ANTHROPOGENIC DYNAMICS OF THE FOREST LANDSCAPE OF PLAINS AND THEIR OPTIMIZATION

Sh.S.Amanova

Institute of Geography of Azerbaijan National Academy of Sciences
AZ1143, Baku, H.Javid ave, 115

The article is devoted to the analysis of forest landscapes and their ecological conditions in the transported cones of Goychay, Girdimanchay and Turyanchay rivers with the application of the ArcGIS program. In order to assess the ecological conditions, the «point» gradation is used. On the basis of this way, the kinds of landscape are analyzed in accordance with their ecological conditions.

The defining of ecogeographical rate of anthropogenic modifications allows to define the assessment of landscape complexes. These rates enable to analyse ecogeographical conditions of transformation as well. Based on the definition of ecogeographical rates, the complex ecogeographical assessment is conducted in the work.

Introduction. Determination of anthropogenic transformation and differentiation, as well as ecological conditions of landscapes are the main objectives of geographical researches conducted in recent years. These studies are important in terms of defining anthropogenic transformation, differentiation and also scale of ecogeographical conditions. In the meantime, this carried out work enables to identify the natural resource potential, the modern conditions, the modern trends observed in the forest landscape of plains, as well as the territorial planning and management.

The study of anthropogenic transformation and differentiation of the territory is quite appropriate and representative in terms of the solution of problems of forest landscapes of plains around the Ajinohur low mountain areas.

The aim of this research work is to learn the evaluation of anthropogenic transformation and differentiation of the Ajinohur low mountain area and surrounding areas, as well as to determine the modern trends in the different landscapes.

The territory of plain forest landscape is a region of higher natural potential. On the other hand, it is significantly transformed due to the impact of agriculture activity. It is characterized by the high level of flora and fauna, relief and climate conditions.

Research methods and initial data. In order to determine the anthropogenic transformation and differentiation, the following cartographic sources are used by us.

- Landscape Map of Ajinohur (scale 1:100000);
- Topographic Maps of Azerbaijan (scale 1:100000);
- Google Earth Maps.

To assess the ecological conditions, the «point» system is applied. Since the assessment of ecogeographical condition is conducted in different anthropogenic modification, we used the following formula:

$$ERA.M = (LE : LN) \times 100 \text{ [2]},$$

where ERA..M is the rate of anthropogenic modification (by «point»); LE is an area of etalon landscape; LN is an area of natural landscape.

After the defining of ecogeographical rate of anthropogenic modifications, the assesment of ecogeographical rate of each landscape complex is reachable. We have done the same by the Ajinohur low mountainous area.

$$C.E.R = (ERS.a + ERP + ERS + ERR + ERG) : n \text{ [2]},$$

where C.E.R is Complex Ecogeographical Rate (by «points»); ERS.a is ecogeographical rate of sown area; ERP is ecogeographical rate of pastures, ERS is ecogeographical rate of settlements; ERR is ecogeographical rate of highways; ERG is ecogeographical rate of gardens; and n is general number of anthropogenic modifications.

The anthropogenic transformation and differentiation of landscapes of the investigated area were determined due to different parameters (the change of forest area, settlements areas, sown areas, pastures areas and roads, degradation level of soil and etc.). This analysis revealed that landscape transformation and differentiation is quite different by several landscapes.

Study area. The total area of Ajinohur low mountainous area and the surrounding areas is 4476 km². 12% (545 km²) of them are the mountainous semideserts, 65% (2892 km²) are the dry steps, 7% (312 km²) are the arid forests and shrub landscapes, while16% (726 km²) are the forest landscape of plains (Figure 1).

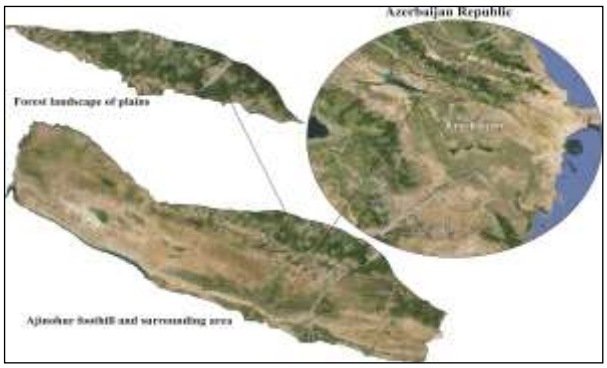

Figure 1. The research area

The area of landscape type is 724 km². The transported cones around the Ajinohur low mountain area are covered with forest landscape of plains. The relief consists of flats. This landscape is available in the Samur-Davachi flat area, the Garayazi plain and the Qanikh-Ayrichay area. The area of this landscape was larger in the beginning of the XX century. The area has been reduced as a result of the intense anthropogenic influences.

