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Chapter

Introductory Chapter: On the Need to Teach, Conserve and Develop the Diversity of Tropical Forests

*Ana Cano Ortiz, Carmelo Maria Musarella
and Eusebio Cano Carmona*

1. Introduction

Tropical forests are located in one of the great biomes of the earth, in tropical and subtropical rainforests the average annual temperature ranges between 26 and 27°C, with thermal oscillations below 2°C. The precipitation, in general, is high, between 2000 and 4000 mm; however, there are shaded areas in which the precipitation is very low, being able to reach 200–300 mm. From the bioclimatic point of view, there is a dominance of the infra, thermo and mesotropical thermotypes. However, the rainy macrobioclimate of a pluvial nature becomes pluviseasonal due to the drop in temperature with altitude. For this reason, tropical environments are rainy in their basal zones and rainy seasons in the mountains. All these conditions, on the one hand, the broadleaf forest or rain forest and the semi-deciduous dry forest, as occurs on the Pacific coast of Mexico and in areas of Caribbean islands [1–5]. The high variability of ecological factors is the cause of the presence of interesting plant formations that present a high rate of endemism. Being areas of interest for conservation because they are hot spots on the planet, which must be studied, known and defended, both with regard to conservation and exploitation [6]. Thus in the tropical and subtropical areas, the pluvisilva forests are surrounded by laurisilva, and towards the central zones of the continents and shady zones [7] the savannahs in which grasses dominate are the centers of origin of this botanical family (Gramineae).

Tropical areas are of great interest worldwide, since they are CO₂ sinks, so in the face of global climate change, large areas of vegetation are needed to act as CO₂ sinks [8–13]. In addition, tropical forests have a high floristic diversity and a high rate of endemic species, being hot spots on the planet, which is why researchers present related works on tropical biomes.

2. Results and discussion

Due to the low purchasing power of the populations residing in the tropics, an increase in their per capita income is necessary. In a comparative analysis of per capita income between developed and poor countries according to the World Bank [14] (**Table 1**), high discrimination is observed with values ranging between USD 460 and 6000 for poor countries in Africa, Central America and Asian areas. However, the

Tropical Forests - Ecology, Diversity and Conservation Status

Country	GDP per capita (USD)	Country	GDP per capita (USD)
Afghanistan	368,8	Isle of man	87.157,50
Haiti	1.829,60	Saint Martin Island	21.920,80
Albanian	6.492,90	Iceland	68.727,60
Germany	51.203,60	Cayman Islands	86.568,80
Andorra	42.137,30	Faroe Islands	69.010,30
Angola	1.953,50	Marshall Islands	6.172,10
Antigua and Barbuda	15.781,40	Solomon Islands	2.304,80
Saudi Arabia	23.185,90	Turks and Caicos Islands	20.908,60
Algeria	3.690,60	Virgin Islands (US)	39.552,20
Argentina	10.636,10	British Virgin Islands	75.152,60
Armenia	4.966,50	Israel	52.170,70
Aruba	29.342,10	Italy	35.657,50
Australia	60.443,10	Jamaica	5.183,60
Austria	53.637,70	Japan	39.312,70
Azerbaijan	5.388,00	Jordan	4.103,30
Bahamas	27.478,40	kazakhstan	10.373,80
Bahrain	26.563,00	kenya	2.081,80
Bangladesh	2.457,90	Kyrgyzstan	1.276,70
Barbados	17.225,50	Kiribati	1.606,50
Belarus	7.302,30	Kosovo	5.269,80
Belgium	51.247,00	Kuwait	24.300,30
Belize	6.228,30	Lesotho	1.094,10
Benin	1.319,20	Latvia	21.148,20
Bermuda	114.090,30	Lebanon	4.136,10
Bhutan	3.266,40	Liberia	675,7
Bolivian	3.345,20	Libya	6.357,20
Bosnia and Herzegovina	7.143,30	Liechtenstein	157.755,00
Botswana	6.805,20	Lithuania	23.723,30
Brazil	7.507,20	Luxembourg	133.590,10
Brunei Darussalam	31.449,10	North Macedonia	6.694,60
Bulgaria	12.221,50	Madagascar	500,5
Burkina Faso	893,1	Malaysia	11.109,30
Burundi	221,5	Malawian	634,8
Cape Verde	3.293,20	Maldives	10.366,30
Cambodia	1.625,20	Mali	873,8
Cameroon	1.666,90	Malt	33.486,70
Canada	51.987,90	Mariana	23.707,30

