

Ecological Zones of Azerbaijan

Diversity of orography, soils and vegetation are characteristics of the environment of the Azerbaijan Republic. The climatic conditions of the Republic are diverse in particular the microclimates which do not require large homogeneous areas.

According to the character of orography, vegetation and topsoil, Azerbaijan is roughly divided into 5 climatic zones: the Greater Caucasus, the Lesser Caucasus, Nakhchivan, Lenkoran and Kura- Araks; each of these zones is characterized by different natural conditions, which serve as a basis for identifying the physical-geographic districts. There are 19 physical-geographic districts. The territory of Azerbaijan belongs to 2 physical-geographic countries: the Caucasus and the Front-Asian plateau. The Caucasus includes 4 regions: the south-eastern part of the Greater Caucasus, Lesser Caucasus, the Kura intermountain hollow, the Lenkoran zone. The Front-Asian plateau covers the Middle Araks zone.

From the geological history of the Caucasus it is known that all the steppe area of Azerbaijan approximately till the second part of the Tertiary period was under the waters of a large sea.

The Greater and Lesser Caucasus, which protruded from the sea, as well as the Talysh Mountains, were covered by subtropical vegetation, the remains of which are preserved in certain zones to this day (the Talysh region). They are evidence of a mild, warm and humid climate which dominated at that time.

With the retreat of the sea, gradually increasing areas of land appeared on the surface of the Caucasus. Upon these areas the modern climatic conditions of the central steppe region and the Nakhchivan region were formed.

While analyzing the modern state of the climatic zones it is necessary to note that anthropogenic factors play an important role in the formation of the micro-climate, relevant orography and vegetation. For the description of ecological districts it is necessary to identify the extent and duration of population pressure.

The task of this section is to analyze the state of the environment, to define priorities and the range of environmental problems. Their selection was based on two criteria:

- whether the problem creates a serious threat to human health
- whether the problem may cause irrevocable changes in ecosystems, that will result in the reduction of biodiversity and the degradation of landscapes.

Work on the assessment of the ecological situation has been carried out in the Republic with the use of the following indices: reproductive capacity (on oxygen and water), demographic capacity, power consumption level, a module of hazardous substances discharged into the atmosphere, an integrated index of the municipal construction impact on the environment.

The reproductive capacity of the Republic's territory of oxygen was determined on the basis of the biological productivity of plant ecosystems, the coefficient of a transition from biological productivity to free oxygen.

The total oxygen production of Azerbaijan is estimated at 36.2 million tons per year without taking into consideration the oxygen production of the Caspian ecosystem. The maximum productive capacity being in the central part of the Greater Caucasus in the Sheki-Zakatali region (over 6 million tons), the lowest reproductivity being in Nakhchivan and the Apsheron Peninsula (0.7 and 0.8 million tons per year respectively). The reproductivity index of atmospheric oxygen as applied to specific territories varies from 1.4 in Nakhchivan and 6.6 in the Karabakh zone. Among the administrative districts the index value ranges from 0.04 in Baku city to 13.7 in Sheki district.

In terms of surface waters the reproductive capacity of the Republic's territory constitutes 7.6 billion m³. The Lenkoran and Sheki-Zakatali regions of the Republic are distinguished due to the highest reproductive capacity, which is 2.5 and 2.4 billion m³ respectively. The lowest value of reproductive capacity falls in the following regions: Araks region - 7.8 million m³, Apsheron region - 10.5 million m³, Mugan-Salyan region - 14.6 million m³.

The demographic or threshold capacity of the territory is the maximum number of people that can be located within the territory, provided that the most important daily needs of the population at the expense of

local resources are met, and the economic balance is guaranteed. Based on recreation, water and agricultural resources, the demographic capacity of territory has been identified for 11 regions of the Republic.

Calculations of the demographic capacity of the territories are mainly of empirical character, however, they permit different characteristics of the regions of Azerbaijan to be recognised. This makes it possible to divide the landscape-geographical structures into ecological zones. The range of differences in the recreation capacity index of the territory is constituted of 5.6 thousand people (Sheki region) to 27.8 thousand people (Lenkoran region); on the water resources index - from 54 thousand people (Baku region) to 2,651 thousand people (Sheki region); in the index of suburban agricultural lands - from 40 thousand people (Agdam region) to 260 thousand people (Ganja region).

As one of the integral indices of population pressure on the environment, the level of total electric power consumption (for production needs) has been used, estimated as one million km²/year in the regions of the Republic, and this has enabled us to identify the following categories of the regions of the Republic:

- with a very high level of consumption (more than 350 thousand KWatt hour/year) - the Apsheron region (6.7 % of the republic's territory)
- with a high level of consumption (161 thousand - 350 thousand KWatt hour/year) - Ali-Bayramli, Mingachevir and Ganja regions (16.1 % of the republic's territory);
- the rest of the territory (72.2%) belongs to regions with an average and low level of power consumption.

The amount of contaminants per km² is shown in the module of hazardous effluents to the atmosphere. By this index, the territory of the Republic is differentiated into the following groups: slightly contaminated (18 districts), contaminated (25 districts), highly contaminated (14 districts), critically contaminated (14 districts), as well as the territories of Baku, Sumgait, Ganja, Mingachevir, Nakhchivan and others.

During the study of the state of the environment in Azerbaijan about 500 problematic situations have been revealed. According to their priority they may be classified as follows: 64 ecological problems caused by contamination of water resources; 48 - by air contamination and trans-boundary transmission of contaminants; 281 - by contamination and destruction of topsoil including those caused by big cattle-breeding complexes and mineral mining; 30 - by the critical impact of the anthropogenic activity on flora and fauna; 71 - by town-planning in urban settlements and motor transportation.

Proceeding from the seriousness of the ecological consequences, the problematic situations have been classified into 4 categories: very serious, serious, average and weak. Such a classification has enabled an understanding of the priorities of the ecological problems, and has also outlined the ecological districts.

According to the state of the ecological situation and the character of the landscape and climate, the territory of the Republic may be classified into the following categories:

- with the most acute ecological situation (the Apsheron Peninsula with Baku, Sumgait cities, the Kura River with Ganja, Mingachevir, Ali-Bayramli cities), where more than 70 % of the Republic's population lives
- with a serious ecological and town-planning situation (Nakhchivan and practically all of the Kura-Araks lowland) with a total population of 315 thousand people
- with individual ecological problems - the remainder of the Republic's territory.

The main sources of contamination and degradation of the natural environmental components are:

- water resources - industry, agriculture, municipal domestic sector, energy, heating, recreation
- air basin - industry, mainly petrochemistry, motor transport, municipal-domestic sector
- land resources - agriculture, industry, water supply system, town planning activity, transport, engineering infrastructure, recreation
- flora and fauna - agriculture, recreation, transport, engineering infrastructure and industry.

Taking into account the level of anthropogenic impact, the state of the environment, climatic landscape peculiarities and the existence of ecological problems, the territory of the Republic may be divided into the following ecological zones, which form several physical geographic regions: