

Agroecology: one of the "tools" for degrowth

Agroecología: una de las “herramientas” para el decrecimiento

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Abstract —Degrowth proposes an economy and a society which means, on the ecological side, a lower consumption of energy and materials, and, on the social side, putting into effect the principles of organization based not on the priorities of the market, but on the autonomy, the care of people, reciprocity and social interaction. In agriculture, as in other areas, the voices of people have grown progressively: farmers, professionals in the field, researchers, academics, challenging the so-called modern agriculture to highlight their problems and their inability to meet the requirements and challenges faced by mankind, especially, the feeding of population and avoidance of environmental contamination. Proposals such as agroecology suggest concrete actions to build a degrowth society from agriculture. This study shows the problem that the prevailing models, monocultures, established as hegemonic, causes to society, concluding that Agroecology and Degrowth implies alternative solutions so that, as a society, we walk in search of humanity, in order to get rid of these dark times and reach perhaps the modernity that we have been searching for centuries.

Keywords—Development; Philosophy of Science; Sustainability; Technological changes.

Resumen — El decrecimiento propone una economía y una sociedad en la que, en el ecológico, baje su consumo de energía y materiales y, en lo social, ponga en vigor principios de organización basados, no en las prioridades del mercado, sino en la autonomía, en el cuidado de las personas, en la reciprocidad y en la convivencia. En la agricultura, como en otras áreas, crecen, cada vez más, las voces de personas: agricultores, profesionales del campo, investigadores, académicos, que cuestionan la llamada agricultura moderna, al evidenciar sus problemas y su incapacidad para responder a los requisitos y desafíos de la humanidad, en particular, la alimentación de la población y la contaminación ambiental. Propuestas como la agroecología sugieren acciones concretas para la construcción de una sociedad decreciente en relación a la agricultura. Se evidencia el problema que los modelos predominantes, monoculturales, establecidos como hegemónicos, causan a la sociedad, llegando a la conclusión de que la Agroecología y el Decrecimiento presentan soluciones alternativas, para que, como sociedad, caminemos en busca de la humanidad, con el propósito de algún día salir de estos tiempos de tinieblas y alcanzar, tal vez, la modernidad que tanto ansiamos desde hace siglos.

Palabras clave—Desarrollo; Filosofía de la Ciencia; Cambios tecnológicos; Sostenibilidad

I INTRODUCTION

The degrowth movement proposes an economy and a society that have, in the ecological level, a lower consumption of energy and materials and, in the social, an emphasis on principles of organization based on the autonomy, in the welfare, reciprocity and conviviality [1]. It is a provocative proposal in the context of an economic and social system with absolute and incontestable truths, but truths that are full of evidence denying them.

In agriculture, as in other areas, people's voices have grown: farmers, field professionals, researchers, academics have been challenging the so-called modern agriculture, highlighting their problems and their inability to respond to the requirements and challenges of humanity, in particular, human feeding and environmental contamination. It is a type of agriculture increasingly distanced from the needs of farmers, directed towards the interests of the concentration of power of a few companies.

Proposals such as agroecology suggest concrete actions to build a degrowth society from the agriculture. Serge Latouche, in his book "Little treatise on serene degrowth" [2], proposes a virtuous circle of eight "R", in which Re-evaluate, Re-conceptualize, Re-structure, Redistribute, Reallocate, Reduce, Re-us and Recycle are interdependent objectives that can produce a process of serene, amiable and sustainable degrowth. It is a virtuous circle that, from a different perspective, agroecology proposes for agriculture.

Agroecology and degrowth represent alternative solutions so that, as a society, we can move towards a new kind of humanity that is environmentally responsible, socially just, ecologically feasible and culturally accepted.

II CONTENT

A. *Conventional agriculture and its unsustainability*

The main threat to life amid diversity comes from the habit of thinking about monocultures.

Vandana Shiva

When mankind, or to be more concrete, some scientists and historians of the Western world determined that in the sixteenth century we had succeeded in making modern values triumph, there was the passage from the long Middle Ages to Modernity. This change of Age represented a turning point in history. Three centuries later, there was an even greater change, from Modernity to Contemporary Age, making it clear that, as a society, humanity has already reached a very high level in its evolution.

