**

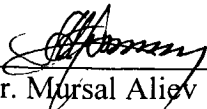
Baku, August 24, 2000



Mr. Fuad Akhund-zade
Head
Department for Ecology Project
State Committee for Ecology and Nature
Utilisation Control



Mr. Susumu Shimura
Leader of JICA Study Team



Mr. Mursal Aliiev
Acting Chairman
Baku Committee on Ecology and Nature
Utilisation Control



Mr. Masahiro Ohta
JICA Senior Advisor on
Environmental Policy Development

MINUTES OF MEETING ON THE INTERIM REPORT OF THE MASTER PLAN STUDY ON INTEGRATED ENVIRONMENTAL MANAGEMENT IN BAKU CITY IN AZERBAIJAN REPUBLIC

1. INTRODUCTION

- 1.1 The study team submitted thirty copies of the English main report and thirty copies of Russian summary report of the Interim Report (IT/R) to the SCE/BCE. A series of meetings was held from August 21st to 25th in Baku in Azerbaijan to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

2. ISSUES AND DECISIONS

- 2.1 Various issues were discussed and clarifications on the IT/R were made. An agreement on the major items of the IT/R including the M/P framework and the major study components in the 2nd Study Work in Azerbaijan was reached during the meetings. Issues agreed upon clarifications and consensus are outlined as follows.

2.2 Pilot Projects

The Azerbaijan side expressed its great appreciation to JICA for the allocation of a budget to undertake the pilot projects. The Azerbaijan side agreed the shared cost and work responsibilities for the pilot project between JICA and the Azerbaijan side, and stated that "Experiment on Development of Illegal Dumping Control System" will turn to be a good opportunity to raise public awareness on the environment of the Baku City. The Azerbaijan side, however, asked the study team to discuss details of the pilot projects in advance.

The team replied that the details of the pilot projects should be discussed and agreed with the counterpart (C/P) and the team before implementation. The team stated that cooperation and active participation of the C/P as well as the involvement of the public, such as people living near the project site and NGOs are indispensable for success of the pilot projects.

Azerbaijan side acknowledged the team's statement.

2.3 Proposed Targets of the M/P and Issues for M/P Formulation

The Azerbaijan side expressed that it has many comments on the proposed targets of the M/P (Table 3-5 of the IT/R) and issues for M/P formulation (Section 3.4 of the IT/R), and that each department of BCE/SCE needs enough time to discuss the details of the subject with the team.

The team replied that as stated in the IT/R the table and section 3.4 only indicate the targets proposed by the team, which will serve as bases for further discussion during the next study phase. Therefore, the team is willing to have technically detailed discussion on each subject with department members of SCE/BCE respectively.

The Azerbaijan side acknowledged the reply.



2.4 Comments on the IT/R

The study team requested the Azerbaijan side that all comments from the Azerbaijan side regarding the IT/R should be sent in writing to the office of the BCE by August 31st, 2000 if they are to be considered by the team in preparing the Draft Final Report.

The Azerbaijan side accepted the request.

2.5 Counterpart Training after the 2nd Study Work in Azerbaijan

The team requested the Azerbaijan side to send a request form to the Embassy of Japan in Baku for the counterpart training which will be carried out during the 2nd study work in Japan (between December 2000 and the middle of January 2001, see Figure 1-2 of IT/R) by the end of August 2000.

The Azerbaijan side accepted the request.

3. CONCLUSION

- 3.1 Following the intensive and technical discussions among participants from August 21st to 25th 2000, the IT/R, with the above clarifications and modifications, was fully approved by both sides.



LIST OF ATTENDEES

<Azerbaijan Side>

State Committee for Ecology and Nature Utilisation Control

Mr. F. Akhund-zade Head of Department for Ecology Project

Baku Committee for Ecology and Nature Utilisation Control

Mr. M. Aliyev First Deputy Chairman
 Mr. A. Nusalov Vice Chairman
 Mr. E. Aliyev Department Chief, Food quality Control Division
 Mr. M. Gambarov Department Chief, Water and Air Protection Division
 Mr. M. Gudayatov Unit Head, Water Protection Department
 Mr. Sh. Bayramov Unit Head, EIA Department
 Mr. A. Safarov Unit Head, Information Department
 Mr. Ragimov Senior Inspector, Water Protection Department
 Mr. Zeinalov Senior Inspector, Department of Land, Natural Resources and Natural Monuments Protection
 Mr. A. Aliev Deputy Head of Fauna Conservation Division

Cabinet of Ministers

Mr. N. Fataliev Deputy Head of Department of Foreign Investments and Technical Assistance
 Mr. R. Fataliev Chief of Environmental Unit
 Mr. R. Suleymanov Advisor, Department of Foreign Investments and Technical Assistance

Ministry of Foreign Affairs

Mr. I. Akhmedov Head of Department of Bilateral Economic Relations
 Mr. K. Murtuzov Attache, Department of Bilateral Economic Relations

Baku Executive Power

Mr. Akif Hashim oglu Samedov Foreign Relations and Investment Programs Department, Head of Division of the Investment Programs and Analytical Information

State Committee for Hydrometeorology

Mr. Gilinch Abdul oglu Hajiyev Head of Environmental Monitoring Department

State Oil Company

Mr. Arif Sadikhov Environmental Control and Safety Measures Department, Advisor

Committee for Melioration and Water Economy

Mr. Rafi Habib oglu Mammedov Director of Research Institute of Water Engineering and Melioration

State Land Committee

Mr. Gismet Yunus oglu Hanbalyev State and Municipal Lands Department, Senior Specialist

"Azeravtonagliyat" State Concern

Mr. Avtandil Yusif oglu Gamarly Head of Department for Environmental Control and Standardisation

State Committee for Hydrometeorology

Mr. Gilinch Abdul oglu Hajiyev Head of Environmental Monitoring Department

Ministry of Public Health

Mr. Ziyaddin Kazimov

Deputy Director of Baku City Centre for Hygiene
and Epidemiology

Baku City Traffic Police

Mr. Shakir Naib oglu Guliyev

Police Captain

<Japanese Side>

JICA Study Team

Mr. Susumu Shimura

Team Leader and Environmental Management
Planning

Mr. Shinya Kawada

Environmental Monitoring Planning

Mr. Yasuji Himi

Environmental Analysis / Environmental
Laboratory Enhancement Planning

Ms. Noriko Otsuki

Fauna and Flora (Birds) Ecology / Environmental
Quality Survey

Mr. Tamotsu Suzuki

Municipal / Medical Solid Waste Management

Mr. Benjamyn Damazer

Institutional Building / Human Resources
Development

Mr. Ichiro Kono

Illegal Dump Control

Mr. Teymour Assadov

Administrative Coordinator

JICA Advisory Committee

Mr. Masahiro Ohta

Chairman

Mr. Kentaro Inoue

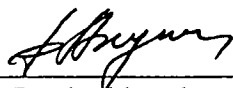
Committee Member

MINUTES OF MEETINGS
ON
THE PROGRESS REPORT (2)
OF
THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIJAN REPUBLIC

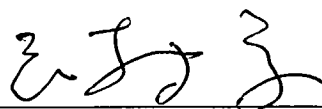
AGREED UPON BETWEEN

STATE COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
BAKU COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
AND
JICA STUDY TEAM

