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Research Article

Reserved Areas Importance in Presering Biodiversity and Ecological Stabilization

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Abstract

Climate change and its adverse environmental consequences that we observe in last decades in all parts of the world compel all ecologists of the world to look for efficient measures to stop or at least mitigate it. One of these measures can be the increment and preservation of all existed forests and reserved areas. Climate change process is exacerbated by deforestation, forest degradation and overexploitation in many forests' rich countries of the world like Brazil, Russia, Indonesia, etc. Another source of climate change is the acceleration of urbanization tempos and air and noise pollution due to city traffic. The degradation of ecosystem services in the world contribute to increase of nature disasters like floods, storms, tidal surges, draughts, and natural and human induced fires taking place every year in USA, Australia, Russia, etc. In this situation forests and especially reserved areas can play significant role in mitigation of climate change consequences by absorbing carbon dioxide and submitting oxygen to the atmospheric air. We must use this unique role of forests and reserved areas by means of enlargement of existed and creating more new reserved areas and preserving forests from many detrimental human induced effects like deforestation, forest degradation and overexploitation. Government leaders and policy-makers from all countries of the world must understand that future of the planet is in our hands and remember that nature can survive without us, but we cannot survive without nature.

Keywords: reserved area; climate; ecology; stabilization; forest; nature; national park; habitat

1.Introduction

Scientific and technical progress brought significant benefits to all peoples of the world but at the same time it was accompanied by many detrimental effects to environment, biodiversity degradation and climate change acceleration. Increased levels of exhausted transport emissions into atmosphere poisoning ambient air in big cities and settlements, causing allergies, respiratory and cardiovascular diseases and lung damage [1,2]. The greatest threats to climate change are: deforestation, forest degradation and forests uncontrolled overexploitation. Especially must be underlined the cut and slash practice in Africa and Latin America where forest lands are converted into agricultural use by indigenous people due to extreme poverty and lack of other facilities to satisfy their elementary human needs. Natural and human induced forest fires taking place in North America, Brazil, Australia, Russia, etc. are also big contributors to climate change [3.4].

Forests and especially reserved areas help to conserve natural ecosystems and provide habitat to forest fauna representatives and people with wood materials and non-wood forest products that help to maintain food security in the world. They are the natural barriers against disasters. They make stable of natural resources and many other ecosystem services. Forest and reserved areas help people as well as different species of flora and fauna in adaptation to climate change. In 2019 many well-known ecologists of the world suggested the plan that was called, The global deal to nature'' for saving the biodiversity on the planet and abundance of life on the earth by enlargement of reserved areas up to 30 % and to designate additional 20 % of adherent territories as climate stabilization zone by 2030 [5]. This plan must be supported by all scientists of the world working on problems of ecology, biodiversity loss and to climate change. Moreover, scientists have to convince government leaders and policy makers in all countries of the world the importance of this plan and that future of the planet is in their hands. This plan will help to keep the average global temperature on/below 1.5^0 C. Many countries of the world have already achieved this goal and others are still working to keep pace with them [6.7]

2. Results And Analysis

2.1 Case study of Georgia

Protected areas are the key factor to have protected planet. Well managed protected areas not only conserve ecosystem services but also benefit communities and provide solutions to global challenges like water provision, soils protection, food security, human health and well-fare, disaster risks reduction and climate change mitigation [8] One of the important ways of conservation and restoration of biodiversity of the planet is increment of extensive network of protected natural territories. Specially established protected natural areas are geographical territories that are under state-level protection in order to safe and maintain biodiversity of nature. Rare and typical natural ecosystems, habitats for rare flora and fauna species, landscapes that are peculiar, beautiful and geomorphologic formations, as

well as territories, significant for recreational and educational purposes are preserved on these areas [9,10].