This periodicity established by historians has had very broad effects in our society, so much that it created the false sense in many areas that society – or at least some peoples or countries – had already reached the top of civilization.

Much of the successes achieved in the Modern Age are linked to the Industrial Revolution and, with it, the mechanization of human activity. The agriculture has developed along with this contemporary movement, incorporating in its practices machines and products coming from the industry, mainly of the military chemical and mechanical industry. It was the so-called "green revolution".

It also came, alongside with modern thought, neglect for everything that did not assume this modernity or did not have the opportunity or option to do. In the modernity centuries, the "new" agricultural model distanced itself so much from "traditional" practices that it ended up assuming another form of agriculture, or, as the geneticists would say, another species not compatible with those that evolved based on other precepts. This type of segregating thinking, embedded in all fields of knowledge, including education, helped add in the minds of people the idea of incompatibility between the so-called Modern and the Non-Modern.

One of the paradigms that support the new modern order is given by homogeneity, the disappearance of diversity, which corresponds to the disappearance of alternatives [3]. This process in agriculture is evident in the establishment of monocultures, in which many (species) are condemned to destruction because, according to our narrow view, they are in the wrong place at the wrong time [4].

1.1 Green revolution and world feeding

Estimates from the Food and Agriculture Organization of the United Nations (FAO) indicate that about 805 million people

are chronically undernourished in the world. This amounts to scandalous 12.5% of the world's population. In other words, 1 in every 8 inhabitants of this planet is starving [5] and, to complete the scenario, about 25,000 people die of hunger every day, of which 16,000 are children under five years old [6].

In general terms, in the long history of humanity, people have found and developed ways of adapting to the conditions of their localities, finding food and ways to prepare and maintain them in times of scarcity. With globalization, new foods and preparations have arrived to enrich diets.

However, what was in principle a breakthrough in terms of gains in world feed has quickly been transformed, turning the modern and globalized agriculture into a food risk.

The most emblematic case has been the great Irish famine, caused by the replacement of the traditional crops of the population by the consumption of a single species, the potato, from the American Andes. With the growing of a disease in the field - the blight caused by *Phytophthora spp.* -, a large part of the crops was lost, which caused the death by starvation of 2 to 2.5 million people between 1845 and 1849, in addition to an exodus of almost equal amount. This great famine was the result, in part, of the changes in "traditional" Irish agriculture, replacing it with modern monoculture.

Together with wild flora and fauna, many domesticated plants, animals, breeds selected for their milk or meat will also disappear [7]. Of the 7,000 species used in agriculture (throughout human history), today only 120 are important for human consumption [8]. According to FAO, 75% of agricultural diversity disappeared; varieties of edible plants were irreversibly lost [9]. In the United States, the amount lost is 95%. Nowadays 60% of the world's food is based on three cereals: wheat, rice and corn [7].

To aggravate the scenario of destruction of diversity and hunger, it is important to say that we are at a period when more food has never been produced before [9]. Nowadays there are more than seven billion people and a daily production of food for thirteen billion. However, there are thousands who are hungry. It is a problem of distribution, politics, conservation, productive chains, and marketing [10]. In conclusion, if you do not have the money to pay for the food, which is each day more expensive, or if you do not have access to natural resources such as land, water, seeds... you do not eat.

The latest UN World Food Program report showed that 70% of food comes from small farmers. Agriculture on an industrial scale does not feed the world; it provides only 30% of the food, but uses 70% of the resources. From the soybean and corn production, 70% is destined to the production of biofuels or animal feed. To have real food, we need to protect small farmers [11]. The conversion of feed into meat is not particularly efficient. In the case of livestock, for example,

about 13kg of feed is needed to produce 0.5kg of meat. In this way, when more the demand for meat growth, more land will be devoted to the cultivation of animal feed [12].