Baku, November 25, 2000



Mr. Fuad Akhund-zade
Head
Department for Ecology Project
State Committee for Ecology and Nature
Utilisation Control



Mr. Susumu Shimura
Leader of JICA Study Team



Mr. Mamed Akhmedov
Chairman
Baku Committee on Ecology and Nature
Utilisation Control

**MINUTES OF MEETINGS ON THE PROGRESS REPORT (2) OF
THE MASTER PLAN STUDY ON INTEGRATED ENVIRONMENTAL
MANAGEMENT IN BAKU CITY IN AZERBAIJAN REPUBLIC**

1. INTRODUCTION

1.1 The study team submitted thirty (30) copies of the Progress Report (P/R) (2) both in English and Russian to the SCE/BCE. A series of meetings was held from the 13th to 25th of November in Baku in Azerbaijan to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

2. ISSUES AND DECISIONS

2.1 Various issues were discussed and clarifications on the P/R(2) were made. An agreement on the major items of the P/R(2) including the M/P framework, the M/P and the priority projects was reached during the meetings. Issues agreed upon following clarifications and consensus are outlined as follows.

2.2 Reports

Since the main objective of the study is the capacity building of the BCE, all the BCE staff should fully understand the study output in order to derive maximum benefit. Considering the insufficient background of English education of most BCE staff, the Azerbaijan side requested the team to produce Russian reports, in addition to English ones, in the following quantities:

	Report	Time of Submission	Requested Number of Copies		Planned Number of Copies
1	Draft Final	End of January 2001	Summary	30 copies (English)	30
			Summary	30 copies (Russian)	30
			Main	10 copies (English)	30
				20 copies (Russian)	0
			Supporting	5 copies (English)	30
				10 copies (Russian)	0
			Data Book	5 copies (English)	30
		10 copies (Russian)	0		
2	Final	End of March 2001	Summary	60 copies (English)	60
			Summary	60 copies (Russian)	60
			Main	20 copies (English)	60
				40 copies (Russian)	0
			Supporting	10 copies (English)	60
				30 copies (Russian)	0
			Data Book	5 copies (English)	60
		20 copies (Russian)	0		

The team replied that the preparation of Russian Draft Final Reports is not possible due to time constraint. It also stated that it would convey the request for Russian Final Reports to JICA headquarters, although it appears to be very difficult since the contract was already signed.

The Azerbaijan side acknowledged the reply.

2.3 Priority Projects

The team proposed six priority projects as previously showed in Progress Report (1) (see table below) and the Azerbaijan side agreed the team's proposal. The team will develop an implementation programme for each of project.

Priority projects	Outline
1. Development of environmental data management	Collection of environmental data, enhancement of GIS, etc.
2. Institutional capacity building for the BCE	Development of administrative structure, development of law enforcement system, etc.
3. Development of environmental monitoring system	Development of environmental monitoring system, establishment of the BCE laboratory, development of pollution source inspection system, etc.
4. Development of nature conservation system	Improvement of BCE's capacity for the conservation of Absheron sanctuary.
5. Development of illegal dumping control system	Improvement of BCE's capacity to control illegal dumping, development of control system among the BCE, BEP, District EPs and other relevant organizations, etc.
6. Development of supervision and support system for M/P formulation of MSW and waste recycling	Improvement of BCE's capacity to supervise and support the M/P formulation and recycling plans, development of cooperative system among the BCE, BEP, District EPs and other relevant organizations, etc.

2.4 Comments to the P/R(2)

The team requested the Azerbaijan side to send comments on the P/R (2) by 13 December to the team.

The Azerbaijan side accepted the request.

3. CONCLUSION

3.1 Following the intensive and technical discussions among participants, the P/R(2), with the above clarifications and modifications, was fully approved by both sides.



LIST OF ATTENDEES

<Azerbaijan Side>

State Committee for Ecology and Nature Utilisation Control

Mr. F. Akhund-zade	Head of Department for Ecology Project
--------------------	--

Baku Committee for Ecology and Nature Utilisation Control

Mr. M. Akhmedov	Chairman
Mr. M. Aliyev	First Deputy Chairman
Mr. A. Nusalov	Vice Chairman
Mr. E. Aliyev	Head, Food environment control and chemical analysis department
Mr. M. Gambarov	Head, Air and water resources protection department
Mr. N. Adyigezalov	Head, Lands, flora and waste control department
Mr. A. Karmukov	Head, Financial and accounting department
Mr. T. Bagirov	Head, EIA, information and environmental education department
Mr. A. Imanov	Deputy head, Fauna and conservation area department
Mr. R. Amirsultanov	Deputy head, Food environment control and chemical analysis department
Mr. N. Tagiev	Deputy head, Air and water resources protection department
Mr. M. Abdulgasanov	Head, Water resources protection unit
Mr. F. Aliyev	Head, Land protection and waste control unit
Mr. B. Gidayatov	Head, Air protection unit
Mr. M. Mamedov	Head, Flora protection unit
Mr. A. Safarov	Head, Information and environmental education unit
Mr. A. Agaev	Head, Chemical analysis unit
Mr. Sh. Bayramov	Head, EIA unit
Mr. Ragimov	Senior inspector
Mr. Zeinalov	Senior inspector

<Japanese Side>

JICA Study Team

Mr. Susumu Shimura	Team Leader and Environmental Management Planning
Mr. Shinya Kawada	Environmental Monitoring Planning
Ms. Noriko Otsuki	Fauna and Flora (Birds) Ecology / Environmental Quality Survey
Mr. Kazutoshi Masuda	System Engineer (GIS)
Mr. Tamotsu Suzuki	Municipal / Medical Solid Waste Management
Mr. Toshiro Hamada	Urban Planning/Land Use Planning
Mr. Benjamyn Damazer	Institutional Building / Human Resources Development
Mr. Kozo Baba	Economy and Finance
Mr. Ichiro Kono	Illegal Dump Control
Mr. Teymour Assadov	Administrative Coordinator




**MINUTES OF MEETINGS
ON
THE DRAFT FINAL REPORT
OF
THE MASTER PLAN STUDY ON
INTEGRATED ENVIRONMENTAL MANAGEMENT
IN BAKU CITY IN AZERBAIJAN REPUBLIC**

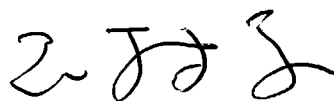
AGREED UPON BETWEEN

**STATE COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
BAKU COMMITTEE FOR ECOLOGY AND NATURE UTILISATION CONTROL
AND
JICA STUDY TEAM**

Baku, January 31, 2001



Mr. Oktay Jafarov
Head of Department of
Science and Natural Resources Protection,
State Committee for Ecology and Nature
Utilisation Control



Mr. Susumu Shimura
Leader of JICA Study Team



Mr. Mamed Akhmedov
Chairman
Baku Committee on Ecology and Nature
Utilisation Control



Mr. Masahiro Ohta
JICA Senior Advisor on
Environmental Policy Development

**MINUTES OF MEETING ON THE DRAFT FINAL REPORT OF
THE MASTER PLAN STUDY ON INTEGRATED ENVIRONMENTAL
MANAGEMENT IN BAKU CITY IN AZERBAIJAN REPUBLIC**

1. INTRODUCTION

- 1.1 The study team submitted the following number of copies of the DF/R (Draft Final Report) to the SCE (State Committee for Ecology and Nature Utilisation Control) / BCE (Baku Committee for Ecology and Nature Utilisation Control).