Country	GDP per capita (USD)	Country	GDP per capita (USD)
Chad	685,7	Morocco	3.795,40
Chili	16.265,10	Mauricio	9.106,20
China	12.556,30	Mauritania	2.166,00
Cyprus	31.551,80	Mexico	10.045,70
Colombia	6.104,10	Micronesia	3.571,30
Comoros	1.577,50	Monaco	234.315,50
Congo, Republic	577,2	Mongolia	4.566,10
Congo, Republic	2.290,40	Montenegro	9.465,70
Korea, Republic	34.997,80	Mozambique	491,8
Costa Rica	12.472,40	Myanmar	1.209,90
Côte d'Ivoire	2.549,00	Namibia	4.865,60
Croatia	17.685,30	Nauru	10.648,10
Cuba	9.499,60	Nepal	1.208,20
Curacao	17.717,60	Nicaragua	2.045,50
Denmark	68.007,80	Niger	590,6
Djiboutian	3.150,40	Nigeria	2.065,70
Dominica	7.653,20	Norway	89.154,30
Ecuador	5.965,10	New Caledonia	37.159,50
Egypt	3.698,80	New Zealand	48.781,00
The Savior	4.551,20	Oman	19.509,50
Arab Emirates	44.315,60	Netherlands	57.767,90
Eritrea	643,8	Pakistan	1.505,00
Slovenia	29.291,40	Palau	12.083,90
Spain	30.103,50	Panama	14.617,60
USA	70.248,60	Papua New Guinea	2.672,90
Estonia	27.943,70	Paraguayan	5.891,50
Swatini	3.978,40	Peru	6.621,60
Ethiopia	925,1	French Polynesia	19.914,60
Russia	12.194,80	Poland	17.999,90
Fiji	4.646,60	Portugal	24.567,50
Philippines	3.460,50	Puerto Rico	32.640,70
Finland	53.654,80	Qatar	66.838,40
France	43.659,00	Macau, China	43.873,60
Gabon	8.635,30	United Kingdom	46.510,30
Gambia	772,2	Syrian Arab Republic	533,4
Georgia	5.023,30	Central African Republic	461,1
Ghana	2.363,30	Czech Republic	26.821,20
Grenade	9.010,60	Lao republic	2.535,60
Greece	20.192,60	Dominican Republic	8.476,80

Country	GDP per capita (USD)	Country	GDP per capita (USD)
Greenland	54.571,20	Slovak Republic	21.391,90
Guam	35.904,90	Republic of Moldova	5.230,70
Guatemala	5.025,50	West Bank and Gaza	3.664,00
Guinea	1.189,20	Romania	14.858,20
Equatorial Guinea	7.506,70	Rwanda	822,3
Guinea-Bissau	795,1	Saint Kitts and Nevis	18.082,60
Guyana	9.998,50	Samoa	3.857,30
Haiti	1.829,60	American Samoa	15.743,30
Honduras	2.771,70	San Marino	45.320,20
Hong Kong	49.800,50	St. Vincent and the Grenadines	8.666,40
Hungary	18.728,10	St. Lucia	9.414,20
India	2.256,60	Sao Tome and Principe	2.360,50
Indonesia	4.332,70	Senegal	1.636,90
Iran	4.091,20	Serbian	9.230,20
Iraq	4.775,40	Seychelles	14.653,30
Ireland	100.172,10	Sierra Leone	480
		Singapore	72.794,00

Table 1.

Data on per capita income in dollars was obtained from World Bank.

developed countries that cause climate change have per capita incomes above USD 20,000, even reaching values above USD 200,000.

This wealth of developed countries based on a powerful industrial sector, due to the use of polluting energy (petroleum) and the cause of climate change, is a reason for all countries to abandon the current production model, and bet on a sustainable balanced development, combining productivity and conservation, so it is necessary to bet on ecosystem services [15–18].

Because in the tropics there are countries with low per capita income and a deficient educational and research system, it is essential to promote research, through which balanced development is achieved, conserving and exploiting at the same time. Exploitation and development are not mutually exclusive, it is only necessary to know the natural resources, their ecology, function, structure and state of conservation, to advocate said sustainable development. To be successful in the sustainable development model, education and research must be promoted, for which various teaching methodologies can be used [19–26].

The high diversity of plant species in tropical and subtropical areas, with a high rate of endemic plants, is reason enough for governments to establish conservation measures while advocating for sustainable development. For this, research must be based on knowledge of the flora and vegetation, as well as on the socioeconomic development model, especially with regard to the type of agriculture, since this, together with deforestation and fires, tend to be the causes of species loss.

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Author details

Ana Cano Ortiz¹, Carmelo Maria Musarella² and Eusebio Cano Carmona^{3*}


1 Department of Didactics of Experimental, Social and Mathematical Sciences, UCM, Madrid, Spain

2 Department of AGRARIA, “Mediterranea” University of Reggio Calabria, Reggio Calabria, Italy

3 Department of Animal and Plant Biology and Ecology, Section of Botany, University of Jaén, Jaén, Spain

*Address all correspondence to: ecano@ujaen.es

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