The forest landscape of plains is available in dry climate. The average annual amount of atmospheric precipitation is 500-600 mm, whereas the amount of evaporation makes up 1000 mm. The main reason of arising of these forests is the availability of surface waters close to the Earth surface [1].

The main flora types are polar, oak, alder, etc. The base of soils is composed of dark brown and gray soils. The amount of humus is 5,8-6% [3].

Main results. There are 11 natural sorts of forest landscape of plain in the investigated are (Figure 2).

The analysis of the anthropogenic transfermation of modern landscapes of the Ajinohur low mountainous reveals that the structural and functional character is connected with the forms of anthropogenic influence. The population, agriculture (sown area, pastures) and transport are the most influential factors responsible for the transformation of landscapes of this landscape.

Moreover, there are many important archeological, natural and historical monuments which increase the recreational importance of the region.

The highest density of population is available in the transformed cones of rivers. Due to the anthropogenic modifications, the map of anthropogenic transformation of the research area is compiled (Figure 3).

20% of this landscape is the middle changed, 34% is the little changed, 44% is the strongly changed, 2% is the intensive changed landscapes. (Figure 4).

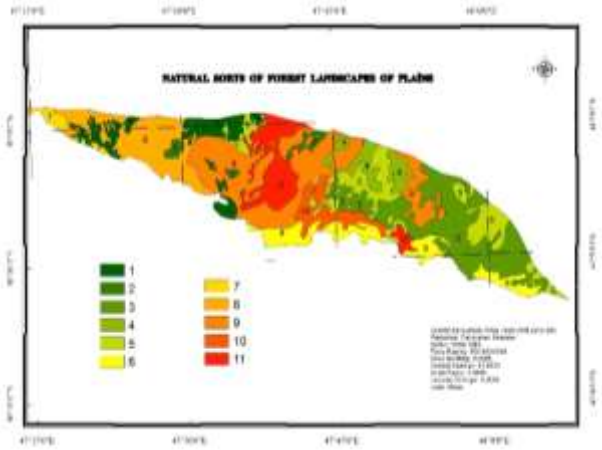

Figure 2. Natural landscape sorts of plains forest

1. Infringed forest-bushes on the meadow-forest and brown-forest soils of upper part of transformed cones; 2. Gardens after forest and seliteb comlpexes on the meadow-forest, incompetely chestnut soils of arch part of transformed cones; 3. Poplar, oak, alder, wing nut and etc. on the meadow-forest soils of less inclined transformed cones which less fragmented; 4. Sparse trees on the meadow-forest soils of transformed cones which middle fragmented; 5. Rebushes after forest on the meadow-forest and incompetely brown soils of transformed cones surface which less fragmented; 6. Bushes after forest on the brown-forest soils of alluvial-proluvial middle clined plains, low mountainous which middle fragmented; 7. Meadow bushes after forest on the chestnut soils of incompetely alluvial-prolluvial plains which middle fragmented; 8. Sparse bushes on the meadow-forest soils of alluvial plains; 9. Sparse tree and bushes after forest on the meadow-forest soils of less clined surface of alluvial plain which less fragmented; 10. Forest-bushes on the brown mountain-forest soils of low mountainous which middle fragmented; 11. Forest-bushes as result of anthropogenic influences on the brown mountain-forest soils of low mountainous with old which middle fragmented;

Figure 3. Anthropogenic transformation of forest landscapes of plains

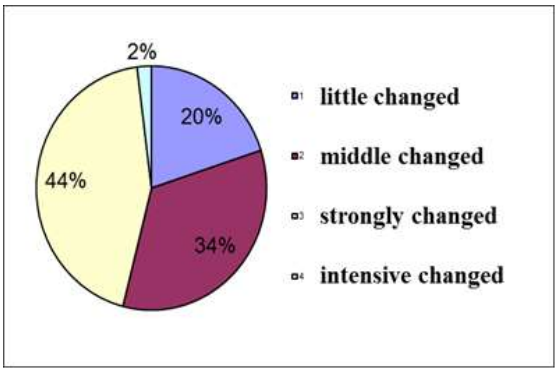

Figure 4. Anthropogenic transformation in plain forest landscape

1% (2,2 km²) of forest landscape of plain consists of roads, 36% (258 km²) are the sown areas, 13% (95 km²) are the settlements, 7% (49 km²) are the gardens, 25% (180 km²) are the forests, 1% (7,5 km²) are the pastures, and 17% consists of other modifications (Figure 5).

Demographic influences on forest landscape of plain can be estimated by indicators as the number of settlements (administrative territorial units, villages and others) number and the density of population per 1 km² of area of landscape. Most of the settlements (95 km²) are situated in the Ajinohur low mountain area and the surrounding areas.