Kind of Report	Items	Language	Number of Copies
1. Summary		English	30
2. Summary		Russian	30
3. Main		English	10
4. Supporting		English	5
5. Data Book		English	5

Consequently a series of meetings was held from January 29th to 31st in Baku in Azerbaijan to discuss the report submitted. A list of officials attending the above meetings is given in Appendix 1.

2. ISSUES AND DECISIONS

- 2.1 Various issues were discussed and clarifications on the DF/R were made. An agreement on the major items of the DF/R including the implementation programme for priority projects and the conclusions & recommendations was reached during the meetings. Issues agreed upon clarifications and consensus are outlined as follows.

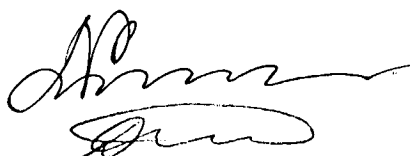
2.2 BCE' Gratitude for the Study

The chairman of the BCE expressed his great gratitude to JICA study team and its advisory committee for the successful study. He also stated that the study products such as GIS database, pilot projects and various field surveys are very valuable for the environmental management works of the BCE, which shall fully utilise them for the realisation of the master plan. However, due to financial constrain of the Republic the Azerbaijan side requested the team to convey their strong wishes for future cooperation from Japanese Government regarding implementation of the priority projects and environmental management training in Japan to learn Japanese experiences in the field of environmental pollution.

The team replied its team leader will convey the request to JICA headquarter and relevant government organisations.

2.3 Reports

The Azerbaijan side requested the team to produce Russian DF/R reports, in addition to English ones as stated in the minutes of meetings (M/M) on the Progress Report



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(2).

In response to the request the team conveyed it to JICA headquarters and received the consent to submit the following reports as the final reports of the study to the Government of Azerbaijan Republic:

Kind of Report	Items	Language	Number of Copies
1. Summary		English	40
2. Summary		Russian	40
3. Main		English	20
4. Main		Russian	30
5. Supporting		English	5
6. Supporting		Russian	5
7. Data Book		English	5
8. Data Book		Russian	5

Azerbaijan side appreciated the consent.

2.4 Comments on the DF/R

The study team requested the Azerbaijan side that all comments from the Azerbaijan side regarding the DF/R should be sent in writing to the office of the BCE by February 20th, 2001 if they are to be considered by the team in preparing the Final Report.


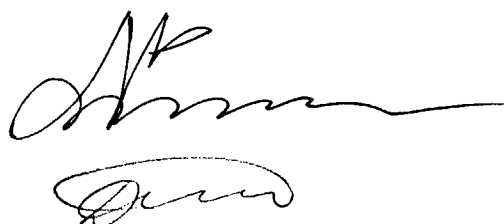
The Azerbaijan side accepted the request.

2.5 Publication of the Final Report

Both side agreed that the final report should be made accessible to the public.

3. CONCLUSION

3.1 Following the intensive and technical discussions among participants from January 29th to 31st 2001, the DF/R, with the above clarifications and modifications, was fully approved by both sides.



LIST OF ATTENDEES

<Azerbaijan Side>

State Committee for Ecology and Nature Utilisation Control

Mr. Oktay Jafarov	Head of Department for Science and Natural Resources Protection
Mr. Abdullov Imran	Head of Department for Environmental Projects and Organizational Works
Mr. Tofiq Hassanov	Project Manger of UEIP-PIU
Mr. A. Allahverdiyev	Senior Inspector

Baku Committee for Ecology and Nature Utilisation Control

Mr. Mamed Akhmedov	Chairman
Mr. M. Aliyev	First Deputy Chairman
Mr. A. Nusalov	Vice Chairman
Mr. T. Bahirov	Head of Department, EIA Department
Mr. N. Tagiyev	Deputy Head of Water and Air Protection Division
Mr. Sh. Bayramov	Unit Head, EIA Department
Mr. A. Safarov	Unit Head, Information Department
Mr. Adigozalov	Head of Division of Land, Natural Resources and Natural Protection

Mr. A. Imanov	Head of Fauna Conservation Division
Mr. A. Agayev	Head of Laboratory
Mr. A. Karmukov	Head of Financial Department
Mr. R. Amirsultanov	Deputy Head of Department, Food quality Control Division
Mr. A. Imanov	Unit Head, Fauna Protection Department
Mr. Z. Zakirov	Senior Inspector
Mr. T. Mammedov	Senior Inspector
Mr. S. Shiraliyev	Senior Inspector
Mr. A. Talibli	Inspector
Mr. T. Rustamov	Inspector
Mr. D. Sohbatov	Inspector
Mr. M. Mamedov	Inspector
Mr. M. Uzdanov	Inspector
Mr. R. Abdullayev	Expert
Mr. Z. Dashdamirov	Expert
Mr. R. Veliyev	Inspector
Mr. H. Ahmedov	Inspector
Mr. J. Muradov	Inspector

Ministry of Foreign Affairs

Mr. Latif Gandilov	First Secretary of Department of Economic Cooperation and Development
Mr. K. Murtuzov	Attache, Department of Economic Cooperation and Development

Committee for Melioration and Water Economy

Mr. Rafi Habib oglu Mammedov	Director of Research Institute of Water Engineering and Melioration
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State Land Committee

Mr. Barat Jafarli	Head of Land Control Department
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“zeravtonagliyat” State Concern

Mr. Hafiz Idayqt oglu Abdullayev
Mr. Nagani Kerimov

Vice-President
Deputy Head of Department

Baku City Traffic Police

Mr. Shakir Naib oglu Guliyev

Police Captain

<Japanese Side>

JICA Study Team

Mr. Susumu Shimura

Team Leader and Environmental Management
Planning

Mr. Shinya Kawada

Environmental Monitoring Planning

Mr. Yasuji Himi

Environmental Analysis / Environmental
Laboratory Enhancement Planning

Mr. Tamotsu Suzuki

Municipal / Medical Solid Waste Management

Mr. Benjamyn Damazer

Institutional Building / Human Resources
Development

Mr. Kazutoshi Masuda

System Engineer (GIS)

Mr. Teymour Assadov

Administrative Coordinator

JICA Advisory Committee

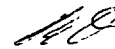
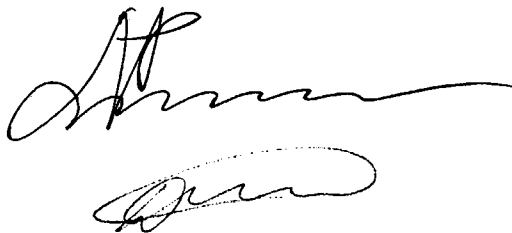
Mr. Masahiro Ohta

