

# Environmental Policy and Directions of Development of "Green Economy" in Ecuador

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**Abstract**—The article considers the essence of "green economy" and its role in improving people's welfare in the framework of the concept of sustainable development. The current model of development of the world economy as a whole and its individual countries is aimed at implementing the "green economy" model as the economy of the future. This model does not disrupt the balance of economic, social and environmental interests. The article examines the processes of implementation of the environmental and economic policy of Ecuador, examines the impact of various sectors of the economy on the environmental situation of Ecuador, in particular the impact of the industrial sector, the irrational use of resources, and agriculture. Barriers and difficulties in the development of the green economy in Ecuador were identified; an important problem was highlighted – corruption in the country, which hinders the development of the "green economy" in Ecuador in General and the processes of investment in environmental projects, in particular. The authors present an overview of current projects and programs of development of green economy in the context of sustainable development of Ecuador (development project for indigenous and black peoples of Ecuador (PRODEPINE), aimed at strengthening the cultural identity, economic development and environmental protection with the participation of indigenous peoples; the local development project (PROLOCAL), developed with the necessary support to vulnerable groups of métis). The article offers key recommendations for the development of a green economy in Ecuador.

**Keywords**—"green economy", Ecuador, environmental problems, social and environmental projects

## I. INTRODUCTION

The industrial revolution gave rise to certain problems, primarily related to the environment. Humanity has already realized what consequences the current model of development

can have. And in this millennium, the world will have to change this model in favor of the model of the "green economy" as the economy of the future, which would not violate the balance of economic, social and environmental interests.

The transition to a green economy is inevitable, and therefore many countries are preparing their strategies for the transition to this very model, and the most developed ones have already taken practical steps in this direction.

The new human development strategy was named sustainable development after the publication in 1987 of the report "Our Common Future", prepared by the Brundtland Commission<sup>1</sup>.

The strategy was based on the task of long-term satisfaction of basic human needs while preserving the life support systems on planet earth.

In this paper, we turn to the experience of implementing the environmental model of development in Ecuador, as well as to problems and promising areas of the "green economy" in Ecuador.

## II. THE MAIN PART

The correct term to be used to describe economic development is "balance" of a system that seeks to ensure an equilibrium between economic growth, environmental protection and social security.

The desired outcome is a social situation where living conditions and resources are used to further meet human needs without undermining the integrity and stability of natural resources. This phenomenon can also be defined as development that meets the needs of the present without

<sup>1</sup> The Report of the World Commission on Environment and Development (WCED), URL: <http://xn-80adbkckdfac8cd1ahpld0f.xn--p1ai/files/monographs/OurCommonFuture-introduction.pdf>

compromising the ability of future generations to meet their own needs.

TABLE I. MAIN INDICATORS OF THE ECONOMY OF ECUADOR<sup>2</sup>

#	Indicator	Value	Period
1	GDP volume	\$109 billion	2019
2	Annual GDP growth rate	-1 %	Q4/19
3	GDP growth rate	-0.68 %	Q4/19
4	GDP per capita	\$5,185	2018
5	Inflation rate for the year	0.75 %	May 2020
6	Interest rate	8.98 %	May 2020
7	Unemployment rate	4.9 %	Q4/19
8	Wages	\$467 / month	2020
9	Trade balance	\$6,2504 thousand	March 2020
10	Current balance	\$146 million	Q4/19
11	International foreign exchange reserves	\$2,860 million	April 2020

Source: [World Bank]

Measures to guarantee the rights to nature were among the first in Latin America to appear in the Ecuadorian constitution. The Ecuadorian Constitution, approved in 2008, spelled out the Law on Environmental Protection, there is a description of environmental justice.

The Law on Environmental Protection is directly related to the control, the necessary imposition of sanctions, as well as the complete cessation of all kinds of activities that pollute the environment and destroy natural resources. The law establishes guidelines for environmental policy, as well as defines the obligations, levels of participation of the public and private sectors in environmental management and specifies the acceptable limits for control and imposition of sanctions in this area.

The adoption of the Law on Environmental Protection in 1999 confirmed that the Ministry of Environment, created in 1996, is the national environmental authority that has established the general framework for the development and approval of environmental norms and principles of sustainable development, enshrined in the UN Rio Declaration on environmental protection and development.

