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Perspective

Soil and Resilience to Climate Change

Marco Fidel Romero Zárate*

Agricultural Engineer, Expert in Edaphology and Agriculture of Precision, Colombia

***Corresponding Author**: Marco Fidel Romero Zárate, Agricultural Engineer, Expert in Edaphology and Agriculture of Precision, Colombia.

Received: : June 12, 2019; **Published:** July 22, 2019

The soil is one of the most valuable natural resources on the planet we inhabit; However, with the development and transcendental changes of human society throughout History, This resource has been progressively degraded and contaminated by multiple origins, such as: mining Illegal and anti-technical, industry, agriculture, logging and burning of forests, agrochemicals, Wastewater, nuclear waste, solid and liquid waste from large cities and urban centers of Smaller size (See figure 1).

Figure 1: *Floors withstanding extreme drought conditions and totally naked (Photos taken from web pages).*

These types of soil degradation mentioned have contributed significantly to climate change, generally increasing the contributions of Gases of Greenhouse, which are released to the atmosphere (See figure 2).

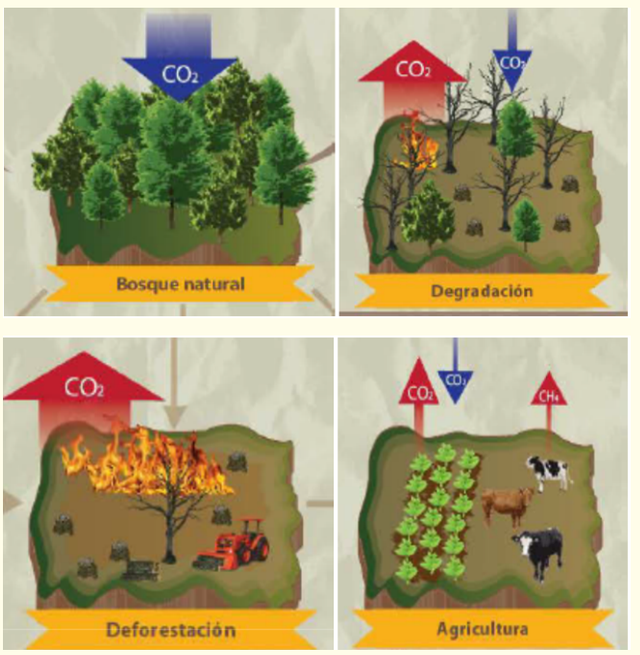

Figure 2: *Outline of Liberation variable carbon dioxide in different ecosystems or practices to Grícolas and cultural inappropriate. (Taken and modified from Andean agriculture in the face of climate change, UNEP, Frankfurt-School and UNEP, 2014).*

The main causes of these phenomena have been caused by the development of inappropriate human practices and activities in the different fields mentioned above. This means that in the same proportion that these negative environmental impacts on natural resources were caused, it is also possible to reduce or mitigate those effects if the whole of humanity makes fundamental changes in the form or methods of developing Its different activities always thinking about environmental sustainability.

For the specific case of soils from the point of view of agriculture and Livestock in relation to the environment, the main practices that can be considered as causes of climate change are: accelerated erosion, Inadequate soil uses, changes in land use, deforestation, presence of clean crops in Pendeford, soils devoid of vegetation, type, time and form of application of Origin fertilizers Synthetic, the drastic reduction of the levels of organic matter in the soils, inappropriate practices of tillage and preparation, the frequent burnings prior to sowings of crops, deficiency or null planning by the authorities responsible for local, regional and national territories, absence of technical assistance and rural extension among many other factors (See figure 3).

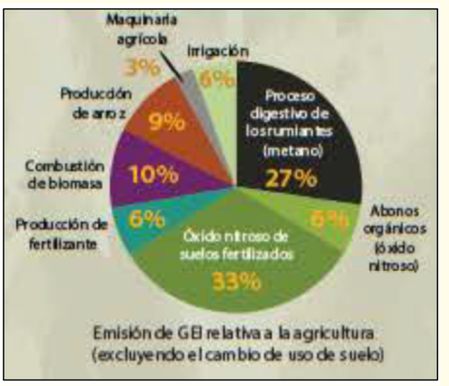

Figure 3: *Relative contributions of greenhouse effect gases (GHG) in agriculture and livestock, excluding those generated in the change of land use (Taken from: Andean agriculture in the face of climate change, UNEP, Frankfurt- School and UNEP, 2014).*

How to reduce the amount of greenhouse gases in agricultural and livestock Farms?