Chairman

JICA Headquarters

Mr. Satoshi Iwakiri

Director of Second Development Study
Ddivision, Social Development Study
Department



Chapter 8

8 Comments on Reports and Replies

8.1 Comments on P/R(1) and the Team's Replies

8.1.1 Comments from the BCE

	Comments	Replies
1.	Page 9 (10), the last paragraph: Oil content and phenols are typical wastewater pollutants on the study area and should be included in the survey	Environmental quality survey was conducted according to the IC/R and TOR, both of which were discussed with the C/P in advance.
2.	Figure 1-3: III <Social conditions> City Water and Wastewater facilities should be added (see Russian version)	City water facilities are included in Figure 1-3, but it did not appear on the figure of the Russian report due to an error of report edition. Wastewater facilities are categorised as a pollution source and included in IV of the figure.
3.	Table 1-3: Soil should be included in the "Natural Conditions" category	In the M/M on the P/R(1), it was agreed that the team would input a soil map into the GIS if it was provided to the team by the end of June.
4.	Page 16, paragraph 7: ANASA is not a state controlling body and, therefore, should be deleted. "Ecopolice" should be replaced with "Ecological Company of Republican Road Police".	The comment will be reflected in the IT/R.
5.	Page 18, b.2 Enforcement, the last paragraph: "Case is sent to the prosecutor's office" should be instead of "approval from the prosecutor's office is required"	The comment will be reflected in the IT/R.
6.	Page 21, a.1.1 (2): Statement <i>Data used to be collected according to the contracts formulated in Moscow</i> is not correct.	It was what the team understood. The team then needs to know how to change this part. The team wonders what made the laboratories collect data.
7.	Page 22, a.1.3 Team's view: Alterations should be made to this section in accordance with the proposal on BCE's laboratory construction.	The team's view expressed in a.1.3 is that a primary laboratory should be established in Azerbaijan's environmental management functioned by the SCE (or future MOEP). The team does not ignore the necessity to strengthen the BCE laboratory, as far as the BCE is within the SCE. Sub-section a.1.4 (Page 23) and Figure 2-1 shows that the Central laboratory is supposed to serve the SCE as a national laboratory to the SCE and the BCE as a regional laboratory.
8.	Page 30, b.3 Mobile Pollution Sources: "...the BEP department of transportation" should be deleted.	The comment will be reflected in the IT/R.
9.	Page 30, b.3 Mobile Pollution Sources: "Although the BCE bears the same	It was what the team understood. The team then needs to know how the BCE

	<i>responsibility, they have actually never executed vehicle inspection, since the BCE does not have equipment to carry out inspection."</i> should be replaced with <i>"The BCE together with the road police carries out vehicle inspections in transport companies and on main streets two months a year during campaigns called "Clean Air"</i>	carries out inspection without equipment.
10.	Page 31, the first paragraph: The following sentence should be added: <i>Efforts made by the BCE to regularly carry out vehicle inspections have not been succeeded yet.</i>	The comment will be reflected in the IT/R.

8.1.2 Comments from State Oil Company of Azerbaijan Republic (SOCAR)

	Comments	Replies
1.	Environmental problems associated with oil production should be considered in the study (e.g. necessity to separate domestic and oil field wastewater in Sabail and Balakhani districts).	It is beyond the manpower and time allowed to the team to consider the pollution abatement of every industry sector. Instead, the team intends to develop the M/P to strengthen the BCE/SCE so that the BCE/SCE will effectively work on the industrial pollution problems.

8.1.3 Comments from Azerbaijan Scientific-Research Institute of water engineering and land-improvement

This institute is attached to the State Committee for Water Economy and Land Improvement.

	Comments	Replies
1.	Environmental conditions of the Jeiranbatan water reservoir including surface run-off, underground water quality, protection measures and possibilities of radioactive contamination of the reservoir.	The team will not study the environmental conditions of Jeiranbatan Reservoir because it is outside the study area and the BCE does not bear responsibility to protect the reservoir. The team, however, recognises the importance of this reservoir as a main potable water source of Baku city and the necessity of the BCE to possess its base data. Therefore, with the approval of JICA, the team will collect water quality data of the reservoir and groundwater nearby in the next phase.
2.	Review of existing water quality standards	The team will review the environmental management structure of the BCE/SCE in order to strengthen their activities. Relevant standards will also be reviewed in this process.
3.	Involvement of local experts, scientists and designers in the Master Plan study who work in other environmental projects in Azerbaijan.	The local experts except the C/P staff have been involved into the study through the sub-contract with local consultants.

8.1.4 Comments from Baku Center for Epidemiology and Hygiene

The centre is a representative of the Ministry of Public Health.

	Comments	Replies
1.	In the framework of the project on rehabilitation of oil contaminated lands the level of contamination should be identified (i.e. area of contaminated lands, oil concentration, and composition of pollution)	The team will identify the level of soil contamination by using data that exist and are provided to the team.
2.	Necessity for rehabilitation of existing and construction of new industrial wastewater pretreatment facilities	Each wastewater generator is responsible for its pre-treatment, while the BCE/SCE is responsible for the supervision of their pre-treatment. The team aims to strengthen the supervising activities of the BCE/SCE. The supervising activities will include the promotion of construction of new pre-treatment facilities and/or rehabilitation of existing ones.
3.	Rehabilitation of wastewater collectors (Ganli Gol, Yasamal 1, Yasamal 2, Bulbula, Hojasan etc.)	Rehabilitation of wastewater collectors is out of the BCE/SCE's duties. Further, sewerage development has already been covered by the study funded by the World Bank.
4.	Construction of a disposal site for hazardous wastes produced by industries should be considered as a priority project.	The M/P that the team is going to develop is not a collection of M/Ps of individual sectors (such as hazardous waste disposal), as defined and agreed in the P/R(1). Further, the study on hazardous waste and the construction of a hazardous waste disposal site are to be carried out in the UEIP of the World Bank.

8.2 Comments on IT/R and the Team's Replies

In September and October, i.e. the first two months during the second study work in Azerbaijan, the team received comments, or proposals, from the BCE. Those were replied by writing as shown below and remaining issues were discussed in meetings with the relevant BCE personnel.

Some other state organisations in the steering committee also submitted comments on the IT/R, but those were addressed to the BCE. Therefore, the team only suggested replies as a draft to the BCE and these are not presented here.

8.2.1 Comments from the BCE

a. Air Protection Unit (1)

	Comments and Proposals	Replies
1.	Page 2-15, chapter a.4.2 - Future Environmental Impact Management	1) How do you carry out discharge concentration control?