The Law stipulates that the Ministry of Environment, for its part, must coordinate control systems with the competent authorities to verify compliance with environmental quality standards regarding air, water, soil, noise, waste, and pollutants.

In Ecuador, the most important environmental regulatory framework is the Organic Code on the Environment (OCE), approved in April 2017. The Code deals with issues such as: climate change; protected areas; wild nature; forest heritage; environmental quality; waste management; environmental incentives; coastal sea area; mangroves; access to genetic resources; biosafety; biomass and more.

The Ministry of Environment of Ecuador is responsible for regulating the Organic Code on the Environment. Table 2 provides an overview of the articles of the Code directly related to the green economy and sustainable development.

In addition to the above, it is worth noting that Ecuador is implementing the "Ecuador" model, created to analyze the energy sector of the Republic of Ecuador. The model

examined the efficiency of investing in the energy sector to mitigate the negative economic consequences of global warming, and also performed a comprehensive analysis of the possible impact of investments on improving efficiency in the energy sector and redirecting savings to other areas.

TABLE II. OVERVIEW OF THE MAIN ARTICLES OF THE ORGANIC CODE ON THE ENVIRONMENT OF ECUADOR<sup>3</sup>

Article	Content
Article 16	Discussion on environmental education; training in sustainable development and environmental protection
Article 37	... protected areas will be priority locations for sustainable development, the state will allocate the necessary economic resources for the financial sustainability of the National Protected Areas System...
Article 88	Discussion on social public participation and effective contribution to sustainable development, especially in rural areas.
Article 224	Discussion of the problems of disposal and correct use of waste for sustainable development of the country

With all the positive aspects of the active implementation of environmental policy in Ecuador, there are also "environmental difficulties":

- Deforestation. Ecuador is the country with the highest deforestation rates in Latin America. For thirty years, the area of forest plantations (planted forests) has tripled. The National Afforestation and Reforestation Plan was developed and entered into force in 2013. The plan calls for planting trees for productive purposes to reduce pressure on local forests.

Forest cover in Ecuador in 1990 was estimated at 14,630 847 hectares of forest. However, the cover declined by 6% in 2000, by 10.5% in 2008 and by 12% in 2014. It is estimated that nearly 2 million hectares of natural forest were lost during this period.

It is also worth noting that the clearing of the forest has not yet been stopped, despite the worsening situation every year. In 2018, Ecuador registered 12.5 million hectares of natural forest, showing a steady decline since the 90s, when the forest cover was over 14.5 million hectares.

Forest fires, urban expansion, extractive activities (mining, oil and oil products), and expansion of agricultural boundaries are the reasons for the decline in forest land.

The expansion of agriculture is one of the biggest challenges today, as vast areas of natural forest have been cleared and planted for production purposes such as the cultivation of African palms, teak and melina trees.

According to the Ministry of Agriculture (MAG) , there are approximately 180,000 hectares of commercial forest in Ecuador, or approximately 180 million trees. 160,000 hectares of the total area are planted with pine, teak, eucalyptus, melina and balsa trees. Some cities like Cotopaxi, Los Rios, Guayas, Pichincha and Santo Domingo de los Tsachilas have 65% of these plantations.

Teak and melina trees are introduced forest species from Asia and are one of the most common in the area.

These trees are planted not only by small and medium-sized farmers, but also by large, well-developed companies (to

<sup>2</sup> "Stock exchange portal", URL: <https://take-profit.org/statistics/countries/ecuador/>

<sup>3</sup> "The Organic Code on the Environment of Ecuador (Código orgánico del medio ambiente del Ecuador)", URL: [https://www.ambiente.gob.ec/wp-content/uploads/downloads/2018/01/CODIGO\\_ORGANICO\\_AMBIENTE.pdf](https://www.ambiente.gob.ec/wp-content/uploads/downloads/2018/01/CODIGO_ORGANICO_AMBIENTE.pdf)

reduce carbon dioxide and increase the export of light wood species to Europe).

The scope of the permitted area of forest use decreases every year. The largest volume was observed in the period from 2009 to 2012, during this period a maximum value of more than 100,000 ha was recorded. In 2018, the figure was 60,000 ha, which is 20,000 ha less than ten years earlier. In 2019, there is a decline to less than 40,000 ha, in subsequent years the downward trend will continue if the government does not take appropriate measures.