1.2 Modern agriculture, genetic homogenization and ecological vulnerability

The basis for the implementation of modern agriculture lies in land concentration, in which the system of large-scale production of homogeneous products can be applied by installing monocultures. Monoculture is the production of only one type of agricultural product. In this system, agriculture ceases to be a source of food for humankind and becomes a source of raw materials for industry. What it was considered food, in the "Modern" system, is re-conceptualized as Commodity. Commodity is the term used to refer to raw products (raw materials) or with a small degree of industrialization, of almost uniform quality, produced in large quantities and by different producers [13]

Monocultures are premised on uniformity, and it is, without any doubt, a risk to the world agriculture. Thus, for example, occurs when a pathogen in which the genotype is susceptible, all individuals will be affected with severe consequences for the crop [14], causing severe losses. To maintain normal levels of productivity, both long and short term, modern agrosystems require considerably more environmental control than traditional farming systems [8]. The only aspect in which the new varieties really represent a breakthrough is when applied in a widely subsidized agricultural systems [3], reason why they are called varieties of great receptivity (VGR), since its productivity is directly linked to the applied external inputs.

On the agriculture foundations (both traditional and academic), the use of diversified crops is promoted. The various productive advantages of conservation as well as the safety of obtaining harvesting products, provide the pillars of the long-standing relationship between man and agricultural

production and nature. Thus, for example, the soil surface used in agriculture was naturally covered by the typical vegetation of the site, which is the natural defense of a terrain against erosion [15]. These accompanying plants help to maintain soil life, favoring the biological fixation of nutrients (mycorrhizal, nitrifying bacteria, etc.), avoiding leaching and maintaining niches for pest balance, as well as providing other products with use value in human or animal.

The problem of monocultures is mainly given in that uniformity and diversity are not only ways of using the land, but are one way of thinking and living [3]. The allied Modernity ideology of mass communication has created the image that progress goes hand by hand with the industrial revolution. However, the concept of progress also evolved (or changed) and came to mean basically economic growth [16] and it was there, in the promise of feeding humanity, in the lie of cheap food, glared by the spotlight of the chemical and mechanical industry, that the agriculture abandoned its principles and came to mean only a producer of raw materials.

One of the most alarming evidence of the process of distortion of the monocultural agricultural system is the concentration of financial benefits in which gains from the green revolution are concentrated not on farmers (Figure 1) but in corporations that concentrate the production of agricultural technological packages, such as seeds, fertilizers and pesticides (Figure 2). The profitability of these companies is well above the average of the increase in farmers' profits, in which farmers generally earn 3.3%, and companies such as Monsanto earn 1190%.

In order to the farmers can be to compete in an increasingly crowded international market, the large-scale production is required, that is possible obtained by increasingly expensive technological apparatus [17] This increasing process of technological dependence on modern agriculture packages, are leading to a total loss of farmers autonomy, which caused the deterioration of arable land, the environment in general and left farmers at the mercy of financial capital.