	<p>Paragraph 2 - We do not agree. We carry out discharge concentration control, but diffused concentration control is carried out by the State Committee for Hydromet. However, the control is not efficient, because of the absence of modern equipment.</p>	<p>2) Could you give us standard of discharge concentration? The standard we got from your side is concerned with not concentration of emission gas from the stack but maximum concentration on the land surface in surrounding area.</p> <p>3) How does Hydromet carry out diffused concentration control?</p> <p>4) Which control is 'not sufficient', BCE or Hydromet, or both?</p> <p>5) What is 'modern equipment'?</p>
<p>2.</p>	<p><i>Page 2-16, chapter a.5 - Environmental Control of Factories by BCE and SCE</i> Paragraph 2 - we consider that large factories should themselves carry out air emission control.</p>	<p>When you drive a car, you control your speed. You should carry out speed control by yourself. Then, why do policemen stand beside the road and inspect your car's speed? Because sometimes you can not control your speed by yourself and it may cause a serious accident.</p> <p>Yes, they should themselves carry out air emission control. However, BCE should confirm whether large factories are carrying out air emission control or not, and whether they exceed the standard or not. BCE is responsible for making all factories follow the standard.</p> <p>After privatisation of state company, productivity and profitability will be first priority and they might not be willing to follow environmental standard.</p>
<p>3.</p>	<p><i>Page 2-21, chapter a.2 - Internal Data Sources</i> Paragraph 1 – we do not agree that the information has not been documented (which information exactly?)</p>	<p>We asked BCE for many kinds of information by paper at the first weekly meeting. But no answer came from your side. Then we asked each staff of BCE individually and could get some information. We had received very limited information by paper from departments of BCE though the department of air protection gave us air pollution standard.</p>
<p>4.</p>	<p><i>Page 3-7, table 3-5</i> Phase II - 70% is too much, we offer 50%.</p>	<p>It seems to be better.</p>
<p>5.</p>	<p><i>Page 3-9 - Technical Aspects (a. Air Pollution)</i> Column 2 (the work of other organisations) - item 4 is being executed, item 5 is not clear to us.</p>	<p>Item 4 (to periodically obtain official approval of satisfactory vehicle condition) :</p> <p>We understand there is the system of regular inspection of vehicles in Azerbaijan Republic. But we think it does not work well, because there seem to be many vehicles which exhaust bad emission gas. Please clarify problems in current inspection system.</p> <p>Item 5 (to assist vehicle owners to equip vehicles exhaust gas control devices) :</p> <p>Other organisation should develop a cheap</p>

		control devices and assist vehicle owners. “ To assist vehicle owners to equip vehicles exhaust gas control devices” means not only to develop a cheap control devices for vehicle owners but also to provide a system to facilitate equipment by means of financial incentives such as provision of low rate loan.
6.	<i>The same table</i> Phase II - Column 2, items 3 and 4 are not clear to us.	Item 3 (traffic improvement plan): smooth flow of traffic reduces amount of pollutants exhausted from vehicles. In Baku, however, traffic jams have occurred sometimes on the streets because of many illegal parking, inappropriate traffic signal system and irrational traffic control. Baku Executive Power is going to conduct improvement of traffic condition of Baku city soon with assistance of Japanese Government. Item 4 (vehicle registration system): We understand there is not a vehicle registration system in Azerbaijan Republic. If there is that system, we have following questions; Why can you not get easily statistic information of vehicles in Baku, for example, number of vehicles by type (car, truck, microbus, bus) and by age (one, two, three or four years). If you can get the information whenever you need, you can make a realistic plan to improve air pollution due to vehicle exhaust gas by introduction of control system, for example, by means of control according to vehicle age.
7.	<i>Page 4-2 - Measurement of Vehicle Emissions</i> Measured items should also include Soot and Hydrocarbon.	This measurement of vehicle emission should be carried out by using mobile instrument introduced into BCE laboratory and Caspian Inspectorate laboratory from Netherlands. There are two sets of instrument but they can not analyse soot and hydrocarbon (HC). Since you have standard of three items, soot, hydrocarbon and carbon monoxide(CO) for exhaust gas, you can inspect vehicles by concentration of CO representatively.

b. Air Protection Unit (2)

	Comments and Proposals	Replies
1.	Air quality monitoring shall be organized on the main roads and city center streets in order to control vehicle emissions..	We agree.
2.	Air quality monitoring shall be carried out at the major point sources (oil	Monitoring by BCE is not necessary because each factory manages to control

	refinery, cement factory etc.).	emission and discharge by themselves. BCE should inspect environmental situation of each factory once or twice a year.
3.	One of the machinery plants shall produce filters by employing modern technologies.	Although there are many problems of technology, patent and market, etc., some machinery plants may be able to produce such filters. You had better produce them in your country because they could be very expensive when they are imported.
4.	Portable gas analyzers shall be purchased to measure concentration of harmful substances in vehicle emissions.	You have two sets of exhaust gas analyzers in BCE Laboratory and Caspian Inspectorate. You should give priority to how to utilize these equipment efficiently and how to apply the result of measurement to reducing air pollution.
5.	Technical assistance shall be provided in order to adopt EU standards.	What is the meaning of 'to adopt EU standards'? Do you intend to introduce EU standards to your country or only to study EU standards? You may get the assistance from European countries.
6.	Monitoring points with necessary equipment shall be established to monitor air quality.	We would like to know how you think of the current monitoring system maintained by Hydromet and what the problems are.
7.	BCE together with "Azeravtonaglyyat" transport concern shall be involved in licensing car repair shops.	Could you explain current licensing system of car repair shops and the necessity of involvement of BCE?
8.	Tariffs for hazardous substances discharged through fugitive and non-fugitive emissions from factories should be appropriately increased.	We agree.

c. Water Resources Protection Unit (1)

	Comments	Replies
Page 2-14	<i>Industrial wastewater.</i> It says that the maximum concentration of BOD and COD in industrial wastewater discharged to the sea is 381mg/l and 513mg/l. These concentrations are not clear because no reference has been made to certain enterprises. Other parameters have not been discussed in this section.	It simply says that the maximum discharge concentration of BOD and COD obtained by the Factories Survey is 381mg/l and 513mg/l. It is not clear whether the wastewater is discharged to the sea or not. However, since this paragraph is very ambiguous, it shall be revised through careful examination of the Factories Survey data.
Page 3-7	<i>Water Quality of Table 3-5, Phase 1.</i> Control of wastewater discharge from oil fields within the Jeiranbatan reservoir catchment area is currently carried out. There is a possibility of wastewater discharge to the catchment area from Khirdalan community and neighboring properties. Besides, an oil pipeline	Thank you very much for valuable information. Following the information, the sentence shall be replaced with "Strengthening control of wastewater discharge to Jeiranbatan reservoir catchment area from oil fields, Khirdalan community and neighboring properties including an oil pipeline going to Sumgait."

	going to Sumgait is located within the catchment area and in case of accident may cause pollution of the reservoir. These issues need to be discussed either.	
Page 3-7	<i>Water Quality of Table 3-5, Phase 2 and 3.</i> It says that BOD and COD in wastewater discharged to the sea should be complied with standards in 70% and 90 %. Other parameters are not discussed.	The Team proposes these figures for further discussion with BCE. Therefore you are requested to propose other parameters if they are necessary.
Page 3-7	<i>Water Quality of Table 3-5, Phase 2.</i> Commencement of the control of the discharge of raw wastewater from oil extraction. The SCE requires to inject the stratal water into the layer after separation from oil.	Thank you very much for valuable information. The Team will prepare the plan following the information.
Page 3-7	<i>Water Quality of Table 3-5, Phase 3.</i> 10% compliance with environmental standards for lake water quality. It would be advisable to add, "strengthening of control for wastewater quality, discharged into the lakes and discharge prevention".	We accept your advice.
Page 3-10	To review and develop wastewater control legislaton. It is advisable to add " the preparation of normative documents".	We accept your advice.
Page 3-17	Phase I, item 2. We advise to use this sentence "to publicise information relevant to illegal waste dumping and promote the illegal dump monitoring system.	We accept your advice.