- Extraction, processing and consumption of fossil fuels. The extraction of oil and oil products in Ecuador has always been carried out without considering the costs that this process brings to the local population and the environment in general. Thus, oil production has become a direct threat to deforestation of large areas of tropical forests, since it is in the forests that some of the most promising oil and gas fields are located.

More than 80% of the energy used in Ecuador comes from oil and gas. Transport is the sector with the highest demand for fossil fuels (gasoline and diesel), followed by residential and industrial sectors.

Brazil, Colombia, Ecuador, Peru, Bolivia, and Nigeria have significant oil activity in rainforest areas suffering from deforestation caused not only by oil drilling directly, but also by construction of roads through the forest that allow for oil prospecting in areas using remote devices. A negative phenomenon in oil production is appearance of toxic by-products, which are often discharged into local rivers, and pipeline ruptures with oil products are also a problem.

In Ecuador, similar exploratory companies are concentrated in the north of the Amazon region. This area is the original territory of the indigenous peoples of Kofan, Zion, Sekoya and Vaorani. It is also the territory of the napo chichuas and several Shuar families who settled there long before the start of extensive oil production. Therefore, attempts are being made to move oil production to the south of the Amazon during the next reform of the oil concessions.

Before the oil activity reached the aforementioned part of the Amazon, the main characteristics of the area were: hunting and fishing; wandering agriculture, which enabled indigenous peoples to create and conserve productive soils in clay soil areas where agriculture was previously not possible, and to create and conserve biodiversity in this rainforest; cultural, religious and recreational activities through land use regulation and "respect for territory".

The first economic activity aimed at overseas markets in Ecuador was rubber and wood production. Then, along with the expansion of oil production, new protected areas such as the Cuyabeno Wildlife Sanctuary, Yasuni National Park, Kayambe Koka Ecological Reserve and Limonkocho Biological Reserve were established.

In turn, the impact of oil production in the Ecuadorian Amazon was documented, largely through a case against Chevron-Texaco, which operated in the northeastern part of the country for 26 years. During this period, Texaco drilled 339 wells on 430 hectares, producing more than 1.5 billion barrels, dumping billions of barrels of toxic water and other toxic waste and burning billions of cubic feet of gas. Although it is impossible to establish the price of environmental impact, the damage caused by the company's activities was estimated

at tens of billions due to oil spills, the death of flora and fauna, the appropriation of territories, salinization of rivers, the occurrence of dangerous diseases (31/1,000 cases of cancer, when the average value in the country is 12.3 per 1,000), low-paid wages in difficult and dangerous conditions, and other reasons.

- Industry. The industrial sector in Ecuador is represented to the greatest extent by production of food and beverages, followed by the automotive industry, derivatives of petroleum products and nuclear fuels, as well as manufacture of rubber and plastic products.

Industry is one of the sectors that requires an increased demand for energy, as well as the demand for energy is observed in the residential and transport sectors. The concentration of industries leads to growth of urban settlements and an increase in the car fleet, therefore, there is an increased demand for electricity in these sectors. The largest emissions of chemicals are observed from the production of food products, paper and its derivatives, oil refining, and the production of chemical products.

- Irrational use of resources. Ecuador's fish resources decrease mainly due to overfishing caused by an increase in the fishing fleet. It is estimated that over 20 key species for the fishing industry and artisanal fisheries are currently under threat, namely: eleven species are threatened with extinction; seven species are at risk; four species are vulnerable.

Another form of wasteful use is trafficking in flora and fauna. In the Yasuni National Park and the surrounding area, wild meat is sold in local markets for free access in large quantities, while some species of animals are on the verge of extinction.

- Agriculture. Agriculture plays an important role in the economy of Ecuador as it is the backbone of the economic system. Agriculture not only provides the population with food and raw materials, but also employment opportunities for most of the population.

Agriculture contributes on average 8.5% to the country's GDP and is the main source of employment in the country, representing 25% of the economically active population, employing more than 1.6 million people in this sector.

Agriculture is a sector that stimulates the country's trade. Agricultural products such as bananas, cocoa, flowers and coffee are Ecuador's main exports. The process of agricultural development is unstable, however, the state policy is aimed at increasing exports and significantly reducing imports.