Georgia is notable for biodiversity. About 400 trees and shrubs of different species grow there. Among them are many species of endemic and relict trees and bushes of local and the Caucasian importance. The best way of preserving local flora and fauna is the enlargement of the reserved areas. At the beginning of the twentieth century there were few reserved protected areas in the world. Today their number account more than 200 thousand. Protected areas provide wide range of social, environmental and economic benefits to people and communities worldwide. They conserve nature and are associated with cultural resources of local communities and indigenous people. Protected areas are the vital response against some today's most pressing challenges including food and water security, human health and well-being, disaster risk reduction and climate change [11, 12].

From reserved areas in Georgia are organized: strict nature reserves, national parks, managed reserves, natural monuments and protected landscapes (table2.1). Until 2005 there were 15 strict nature reserve, 5 hunting farm and only one national park that was not recognized by IUCN because it wasn't organized according to their regulations, there wasn't strict nature reserve [13]. After including strict nature reserve in Tbilisi national park, it was recognized by IUCN [13.14]. By Conservation International Georgia is praised as an area distinguished for richness of species and complex of landscapes, variation of climate and ecosystems [15]. The central and eastern parts of Caucasus mountains are especially rich by endemics. Some ecosystems of Georgia have global environment value. There are 31 sites of special importance for bird species, 17 sites of special interest for biodiversity, which are included in the Emerald Network. Since 2019 Georgia officially Adopted Emerald cites of its territories [16]. The wetland forests of central Kolkheti Lowland located by the Black Sea coastal line, as well as unique peat bogs and alder forests are included in the Ramsar List of Wetlands of international importance [17]. According to 1990 registry of the state fund of Georgia the total territory of reserved areas occupied 200591 hectares with 15 strict nature reserve with territory of 168872 hectare and 5 hunting farm -12283 hectare.

	Year								
Category	2013	2014	2015	2016	2017	2018	2019	2020	2021
Strict nature reserve	14/ 140672	14/ 140672	14/ 140672	14/ 139049	14/ 139049	14/ 139049	14/ 131301	14/ 131301	14/ 131301
National Park	11/ 352566	11/ 352566	11/ 350385	11/ 349327	11/ 347927	11/ 347921	12/ 430202	12/ 434382	13/ 445768
Managed reserve	19/ 70393	19/ 70393	19/ 70266	19/ 71530	19/ 71530	19/ 71530	23/ 75207	23/ 75207	23/ 75207
Natural monument	41/ 2378	41/2378	41/ 2378	42/ 2932	42/ 2941	40/ 2754	40/ 2749	40/ 2749	40/ 2749
Protected landscape	2/ 34708	2/ 34708	2/ 34708	2/ 34708	2/ 34708	2/ 34708	1/ 31518	1/ 31518	3/ 138327
Total	**87/ 600597**	**87/ 600597**	**87/ 598409**	**88/ 597547**	**88/ 596156**	**86/ 595963**	**90/ 670978**	**90/ 675157**	**93/ 793352**

Table 2.1.1 Protected areas of Georgia by categories, number/hectare, 2021

Source: 1. Ministry of Environment Protection and Agriculture of Georgia

2. LEPL Agency of Protected Areas

The first strict nature reserve was established in east Georgia in 1912 in Lagodekhi. It was the first strict nature reserve not only in Georgia, but in the Caucasus region altogether. The strict nature reserves conserve regional rare and typical ecosystems and biodiversity of local nature, habitats of rare species of fauna and flora, landscapes that are peculiar, beautiful and characteristic for the given region of the country, geological and geomorphologic formations, as well as, beautiful forest territories most significant for recreational purposes. In strict nature reserves grow such relict and endemic species of Georgia and Caucasus as: Pinus Pithuisa, Pinus Eldarica, Querqus Pontica, Buxus Colchica, Rhamnus Imeretina, Rhododendron Ponticum etc [18,20]. According to 2021 data there are 93 reserve area in Georgia with territory of 793352 hectare, among them: 14 strict nature reserve with territory of 131301 hectare; 13 national park with territory of 445708 hectare; 23 managed reserves with territory of 75207 hectare; 40 nature monuments with territory of 2749 hectare and 3 protected landscapes with territory of 138327 hectare.

