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AGRICULTURAL ECONOMY IN THE AMAZON

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The regions of cold climate have two natural conditions are favorable to agriculture of short cycle: fertile soils and harsh winter with snow. They promote the sustained productivity of crops and the fight to find natural pests and diseases that attack the agriculture. However, the low temperatures and long nights of winter crops prevent semi-perennial plants: banana (*Musa spp*); sugar cane (*Saccharum officinarum* L.); cassava (*Manihot esculenta* Crantz, *Manihot utilíssima* Pohl), etc. Even the forest species adapted to these ecosystems need more time to grow.

The Amazon is a region tropical rainforest with average temperature high brightness, abundant, and a lot of moisture, the latter as a result of high rainfall. The favorable combination of sunlight intensity, high temperatures, abundant rainfall and available nutrients in the surface soil layer from the decomposition of organic matter, results in more high biological productivity of the land.

These conditions favor the large biomass production, which translates into a forest ecosystem thriving, even their soils with 88% dystrophic (acidic and low in fertility), and only 12% eutrophic (less acidic and relatively high in fertility). Of the latter, 50% are upland soils, and 50% are floodable soils (NASCIMENTO & HOMMA, 1984). However, the circumstances favorable to growth and maintenance of the forest, not adapted to the monoculture for a long period, especially those of short cycle and the pasture system. The production is down by the loss of soil fertility, by invading plants or outbreaks of pests.

To cultivate these soils, primitive peoples and peasants with empirical knowledge, developed a method of cultivation in the fallow, or period of "rest" from the ground between a cultivation time and another, known as cut-and-burn, internationally identified in the literature as agronomic shifting cultivation. The period of fallow

promotes the regeneration of biomass that burned fertilizes the soil with the ashes, offering good harvest again for a short period (SANCHEZ, 1976).

The system cut-and-burn, by need of fallow and consequently of rotation of the cultivated area is feasible in conditions of low population density or the use of communal land. Another condition that enables is the non-existence of titling of land, i.e., that there is availability of free land.

The expansion of the agricultural frontier, by the peasants, was used this system. Also the extensive farming to expand in the Amazon has employed, and by the size of the area farmed has serious environmental damage. The agriculture, seen by this aspect, came to be seen as unsustainable in the Amazon, sustaining itself first in geographical hypothesis.

John Kenneth Galbraith (1908-2006), renowned Canadian economist, naturalized American and, professor at the University of Harvard, writing about problems over agrarian problems refers itself to the geographic position: *"If we delimit a strip of about three thousand miles wide surrounding the Earth in Ecuador, there we will find there is no developed country (…) In all this vast area the standard of living is low, and the life expectancy, short".* (GALBRAITH, 1951).

Also in the United States, Ellsworth Huntington, professor at the University of Yale, and his disciples by studying the processes by which the geography, in particular the climate, influenced the human development, and although much research useful and revealing, Huntington gave a bad reputation to geography. He was so impressed with the connections between the environment and human activity that has increasingly causes the geography starting with the physical influences and advancing to the culture. He classified hierarchically civilizations and attributed the best - according to his own definition - the favors of the climate (KAMARCK: 1976).

However, history shows the lack of simple links or relationships between climate and geography and economic success. It is not true that the tropics have always been poorer than the temperate latitudes. At the time of the conquest of the Americas by Christopher Columbus, the track south of the Tropic of Cancer and north of Capricorn, which today include Mexico, Central America, Peru and Bolivia, contained the great civilizations Aztec and Inca, complex societies, with strong agriculture, who built roads and provided aid against hunger.

The Aztecs had money and writing, and the Incas, although they lacked these two fundamental technologies, recorded a vast amount of information on beads full of

us, called quipos. On the other way, in areas where today are the United States, Canada, Argentina and Chile their populations still lived in the Stone Age, devoid of such technologies.

The Tropics in the Americas were much wealthier than the temperate zones, indicating that poverty tropical is not, obviously, and much less a fact (ACEMOGLU & ROBINSON, 2012). On the contrary, the greatest wealth in the United States and Canada, today, represents a sharp reversal of fortune in relation to the current scenario on the occasion of the arrival of the Europeans, not by geographical factors, but for others the nature of the institutions and the political system.

Also in the present world, the geographical hypothesis is not sustained. The countries of South-East Asia have demonstrated by the quickening economic advancement that has represented. If the hypothesis is not geographical gives an account to explain the examples mentioned above that contrast between the tropical and temperate regions, what to say about the differences between the Germanys Western and Eastern Europe before the fall of the Berlin wall?

Such inversions clearly nothing should have to do with geography, but with the way they gave the colonization of these areas, as the institutions have been established and operate, and also by the political system adopted. In the face of these historical evidences and present, as well as others that could be mentioned, there is little doubt that there is no correlation between tropical location and economic success.