Agriculture is a source of raw materials for major industries such as cereals, corn, sugar, edible and non-edible oils, and more.

Thus, from all of the above, we can conclude that agriculture plays an important role in the development of the economy of Ecuador.

In addition to the highlighted environmental problems of Ecuador, it is worth mentioning such an important problem as corruption, which hinders the development of the "green economy" in the country in general and the processes of investing in environmental projects, in particular.

Despite the above barriers and difficulties in the environmental development of Ecuador, the country is

implementing a number of projects supported by the World Bank and aimed at the interests of vulnerable groups in mountainous areas. These include:

- The Ecuadorian Indigenous and Black Peoples Development Project (PRODEPINE) aims to foster cultural identity, economic development and environmental conservation with the participation of indigenous peoples;
- The Local Development Project (PROLOCAL) is designed taking into account the necessary support for vulnerable mestizo populations.

Environmental projects, although they contribute to the environment, are not all focused on social development.

- Forest pastoral systems. The transformation of traditional livestock farming into forest pastoral systems consists of improved site management and includes the following elements:
- fractionating pastures through fences and corridors of fruit trees or shrubs that integrate moisture into the soil, sequester carbon, conserve biodiversity and allow the grower to market their fruit, timber and other products in the medium to long term;
- rotation of cattle between several areas, which allows the soil to have a better vegetation cover for a longer time, as well as to maintain moisture and increase its fertility, which leads to growth in herd productivity;
- plantations of high-protein pastures and feed, which, in addition to sequestering carbon and producing oxygen, allow better feeding of livestock and thus higher productivity.

These systems restore the environmental state of farms, and with it their ability to generate environmental services, and provide producers with higher and consistent yields in the medium to long term, preventing the clearing of forests and jungle to create new fenced areas.

- Agroforestry. Agroforestry systems are an alternative to intensive agriculture and consist of a combination of trees and crops on the same farm, allowing growers to maintain profitable and sustainable production activities while conserving and restoring forest areas.

An example is the cultivation of shade-grown coffee and palm trees in various states in the country. These products, which have a high market value, require the correct growth of tree shade, which contributes to the conservation and restoration of forests and jungle as part of production activities.

- Non-wood forest products are products of biological animal or plant origin, other than wood, that are obtained from forests, and woodlands and trees isolated from forests, usually harvested by hand. However, they can also occur on forest plantations and/or exploitation systems for food, energy, cultural, medical or cosmetic use by the public.
- Private nature reserves. Currently, in Ecuador, private nature reserves cover only 19% of the continental surface. At the same time, the reserves have great potential, since owners of such territories can conclude contracts for production of oxygen with factories and

enterprises that have harmful emissions. You can also get data on how much carbon is consumed by the forest per year and how much oxygen is produced, due to which factories receive the necessary certificates, which demonstrate the elimination of emissions.

- Carbon capture and recycling. Ecuadorian companies launch projects to convert carbon captured in factories and power plants into products like plastic or cement. In addition to preventing greenhouse gas emissions, it turns out that carbon is an economical material and provides the end product with greater resistance and durability.

### III. CONCLUSION

Summing up all of the above, we can say that the following key points will contribute to stepping on the "green path" in Ecuador:

- increasing public and private investment in those sectors of the economy that in their work can reduce environmental risks and resource scarcity;
- developing green policies and reforms that provide a legal basis for green action and establish market incentives for its creation. National and local authorities as well as international organizations are involved in this area;
- green investments will open up a number of new opportunities to advance business and infrastructure reengineering processes in general. The results of reengineering are more active participation of green sectors in the gross domestic product, more jobs, reduced use of energy and materials in production, as well as reduction in polluting waste and greenhouse gas emissions.

We have to choose between environmental sustainability and economic progress. Both processes are interdependent. The choice of a green economy model allows achieving sustainable development and at the same time eradicating poverty.

There is a misconception that a green economy is a luxury that only rich countries can afford. In fact, developed countries bear a greater responsibility for greenhouse gas emissions and, therefore, must take on more obligations, while they will receive economic, social and environmental benefits from the introduction of a green economy, which gives them certain advantages and further development.

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