In natural reserves of Georgia along the endemic and relict plants and bushes are preserved many local animals and birds. Among them from animals: brown bear, wild cat, common marten, Eurasian badger, grey wolf, red fox, nutria, Asiatic jackal, European lynx Caucasian goat etc. From birds: hawk, griffon vulture, hillock eagle, tawny owl, rock partridge, Caucasian blackcock, Turkey vulture, Eurasian woodcock, wood pigeon, goshawk, white stark, crow, Eurasian jay, pheasant, etc.

Historically Georgia was considered as forest rich country, but little by little it lost this status due to different reasons, mostly from foreign invaders in early centuries and later from uncontrolled overexploitation. It continued until 1970s when forests were exploited on scientific base. It continued up to the breaking of the Soviet system. From 1991 on, the chaos in forest overexploitation continued with new wave and this trend is still continued. Strict nature reserves played great role in preserving the biodiversity of forests. Georgia have always been a leader country by reserved areas amount in the south Caucasus, but presently it legged behind from our close neighbors. According to World Bank data base of 2021 the percentage of terrestrial reserved areas of Georgia from the whole territory of the country was 9.3, though it increased presently up to 13% by the end of 2021. According to the same World Bank data Azerbaijan has 24.3 % and Arnenia-10.2.

2.2 Reserved Territories and Biodiversity in the Other Parts of the World

If we look at table 2.2. 1 we'll see that many countries of the world have already exceeded the target of 30 % that was designated in 2019 by the

leading ecologists of the world for keeping the world's average temperature increase by 2030 at 1.5^0C. We must be in a hurry to catch up with the leading countries as there is only seven years ahead. We have many beautiful landscapes rich by biodiversity, geographical and geomorphologic features, flora and fauna that deserve and must be organized as strict nature reserves, national parks, managed reserves, natural monuments or protected landscapes. It must be underlined that the biodiversity of the country and relict and endemic species have been preserved due to the reserved areas [21].

N	Country	%	N	Country	%
1	Austria	29.3	21	Guinea	37.6
2	Andorra	26.9	22	Japan	29.7
3	Bahamas	36.6	23	Liechtenstein	42.6
4	Belize	37.5	24	Luxemburg	51.3
5	Benin	29.6	25	Malta	30.6
6	Bhutan	49.7	26	Mozambique	29.5
7	Bolivia	30.9	27	Namibia	37.9
8	Botswana	29.1	28	New Zealand	33.4
9	Brazil	30.3	29	Norway	29.9
10	Bulgaria	41.0	30	Poland	39.5
11	Cambodia	39.7	31	Seychelles	61.5
12	Congo, Rep.	36.8	32	Slovakia	37.6
13	Costa Rica	28.4	33	Slovenia	40.4
14	Croatia	38.4	34	Spain	28.1
15	Cyprus	38.6	35	Tanzania	38.2
16	Dominican Repub.	26.2	36	United Kingdom	28.7
17	France	28.0	37	Zambia	41.3
18	Germany	37.5	38	European Union	25.9
19	Greece	35.2	39	Latin America and Caribbean	29.3
20	Greenland	41.6	40	**The World**	**14.8**

Table 2.2. 1 Terrestrial reserved area (% of total land area) of the countries which already

achieved the designated 30% in 2019 and even exceeded it

Source: United Nations List of Protected Areas. https://www.worldbank.org

N	Region	Forest in protected areas	
		Area (1 000 hectare)	% of forest area
1	Africa	157829	27
2	Asia	144197	25
3	Europe	57780	6
4	North and central America	79587	11
5	Oceania	29120	16
6	South America	257293	31
7	**The World**	**725807**	**18**