Environmentalists also oppose the agricultural use of soils in the Amazon for production in economies of scale, because of the low soil fertility, among other factors. So, opt for systems of production of traditional populations and the green economy, i.e., the industry of biodiversity, ecotourism and environmental services.

The industry of biodiversity depends on the advancement of basic research in areas such as biology and the biochemistry of species, as well as consolidation in the experiments with hatchery-based firms, in the initial phase in the institutions of Manaus and Belém. The payment for environmental services will depend on the political agreements between governments and international organizations. Thus, we cannot design with accuracy when these segments become economies of scale by contributing more effectively with economic development.

The green economy even though it is an important segment and viable to the economy of the Amazon in which should be inserted, however, alone and by its low

penetration, is not able to promote economic development in a region with the Brazilian population of approximately 30 million inhabitants in 2017, and growing.

The agricultural economy by having wide capillarity, and is structured in sustainable production systems and chains of production, plays an important and indispensable participation in regional economic development, especially for the municipalities.

The research in humanities and social sciences must overcome the applicant Manichaeism, which shows the well represented by the small household production and the evil ever seen on that is modern, as the large industry and agricultural production. It is necessary to the understanding that, on both sides, can occur hits and distortion.

From the second half of the last century research in ecology, agronomy and genetics are uncovering the "secrets" of the ecosystem tropical humid, and more than that, generating technologies that enable the use of the soil of the Amazon by agricultural activities in deforestations areas, allowing both to establish the agricultural economy and to preserve the forest. What is being demonstrated in increasing scale, mainly, by the financial return to the producer, the sustainability of production in line with environmental preservation.

In this respect, has itself been seen in the Brazilian Amazon an increasing social and environmental responsibility, with economic outcome, by economic agents. Even recognizing meritorious action of environmentalists, there is no way to strengthen the environmentalism, in our time, without the support of these new actors. To adopt and invest in good agricultural practices these producers who were part of the problem become part of the solution. The profit that has always had great influence in the creation of wealth can be seen as a decisive force of sustainability.

Surveys show ecological mechanisms of the functioning of this ecosystem, responsible for the grandness and balance of the forest. This is still by the cycling of nutrients promoted by the action of soil microorganisms in the decomposition of organic matter from the same forest, maintaining soil fertility; by high rates of photosynthesis and the constant humidity (NATIONAL RESEARCH COUNCIL, 1993). And more, these systems use primary production líquid[1] transforming it into energy available to consumers, i.e. products. May itself be concluded by saying that in these circumstances the nature establishes a biological virtuous circle.

Genetic research has opened a horizon of possibilities the techno-scientific never before imagined for understanding and transformation of agriculture throughout the tropical zone. As an example of this transformation has been the expansion of soybean cultivation [*Glycine max* (L.) Merril], of the state of Rio Grande do Sul, whit temperate climate, to the state of Amapá, with equatorial climate.

The agronomic survey comes providing technologies, through the integrated systems, which enable the livestock production in these soils. The expansion of crops perennials – cacao tree (*Theobroma cacao* L.), oil palm tree (*Elaies guineenses* Jacq.), rubber tree [*Hevea brasiliensis* (Willd. ex Adc. de Juss.) Muell. Arg,], and fruits. Agroforestry systems. Crop-livestock-forest integration system. The reforestation with native and exotic species, capable of providing certified wood, with promising initiatives growing in the region.

The production system of the pioneers with the forest clearing, biomass burning, improper handling of the soil for farming or for subsistence agriculture, abandonment of the area, and new attack on the forest no longer has to be practiced.

Science and technology are the keys to success, but do not act in isolation. It is obvious that the more you have to know more can be done by agriculture in the tropics. Brazil has been discovering that path. In 1973 created the Brazilian Agricultural Research Corporation (Embrapa, acronym in Portuguese). Today, the Embrapa is in all Brazilian states and the Federal District with 48 units of research. Combined with the state institutes of research and universities has provided technologies that power the agricultural use of tropical soils.

The agronomy research has its origin in temperate countries. Brazil has become a world leader in this research in the tropics from the second half of the last century. Today, even with the structural problems - land regularization and environmental and logistics - have not been resolved, but that affect the productive chains, Brazil is a respected player of agribusiness in the world. According to the FAO, will be responsible, in this century to provide up to 40% of food for the world population.

The science is doing its part for the development of agriculture in this region, but other conditions interfere to their not expansion, and more, contribute to maintaining the condition of underdevelopment to a large portion of the population that lives in this activity. Political factors and poor functioning of the institutions need to be revitalized and best operationalized to fulfill its functions, thus giving, irreplaceable

contribution to regional economic development with the essential participation of the agricultural economy.

NOTE

1 Net primary production is a concept of ecology which refers to the part of the total energy absorbed by plants through photosynthesis. The high rate of photosynthesis is a primary factor in the tropics.

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