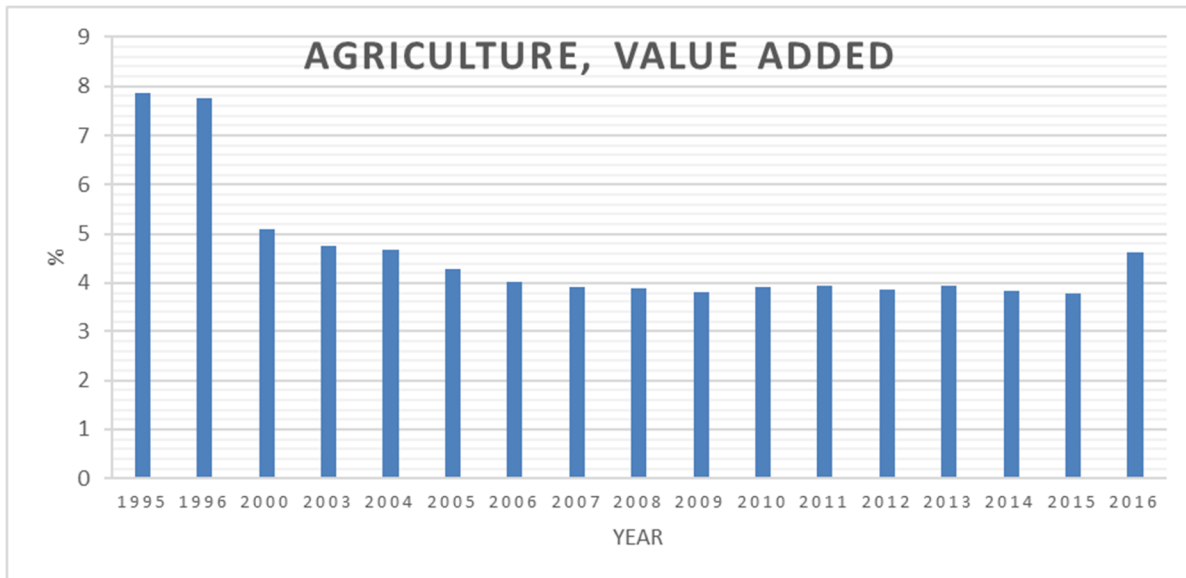


Fig. 1: Average value of gains from agriculture [18]. Agriculture included: forestry, hunt, fishing and Livestock. Value added is the difference between what the paid for its inputs and the price it charges for the product.



Fig. 2: Return value of the largest agricultural packages corporations [19]

MON (Monsanto), SYT (Syngenta), DD (Du pont), DO (Dow chemical), BFFAF (BASF), BAYRY (Bayer)

B. The degrowth proposal

1.1 Agroecology: one of the "tools" to implement the degrowth in agriculture

In the first half of the twentieth century, groups of scientists from different areas began to show that the great engine of our evolution as a society was generating problems for ourselves in the medium and long term, leaving our own livelihood at risk. The presence of economic interests above the social ones was emphasized, food production ceased to

be a priority, and above all, the idea was challenged in which man-science was at the top of evolution as a man more than modern, contemporaneous.

In the centuries that have passed within the modernity and the contemporaneity, groups that did not follow the industrial precepts, survived and continued their own evolution, developing other techniques and procedures, rising, among others, to what we now know as agroecology or agroecological approach to agriculture. Agroecology is a new science that, like all develop process, takes elements from other sciences and the history in which it has developed to build itself. In the historical process of the

emergence of agroecology as a science, it received the criticisms and contributions that helped it grow. However, many abuses and slanders arose, especially from those who did not want or could not stand that another idea of science was explaining the agricultural world in a way that was more realistic, contrary to monocultural thinking.

Most of the arguments against agroecology were brought from the times of the origin of such modernity, labeling agroecology as traditional, as a continuation of old medieval practices (or even of older eras), trying to frame the new science without recognizing its evolution parallel in modern and contemporary times. Times claimed as the exclusive property of the green revolution.

With the great evidence accumulated in the last century, contrary to the once undeniable advantages of industrial agriculture, many scientists have tried to fit into what, for them, should be the new course of agriculture, recognizing gradually the advances of agroecology, and their capacity to explain the agroecosystem. This way of thinking, the green revolution approach and behavior fits easily into a society accustomed to thinking in absolute, monocultural truths and cannot accept that the model that it supports its existence is in crisis.

1.2 The eight "R" proposed by Latouche and agroecology

The research about green revolution was important for the evolution of the agroecological thought, because the studies on the impact of this technology were an instrument that shed light on the types of prejudice that predominated in agricultural thought and development [8]. The agroecological theory and the theory of degrowth, by different routes, focused on different segments of knowledge, but with similar aims, came to propose similar alternatives for society.

The discussion on agricultural production has evolved from a purely technical approach to a more complex reading characterized by social, cultural, political and economic dimensions [8]. Hence it is necessary to deal with the excess of the system that could be translated into the "hyper-" root of "hyperactivity", "hyper-development", "hyper-production", "hyper-abundance." [2]. An approximation of these lines of thought can be seen in this juxtaposition between the proposal of the virtuous circle of the eight Latouche "R" and the proposal of agroecology represented by Altieri.

The degrowth movement proposes to apply eight "R" (Re-evaluate, Re-conceptualize, Re-structure, Redistribute, Relocation, Reduce, Reus and Recycle) as interdependent goals to generate a serene, pleasant and sustainable process of degrowth. It is a process in which many locally developed farming systems routinely incorporate techniques to accommodate agricultural crops the variables of the natural

environment and to protect them from predation and competition [8].

Re-evaluate: Conventional agriculture follows the prevailing premises of modern science. For example, it supposes that agricultural production can be understood objectively without considering the farmers and their way of thinking, nor the social systems and the agro-ecosystem that surrounds them. Further, they suppose that agriculture can be understood in atomistic form or in small parts [8]. The degrowth proposes to replace the dominant values with other more beneficial [2]. Agroecology extrapolates the one-dimensional view of agroecosystems to encompass an understanding of ecological, social and coevolutionary levels [8]. Agroecology re-evaluates agriculture by emphasizing attention in the interrelationships between the components of the agricultural production system.