c. Water Resources Protection Unit (2)

	Proposals	Replies
1.	Appropriate normative payment prices for wastewater discharged into the water bodies have to be developed and approved by the Cabinet of Ministers.	We found the word 'normative payment' for the first time. What is normative payment? Should each factory pay it during operation? How much is normative payment?
2.	Appropriate normative claim prices for damage to the environment and water bodies due to the wastewater discharge have to be developed and approved by relevant organizations.	We received the word 'Nortmative claim' for the first time. What is normative claim? How do you claim and decide the normative payment prices? How much is normative claim payment?
3.	To entrust approval of normative payment prices and claim prices to the SCE.	Which organisation has an authority of approval of normative payment and claim prices at present? What is the benefit of entrusting it to SCE?
4.	To provide specialists involved in analytical control with hardware.	What do you mean 'hardware' ? Computers are required to manage an analytical control.

5.	To review environmental manuals, GOSTs and other normative documents in accordance with new laws.	Could you show us the problems in manuals, GOSTs and other normative documents in accordance with new laws?
6.	To provide hardware (vehicle, computers, etc.) to increase work efficiency.	We agree.
7.	To organise specialists exchange programs (i.e. training programs) in order to study work of international environmental organisations.	For this purpose, we recommend you to ask technical cooperation programmes of international cooperation agencies. JICA has technical cooperation programmes for this purpose, i.e. dispatch of Japanese experts to Azerbaijan and training in Japan for your experts.
8.	To show films on environmental control management and regulations in Japan to BCE specialists.	Mr. Himi will try to bring a video of environmental control management.
9.	Financial motivation should be provided to BCE specialists.	This is the matter of Azerbaijan Government.

e. Land, Flora, and Waste Control Department

Proposals	Answer
I. Flora Unit	
1. Appropriate organisations should prepare a map of Baku city to identify the area of existing plantations, their locations, species and number of trees, bushes and other plants and to provide other data related to city vegetation.	Greenery development has been carried out by BEP, Ministry of Forest Economy and Ministry of Transport, thus they will be the organisations that prepare greenery maps. Now that the current greenery information was entered to the GIS, BCE should regularly receive information on greenery development from those organizations and keep the GIS updated. The GIS will then integrate greenery information of the entire city and be utilised by such organisations for greenery planning and implementation.
2. BCE shall be informed beforehand about planting of new areas or rehabilitation of existing plantations.	Why should it be beforehand? What would you like to do by being informed beforehand?
3. Amendments and additions should be made to relative laws and enforcement mechanisms should be developed in order to overcome or eliminate obstacles and drawbacks associated with claims against natural persons or legal entities, which have damaged plantations.	What items need amendments and what items need to be added?
4. Existing tariffs and fines for damage to the environment (cutting down or damage caused to trees, bushes and other plants) should be accordingly adjusted and increased.	We agree. What causes the delay of tariff adjustment?
5. In order to strengthen flora protection the personnel of the department should be	Basically we agree but the vehicles will be shared by other department. But we would

provided with vehicles.	also like to propose that the tasks of BCE Flora unit should not be field oriented, but policy-and-supervision oriented.
6. Salaries of inspectors should be accordingly increased.	This is the matter of Azerbaijan Government.
II. Domestic Waste Unit	
1. Page 2-5, item b, Par 1: It can be understood that some districts are not provided with waste collection services. However, it would be better to say that some districts are provided with <i>insufficient</i> waste collection services.	The paragraph will be replaced with "The number of areas receiving insufficient collection services is -----."
2. Par 2: "Collection of waste collection fees involves a number of organizations" is not correct. Housing committees collect waste collection fees. 90% of the fees collected by housing committees in Sabayil and Yasamal districts is transferred to KASKO and 10% is left to housing committees according to the agreement.	Thank you very much for the information. Since KASCO and UPA collect waste collection fees, the paragraph will be replaced with "-----", particularly as the collection of waste and waste collection fees involves KASCO and UPA, and Communal / Housing Department for other districts than the districts served by KASCO and UPA.
3. BEP should set clear tariffs for domestic wastes collection and disposal services.	We understand that the Cabinet of Ministers set the tariffs. Can BEP set the tariffs by law?
III. Hazardous Wastes	
1. Page 2-14, item 2.3, par 1: " <i>According to the Factory Survey, the most of the factories, which produce HW, treat/dispose HW within their compound</i> ". It would be appropriate if quantity and names of such factories have been included in the report.	For the Factory Survey we applied 8 industrial wastes, as shown in page 4-52 of the main report, in order to identify the demand of treatment/disposal of the wastes. Some wastes of the 8 categories may be HW, waste oil, oil sludge, etc. In addition we also conducted questionnaire survey regarding HW. The results of it are shown in pages 4-31, 4-32 and 4-33 of the main report. Combining these information we will try to provide the information requested by you in the DF/R.
2. Page 2-19, item e, par 1: Some hazardous wastes generated in Baku are treated and disposed. For example, "Azinteroil" Joint Venture provides oil sludge recovery (separation of oil, soil and water). Sludge originating from oil well drilling is disposed to the disposal site of Pirallahi Drilling Department near the Akhtarma mountain in Garadag district. Radioactive wastes are disposed of to the Isotope radioactive waste disposal site.	Thank you very much for your valuable information. We will present the information in the DF/R.
3. The existing problems in HWM: <ul style="list-style-type: none"> • There is no HW disposal site in Baku; • There are no HW classification and treatment methods; • No reports on exact amount of HW generated at factories; • There are no planning of HW collection, 	Thank you very much for your information. We will consider the information for the preparation of the master plan.

storage, transportation and disposal	
IV. Soil Resources	
1. There are a number of limestone open mines within the area of BCE's responsibility in Garadag, Sabunchi, Azizbekov and Sabail districts where stone blocks are produced for construction purposes. The total area allocated for limestone mining is 1089 ha, of which 700 ha have already been developed. Some parts of such open mines are still being developed while the others have already been abandoned. For the past eight years around 750,000 m ³ of limestone wastes have accumulated in abandoned open mines. If possible the issue of improvement of these areas should be considered during the study.	We basically agree to provide the issue of improvement of these areas. However, the content and extent of the issue highly depend on what kind of information you will provide us by the end of November. If we will not able to receive the information other than this comment, we will prepare the issue of improvement of these areas based on a site visit arranged by you.
2. Current problems of the department are lack of vehicles and financial motivation.	We understand lack of transportation is one of main issues, but financial motivation is the matter of Azerbaijan Government.

f. Fauna Unit

f.1 Comments

There are 8 persons working for the Fauna Department, including 4 inspectors, 1 hunt-inspector, 1 specialist-ichthyologist, the deputy head and the head of the department.