14% (13,6 km²) of the settlements are administrative territorial districts, while 86% (81,4 km²) are the villages and others. 24% of the highways i the paved roads, 25% are (1,3 km²) the uncovered roads, 6% (0,3 km²) are the ground roads, while 45% (0,06 km²) are the rural roads (Table 1).

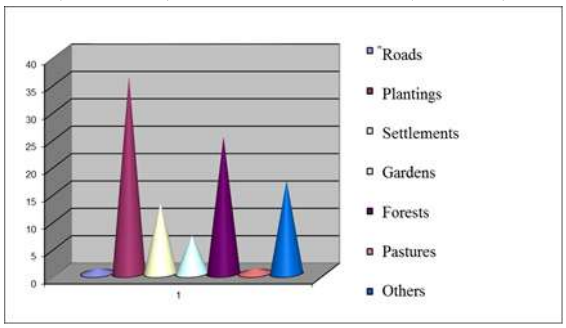

Figure 5. Land use in the forest landscape of plains

Table 1

Some data of highways in the research area

Kinds of highways	Length (with km)	Area (with km²)
Paved highways	118	0,7
Uncovered highways	123	12
Rural roads	216	0,3
Ground roads	29	0,06
Total	486	13,06

According to the complex ecogeographical assessment of landscape types, 99-100 ecogeographical points indicate stable landscapes, 75-99 points mean landscapes in good condition, 60-75 points indicate 'satisfactory' landscapes, while 0-65 points include the landscapes, ecogeographical conditions of which is critical. All areas of the forest landscapes of plains belong to 'good' landscape.

In the forest plain landscapes the points of roads are higher and makes up 99,5. The indicator is 98 by pastures and 95 by gardens. These and other indicators are reflected in Table 2.

Table 2

Assessment of ecogeographical condition of the plain forest landscape in the Ajinohur low mountain areas by points

Landscape type	Settlements	Sown areas	Pastures	Gardens	Roads	Complex ecogeographical condition
Plain forest landscape	82	65	98	95	99,5	88

Conclusion. The forest landscapes of the Ajinohur low mountain area and its surroundings have experienced the most considerable changes since the early days of human development, while the forest area has been decreased intensively. Most part of landscapes in the Ajinohur low mountain areas and its surroundings were covered with forests in the past, whereas now they are represented with the fragments of forest, agricultural lands, settlements, shrubs, roads and etc.

REFERENCES

1. Əyyubov Ə.S., Hacıyev Q.Ə. Azərbaycan Respublikasının iqlim ehtiyatları, Bakı, 1984, 184s.

2. İsmayılova A.A. Böyük Qafqazın cənub-şərq yamacı landşaft komplekslərinin ekocoğrafi qiymətləndirilməsi // Bakı Universitetinin Xəbərləri, Təbiət elmləri seriyası, 2014, №2, s. 164-169.

3. Məmmədov Q. Ş. Azərbaycanın torpaq ehtiyatlarından səmərəli istifadənin sosial-iqtiadi və ekoloji əsasları. Bakı : Elm, 2007, 856s.

DÜZƏN MEŞƏ LANDŞAFTLARININ ANTROPOGEN DINAMIKASI VƏ ONLARIN OPTIMALLAŞDIRILMASI

Ş.S.Amanova

Məqalədə Göyçay, Girdimançay və Türyançayın gətirmə konuslarında yayılan düzən meşə landşaftları və onların ekoloji vəziyyəti ArcGIS proqramında təhlil edilib. Ekoloji vəziyyətin təhlili üçün «bal» sistemindən

istifadə olunub. «Bal» sistemindən istifadə edərək hər bir landşaft növü üzrə ekoloji vəziyyəti analiz etmişik.

Antropogen modifikasiyaların ekocoğrafi qiymətini müəyyən etdikdən sonra landşaft komplekslərinin qiymətləndirilməsi mümkündür. Bu, qiymət transformasiyanın ekocoğrafi vəziyyətini də müəyyən etməyə imkan verir. Ekocoğrafi qiyməti müəyyənləşdirdikdən sonra kompleks ekocoğrafi qiymətləndirmə aparmışıq.

АНТРОПОГЕННАЯ ДИНАМИКА РАВНИННЫХ ЛЕСНЫХ ЛАНДШАФТОВ И ИХ ОПТИМИЗАЦИЯ

Ш.С.Аманова

В статье на программе ArcGIS проанализированы равнинные лесные ландшафты, распространенные в наносных конусах Гекчайа, Гирдиманчайа и Турианчая, а также их экологическая ситуация. Для анализа экологической ситуации нами было использовано очковая система. Используя эту систему было проанализирована экологическая ситуация для каждого типа ландшафта.

Определение экогеографической оценки антропогенных модификаций дает также возможность определения оценки ландшафтных комплексов. Такая оценка позволяет определить состояние экогеографической трансформации. После определения экогеографической оценки было проведено комплексная экогеографическая оценка.