Re-conceptualize. The change of values (re-evaluate) brings with it another view of the world and, therefore, another way of interpreting reality [2], just as agroecology starts from the understanding that the answers are multiple and not unique. Alternative views are more intuitive and more similar to our common sense [8].

Restructure. It means adapting the production system and social relationships according to the new scale of values [2]. Conventional agricultural practices displace nature and man from the countryside. Agroecology proposes a change from the agroecosystem to the social system, by integrating different components in order to increase its biological efficiency, productive capacity and self-sufficiency. It applies ecological principles such as increased biomass cycling. It promotes the intra and inter-species diversification in time and space, the substitution of fertilizers produced industrially by the relationships between plants, fungi and nitrogen-fixing bacteria. It replaces pesticides and insecticides with natural balance mechanisms exerted by predators and parasitoids, among others [8].

Relocation. It means, locally producing essential goods to satisfy our needs [2]. the so-called modern agricultural practices increase the gap between social and ecological processes. Conventional agricultural development has transformed ties between producers and consumers, designers and beneficiaries, researchers and practitioners, with more indirect and more distant relationships, a process that can be understood as distancing. Modern agricultural decisions are based on signals transmitted through capital markets and commodities [8]. The short agri-food chains, defended by agroecology, promote the interaction of family agriculture with the local development dynamics. The short agrifood chains refer to forms of commercialization that express proximity between producers and consumers, not only and necessarily in the spatial aspect, but to a kind of

connection that allows to provoke interactivity, making it easier for both to know the purposes of each other.

Redistribute. It would basically involve a different distribution of wealth and access to natural heritage [2]. The family properties are much more productive than the large properties, if we consider the total production and not only the yield of a single crop [8]. According to INCRA data, in Brazil 9.8% of the rural properties occupy 75.7% of the land [21], which makes an agrarian reform have a significant impact on food production and job creation. According to the IBGE in the Agricultural Census data announced in 2009, peasant agriculture currently accounts for 70% of food production in Brazil, occupying 74% of the rural labor force [22]. One of the principles that guide agroecological proposals is that of rural development based on social justice and the distribution of productive resources, focusing on family production [23], which implies a redistribution of productive resources, starting from the land and passing through the water for irrigation, inputs, credit, redistributing even the technology.

Reduce. It means doing everything possible to reduce the impact of our production and consumption on the biosphere, as well as limiting working hours and mass tourism [2]. Although proponents of biotechnology argue that the plants they produce may be resistant to various pests and able to thrive on nutrient-poor soils (thereby reducing the need for pesticides and fertilizers), the approach makes farmers increasingly dependent on corporations of "packages" of seed and chemistry. In this scenario, farmers will be automatically dependent on the chemical elements needed to sow the seeds [8], which creates an increasingly vicious cycle of consumption and dependence. Agroecological management enhances the cycling of nutrients and organic matter, optimizes energy flows, conserves water and soil, balances pest populations and natural enemies, focusing on conservation and enhancement of local resources, [8] one approach for the "reduce" it proposal by the LEISA system (Low External Input for Sustainable Agriculture).

Reuse and recycle. The best way to stop waste is to extend the life of products [2]. Agroecology is based on the understanding of natural cycles. The role of agroecosystems is related to understand and use the energy flow and the cycling of materials through the structural components of the ecosystem, which is modified through input management. The energy flux refers to its initial fixation in the agroecosystem by photosynthesis, its transfer through the system along a food chain and its final dispersion through respiration. Biological cycling refers to the continuous flow of elements from an inorganic (GEO) to an organic (BIO) and vice versa.

III. CONCLUSION

We can conclude that agroecology is a decrescent science or that degrowth is an agroecology theory.

From many branches of knowledge, the problem that the monocultural and predominant models, established like hegemonic, causes to society they are being announced and denounced. Agroecology and degrowth present alternatives solutions so that, as a society, we may walk in search of humanity, in order to one day leave these times of darkness and reach, perhaps, the modernity that we have longed for so long reach.

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