The controlled area is 375 km. We carry out

- protection of different species inhabited the controlled area,
- legal and illegal hunting control,
- species number record during migration,
- preparation and approval of the reports.

We completely agree with the technical aspects described in the report. It is important to supply us with technology (motor boats, vehicle). In addition, our inspectors need overalls, cameras.

f.2 Replies

The comments/proposals above were discussed in the meetings with the BCE and reflected into the M/P.

g. Chemical Analysis Unit

g.1 Comments

- *Page 3-1 of the English version of the report, Tables 3-1 - 3-9.* The source of the information mentioned in the tables has not been indicated.

- Page 4-2 of the Russian version of the report, Chapters E.2.1, E.2.2, E.2.3. The measured items, period, measuring sites are not enough for carrying out monitoring.
- Page 4-6, Table 4-2. to be discussed in details.
- Page 3-15, Table g: Food Environmental Control. to be discussed in details.
- Page 2-23, Chapter 2.4.5 Food Control. According to the Legislation of the Azerbaijan Republic, the BCE enables to carry out pesticides, heavy metals and radioactive control.
- The issue of the Central Laboratory establishing is mainly discussed in the report. We think that more attention has to be paid to the BCE ' laboratory improvement.
- There are many proposals and organisations indicated in the report, but no ways of problems solving have been mentioned (for example, page 3-15, Table g).
- It should be paid more attention to the role of the BCE ' laboratory.

g.2 Replies

The comments/proposals above were discussed in the meetings with the BCE and reflected into the M/P.

h. EIA Unit

	Comments	Replies
1.	In the introduction it is mentioned about implementation programme for priority projects. Which project are priority projects?	Intended priority projects are shown in Table 4-1 on Page 4-1.
2.	Page 1-10, C.1.2 - Environmental quality survey. It is not clear to us what do you mean by " accuracy assessment survey and data verification survey".	In case that you impose a fine on the result of measurement of pollutants, the accuracy of measurement should be expected. However, BCE staff complains the equipment are obsolete. Therefore, accuracy assessment survey was carried out.
3.	The soil quality should also be included in this chapter.	Since it was said that there were a lot of data of soil in Baku area, it was judged that field survey of soil on site was not necessary.
4.	C.2 The word "GIS" should be changed to "State Information Centre"	GIS is not the name of the place but the name of software system in common use throughout the world.
5.	2. Natural conditions (soil, flora, fauna, climate) - the maps should be attached. 1. Base map	Maps are put into GIS.
6.	2. Natural Conditions - to add "soil cover". Table 1-3 also to add "soil cover".	Soil Map was not put into GIS because it was not provided from C/P. (Refer to P/R(1) M/M 2.10)
7.	Page 1-14, C-3 - "the willingness to pay for the environmental improvement has	Financial support would be required for environmental improvement. The

	to be understood since WTP is a key element to make the environmental management M/P practicable and financially sound” - not clear to us.	implementation of M/P depends on the willingness of people to pay for environmental improvement. Therefore, it is very important to understand public opinion in advance.
8.	Page 2-1 Environmental Status - it is necessary to reflect environmental changes in bowels of the earth in result of oil extraction and pumping of associated water under layers at the Absheron peninsula.	Could you show us a correct expression because you are good at this environmental issue?
9.	Page 2-2, Chapter 2.3.1 “All authority rests with the Chairman” is not exact expression.	Could you show us a correct expression?
10.	Page 2-3. It is not practical and real to form the structure with two major elements in the BCE.	It is not proposed by JICA Study Team. It is proposed in the project for strengthening SCE by WB.
11.	Page 2-6. The buildings should be built within areas approved by BEP, taking into account ecological conditions and location of current buildings. Impacts on human activities also should be taken into account.	This part will be modified, taking your opinion into account.
12.	Page 2-11, a.4 - The results of analysis carried out in different laboratories must be collected in BCE.	BCE needs to collect available data from different laboratories in the necessity.
13.	Page 2-14, a.2.4 - “it is recommended that the oil content in the sludge is recovered and the remainder purified” - the project in this field was developed by “Giproazneft” and Azerbaijan Scientific-research Design Institute a long time before.	We appreciate your information.
14.	Page 2-19 - To attach map of legal and illegal hazardous waste dumping within Baku city area.	We want to attach such a map if you provide it.
15.	Page 2-19 The purification of oil contaminated land must be considered in complex.	It is not clear for us to understand.
16.	Page 2-20 “Practically the role of the BCE is to keep nature intact, and peoples’ access to the two sanctuaries is therefore not allowed” - we do not agree with this expression.	We heard from BCE that people are not allowed to enter the sanctuaries by law. However, we recently heard from other BCVE staff that it is not correct. We want to request BCE to clarify this point.
17.	Page 2-20 On the territory of Baku city it necessary take into account impact level of engineering and economical activity of people on environment (man’s impact).	We agree and consider that EIA at project commencement and follow-up of EIA are needed for this reason.
18.	Page 2-21 External Data Sources - BCE receives enough information, but it is not analysed.	BCE will be able to analyse the information by means of GIS.
19.	Page 3-2: Table 3-1 is not serious.	It is not clear for us to understand.
20.	Page 3-4, Table 3-3. A level of 1990 is	The data of 1990 will be inserted.

	taken as a basis but the table starts with 1999.	
21.	Page 3-4, Table 3-4. Dividing into three industrial sectors is not reasonable.	This dividing into three industrial sectors is generally familiar in the world.
22.	Page 3-4, Par 3.2.3. The level of environmental pollution does not depend on population growth only because industrial technologies become more efficient year by year.	Environment is polluted, not because industrial technologies become more efficient, but because technologies without considering environmental impact are introduced.
23.	Page 3-5, Par 3.3.1. Proposals on environmental protection, rehabilitation and resources conservation should be added.	Goals (vision) of M/P should be described here. Proposals will be presented in detail later as concrete plans.
24.	Page 3-7. M/P should be implemented in two phases but not three because ideas and proposals are repeating.	M/P should be generally implemented on the three phases of short term, middle term and long term in order to realise the above-mentioned goal.
25.	Page 3-12 c, Page 3-13 d and Page 3-14 e – The idea is repeating.	It is natural that each department would set the same target because they are facing same kind of problems.
26.	Page 3-20. "The Constitutional Court" should be replaced with "Economic Court". The SCE should be responsible for enforcement of payment for environmental damage.	Constitutional or economic is the matter of translation. Give us correct Russian or Azeri term. The second comment is not clear.
27.	Page 3-23 c. In order to improve BCE's staff expertise computer specialists should be invited to the BCE or computer courses should be provided to the personnel to enable a wide use of computers in the committee.	We agree with your opinion. You should do if possible. JICA Study Team has been conducting technical transfer of GIS including computer technology to young staff of BCE.
28.	Page 3-26 c.4. Strong recommendations should be made to stop irrational use of resources in limestone open-cast mines and sand pits.	JICA Study Team will visit limestone mines on 6 th of October.
29.	Page 4-1, Section 4-1. "Priority " and "Pilot projects" are very unknown concepts.	We understand these words are generally familiar in M/P project.
30.	Table 4-1. Item 6 should include a System to prevent contamination of the Caspian Sea.	It is possible to reduce the degree of pollution in Caspian Sea by carrying out monitoring of inland water quality. Monitoring of Caspian Sea water will not be considered in this M/P because the area is managed by SCE and Hydromet.
31.	Page 4-3, E.2.2. Outputs of the study carried out by a Dutch company should be used to investigate a sediment quality. The radiation level and water should be identified during sediment quality measurements.	Dutch did not carry out analysis of sediment in lakes. Unfortunately Hydromet has never analysed sediment in lakes. Therefore, JICA Study Team will analyse sediment in lakes in order to judge whether monitoring of sediment should be taken into account in M/P or not. The items to be analysed at least were decided.
32.	Page 4-4, E.3.2. This section shall	Pollution map is prepared to show the

	consider the use of contaminated lands within Baku area.	situation of pollution visually and this M/P is not a plan for rehabilitation of contaminated lands.
33.	Page 4-4. Table 4-4 is not well explained.	Could you point out the part to be explained?