Table 2.2.2 Forest amount in protected areas by geographical regions, 2020

Source: Global forest resources assessment, 2020. https://www.sprep.org

N	Country	Forest in protected areas		
		Area (1 000 hectare)	Share of global total (%)	Cumulative %
1	Brazil	149577	21	21
2	Indonesia	51770	7	28
3	Venezuela	45605	6	34
4	Zambia	31831	4	38
5	United States of America	31735	4	43
6	China	30350	4	47
7	Canada	29507	4	51
8	United Republic of Tanzania	28508	4	55
9	Democratic Republic of Congo	24297	3	58
10	Australia	24072	3	62

Table 2.2.3 Top ten countries for forest amount in protected areas

Source: United Nations List of Protected Areas. https://wedocs.unep.org

Reserved areas prevent the loss of carbon in vegetations. Ecosystem degradation is one of the major causes of greenhouse gas emissions that is about 20 % of the total greenhouse gas emissions altogether. The degradation of ecosystem services in the world contribute to increase of such natural disasters as: floods, storms, tidal surges, draughts and wild and human induced fires. In last decades economic loss from climate and human induced disasters increased ten times and is predicted to keep this trend in future too.

N	Region	Forest designated for biodiversity conservation	
		Area (1 000 Hectare)	% of forest are.
1	Africa	106585	24
2	Asia	89292	15
3	Europe	38919	4
4	North and Central America	74939	10
5	Oceania	30752	17
6	South America	83 883	11
7	**THE World**	**424370**	**11**

Table 2.2.4: Forest area designated for biodiversity conservation by region

Source: United Nations List of Protected Areas. https://wedocs.unep.org

Presently the percentage of the world's terrestrial reserved areas from the total land area is 14.8. It is the half of the target that we need for stabilization of average temperature by 2030 on 1.5^0 C. Many countries of the world have already achieved the target of 30% of the reserved areas and even exceeded, especially the European ones (table 2.2). Among world regions Latin America and Caribbean and the European Union are the leaders. By forest amount in protected areas according to geographical regions are leading South America-31%, Africa-27%, Asia-25% and Oceania-16%. The forest amount in protected areas of the world is 18% (table 2.3). In top ten countries for forest amount in protected areas are leading Brazil-21%, Indonesia-7% and Venezuela-6% (table 2.4). The other countries have approximately the same 4-3 %. The forest area designated of biodiversity conservation by region shows that Africa. Oceania and Asia are the leaders (table 2.5).

Conclusions

Reserved areas preserve essential ecosystem services and increase resistance to climate change. They reduce vulnerability of livelihoods against different natural disasters like, floods, storms, tidal surges, droughts and wild and human induced fires. Presently there are 93 reserved area in Georgia with territory of 793352 hectare, among them: 14 strict nature reserve with territory of 131301 hectare; 13 national park with territory of 445708 hectare; 23 managed reserve with territory of 75207 hectare; 40 nature monument with territory of 2749 hectare and 3 protected landscapes with territory of 138327 hectare. In natural reserves of Georgia along the endemic and relict plants and bushes are preserved many local animals and birds. Among them from animals: brown bear, wild cat, common marten, Eurasian badger, grey wolf, red fox, nutria, Asiatic jackal, European lynx Caucasian goat etc. From birds: hawk, griffon vulture, hillock eagle, tawny owl, rock partridge, Caucasian blackcock, Turkey vulture, Eurasian woodcock, wood pigeon, goshawk, white stark, crow, Eurasian jay, pheasant, etc. According to World Bank data base of 2021 the percentage of terrestrial reserved areas of Georgia from the whole territory of the country was 9.3 though it increased last year to 13% by the end of 2021. From our close neighbors: Azerbaijan has 24.3 % and Armenia 10.2. Many countries of the world have already exceeded the target of 30 % that was designated in 2019 by the leading ecologists of the world for keeping the world's average temperature increase by 2030 at 1.5^0C. We must be in a hurry to catch up with the leading countries as there is only seven years ahead. Georgia has many beautiful landscapes rich by biodiversity, geographical and geomorphologic features, flora and fauna that must be protected. The biodiversity of the country and preservation of relict and endemic species much depend on abundance of reserved areas.

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