The optimum management of soils is a factor of resilience to climate change, below are some practices that help to reduce greenhouse gases in rural areas:

- Permanently maintaining soil cover with different types of species, this favors the absorbance of the radiation and in turn reduces the phenomenon of refraction.
- To recover the levels of organic matter in the agricultural and livestock soils, with this practice the biological properties of the soils are maintained, the levels of fertility and equilibrium of the Eco's is subjects.
- The presence of plant cover allows the development of the photosynthesis process, which causes the plants to take carbon dioxide and in the presence of water, light and chlorophyll generate sugars and release the oxygen to The atmosphere in Exchange for greenhouse- effect gases, which occur in the absence of vegetation (See figure 4).
- Avoid the burning of forests and vegetation in the pre-planting stages, since in this process carbon dioxide is released into the atmosphere, the macro and micro organisms of the soil are destroyed, erosive phenomena are favoured to Be exposed to runoff especially in areas with pronounced slopes, limiting the productive capacity of the soil seven more.
- To establish zones with trees or shrubs in paddocks, preferably legumes, which fix part of the atmospheric nitrogen, in the same way the process of photosynthesis is maintained and Siren of shade for the cattle. In addition, at least 25% of leguminous plants should be maintained within the pastures, favoring livestock nutrition and the biotic balance.
- Recover pastures degraded by improved pastures.
- Use of clean energies such as wind, electric, solar, to replace those of fossil Origin.
- Forestry management with sustainability approaches.
- To maintain sectors with forests, especially in the areas with water sources and in those destined to the conservation of the natural resources.
- Avoid excessive Urea applications, especially in dry soils, which usually volatilize by releasing gases into the atmosphere.

- Avoid reforestation with plants of exotic origin as only species, because there are drastic changes in the ecosystems, since many regional organisms hardly adapt to the new environment and other Species are usually extinguished. Moreover, in much cases do not allow biodiversity, which happens with forest species of local or regional origin.
- Mitigation practices reduce emissions and in turn the magnitude of climate change. Mitigation focuses on efforts to control the causes of these changes.
- The concept of adaptation to climate change reduces vulnerability and losses in different ecosystems. The adaptation is oriented to make adjustments in the activities to reduce the impacts.
- Implement agroforestry systems.
- Capture rainwater and excess water in appropriate reservoirs to employ them in times of water deficits.
- To establish pest and disease management programs in crops through biological controls.
- Reforest the most degraded rural areas with local species.
- To maintain biodiversity through practices of sustainable management of agro-ecosystems.
- Restore, maintain and protect water sources with dense vegetation, increase the recharge of the Aquifers.
- Establish rural and environmental outreach and education programs on the negative impacts of climate change and how to develop actions for mitigation and adaptation to these new environmental realities.

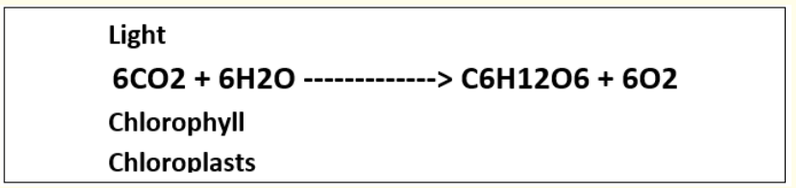

Figure 4: *Basic equation of the photosynthesis process.*

In order to confront the problems of global climate change, mitigate its impacts and its adaptation process, it must be generated in the human society an environmental awareness that allows to make changes in its activities every day in an integral way. In the present case, nothing with soil management, agriculture and livestock, should be implemented, adjusted and modified Agricultural Practices mentioned in Together and sustainable way to achieve the proposed objectives [1-3].

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Volume 5 Issue 8 August 2019