i. Information and Environmental Education Department

i.1 Proposals

- The Information Department shall raise population awareness on the BCE's activity and ask citizens to report to the BCE when they witness environmental offences.
- As it is important to raise public awareness in order to improve the environment, articles regarding different environmental issues should be printed in mass media, ecological campaigns should be carried out together with socio-political societies.
- To inform the population through mass media about draft environmental laws which are subject to the Parliament's approval and, if necessary, to discuss these laws with none-governmental organisations and population.
- To inform population through mass media about organisations and physical persons which do not carry their activities in compliance with environmental legislation.
- To organise actions to educate careful relation to the environment in people and increase the level of environmental education of general public. Jointly with government, non-government, academic and public environmentally active organisations, the BCE shall organise the dissemination of knowledge about environmental and personal health impact of consumption of food and other products not meeting environmental standards of rational utilisation of nature resources, as well as hold public awareness campaigns, conferences and other events.
- To organise meetings and campaigns raising environmental education among schoolchildren.
- To place advertisement boards regarding environmental protection in Baku city.
- To prepare pamphlets on environmental protection in order to raise public awareness and carry out opinion polls among the population.
- To broadcast environmental advertisements through advertising TV agencies.
- To select the best ecological articles published in mass media in 2000, to award prizes to articles' authors.
- To inform population about industries inspections carried out by relevant departments of the BCE.

- To organise subscription for ecological magazines and newspapers published in Azerbaijan and CIS countries, and, if necessary, carry out discussions of articles between BCE's specialists.
- BCE shall co-operate with international organisations in the area of environmental protection and upon the SCE's approval make agreements on the solution of environmental problems with foreign companies.
- To carry out ecological propagation, to study environmental management of developed countries.
- Jointly with relevant executive power bodies and scientific institutions, the BCE shall develop an information database on environmental pollution and negative environmental impact, inform relevant bodies and publish information in the press, duly exchange it with regional and international organisations. The BCE shall participate in the organisation and conduct of environmental monitoring activities.
- To explain to citizens the importance of environmental problems, and the role of population in keeping the city clean.
- To purchase video equipment for the Information Department and establish Information Centre.

i.2 Replies

The comments/proposals above were discussed in the meetings with the BCE and reflected into the M/P.

8.3 Comments on P/R(2) and the Team's Replies

8.3.1 Comments from the Committee for Amelioration and Water Farm

	Comments	Replies
1.	The P/R (2) says that "...most of those polluted lakes are not used for domestic or agricultural purposes and there are no reports on major impacts on public health" (page 1-7). However, those lakes are considered as main water bodies which cause direct impacts on Baku environment and public health. Therefore, regular monitoring should be established and conducted on those lakes including a highly contaminated lake in Surakhani district.	We agree the necessity of regular monitoring in lakes (including Lake Bul-bul and Lake Zykh in Surakhani district) and will propose a monitoring system in the DF/R.
2.	The water ditch (water way) around the Jeiranbatan reservoir was constructed to collect and derive surface runoff but not wastewater (page 1-8).	"Wastewater" mentioned here means surface runoff contaminated by running through illegal dumps and other polluted land around the reservoir.
3.	At present, the Committee for Melioration and Water Economy and ARWC do not carry out regular monitoring of water quality in the	We agree the necessity to monitor the Jeiranbatan reservoir and its chatchment and will propose a monitoring system in the DF/R.

	Jeiranbatan reservoir and it was mentioned in our comments on P/R (1). However, in response to our comment you said that the Jeiranbatan catchment area had not been included in the Study Area and therefore establishment of monitoring for the reservoir would not been considered in this study. But we deem necessary to reconsider this issue because of the importance of the reservoir as a major drinking water source for Baku population.	
4.	According to Decree #195 dated the 25 th of September 1998 and issued by the Cabinet of Ministers the Committee for Melioration and Water Economy is responsible for use and protection of surface water bodies. We consider reasonable to take this into account in further phases of the study.	We consider that your committee is responsible for the control of the Jeiranbatan reservoir and we would expect you to work effectively with the BCE for Baku environment.

8.4 Comments on DF/R and the Team's Replies

Twenty days were given to the Azerbaijan side to express their comments on the DF/R after the M/M on the DF/R was signed.

8.4.1 Comments from the BCE

The team received a letter from the BCE which said that there were no comments on the DF/R except those from the state transportation concern Azeravtonagliyaat.

8.4.2 Comments from Azeravtonagliyaat

The state transportation concern Azeravtonagliyaat sent some proposals to the report as below.

	Proposals	Replies
Section 2.2.3, item b.3 of May 2000 Report		
	<ul style="list-style-type: none"> - Development of the environmental station described in this item at Baku ferryboat; - Development of control and adjustment points for vehicle ignition systems near the environmental stations. 	Your both comments are for P/R(1), which was already completed. However, we appreciate your proposals and recommend you to discuss on their feasibility.
Section 2.3.4, item b.1.4 of January 2001 Report		
1.	Enactment of legislative acts regarding the adaptation of international and European standards.	In the report, we also suggested the BCE/SCE to improve legislation.
Section 2.3.4, item b.2 of January 2001 Report		
1.	Development of computer-based system for traffic lights management and improvement of traffic stream control in	We appreciate your proposal. It will be considered by another JICA study on transport or elsewhere.

	Baku.	
2.	Reconstruction and putting into operation of Baku ring road	Ditto.
3.	To supply the environmental stations, situated at Baku exit and entrance, with mobile laboratories at the expense of foreign investments	We consider that our proposal (establishment of one new monitoring station to monitor air pollution caused by vehicle exhausts in the city center) is a project of a realistic scale considering the present limited readiness of the Azerbaijan Government to allocate budget to environment management. We will suggest you to seek for foreign investments for the said purpose only if you consider you could manage the O&M cost.
4.	To entrust to the State Transportation Concern "Azeravtonaghiyyat" the development of control and adjustment points for vehicle ignition systems near the environmental stations	The control of vehicle ignition systems should be a routine work that has to be constantly carried out and be financed by the Azerbaijan Government. Any international agencies can only assist such work only temporally and only if it seems to be sustainable after assistance.